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HOW TO SUPPORT OPEN INNOVATIONS THROUGH PUBLIC POLICIES?

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ABSTRACT: Open innovation, as one of the important current trends, calls for transformation of innovation policy both at the enterprise level and at the state and regional levels. The paper presents results of the research and surveys that should be the basis of innovation policy framework in AP Vojvodina, which is illustrated in the proposed model of innovation policy. In the world of open innovation public policies have to be consistent with the behavior of innovative companies and external conditions which motivate companies to engage in open innovation. In accordance with that, innovation policy should be improved through intersectoral linkage of different areas, subjects of innovation activity, as well as countries in the region. It significantly affects the transformation of many familiar drivers of innovation process (intellectual property rights, capital markets and cooperation between universities and companies) and the policy instruments too.

KEYWORDS: Innovation policy, Open innovation, SME, Government, Intellectual Property

INTRODUCTION

Chesbrough defines open innovation as [2], [3] the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology.

An examination of open innovation in the context of national innovation systems could more clearly identify both the prerequisites for and limits of open innovation, and make explicit linkages between these institutions and practice. The aim of the research, whose part is represented in this paper, was to develop the model of innovation policy based on the Open Innovation concept, which should improve current situation in Serbia, through connecting all factors of innovation process, and with purpose to enlarge existing effects.

PUBLIC POLICIES IN THE CONTEXT OF SUPPORTING OPEN INNOVATION PROCES

From the very limited research on open innovation at the state and regional level, it could be seen that current government policies in many countries already contain many elements to support it. The Open Innovation model inevitably influences to traditional policy making, but does not completely upset it. Current state innovation policies already reflect many aspects of Open Innovation. These are [4] policies to offer financial research and development incentives, to stimulate interaction between actors in the innovation system, to better secure innovating enterprises' access to finance, and to generally stimulate competition. Other guidelines which are frequently found are support for regional clusters and to organize the diffusion of scientific knowledge. Open Innovation broadens the scope of policymaking. It is influenced by a rather broad set of policy areas outside the traditional domains such as labor markets and education. [4] It will be a challenge for policy makers to develop truly lateral policies and to find out how to effectively influence all policy areas.

General question is how important Open Innovation should be to guide policymaking. The experiences of European Union countries show tendency to a broadening of the scope of their policies towards support the open innovation model. Developing countries, from the other side, have other priorities for policymaking due to the relatively under-developed innovation institutions. In such countries have to developed basic innovation and interaction instruments in the first phase. The next step should be more sophisticated instruments such as development of technology markets, stimulation of corporate entrepreneurship, etc.

As the part of VISION-Era Net project [4], a group of researchers has developed a framework, where the most important guidelines of policy, which refer to Open Innovation, are identified. That

framework is applied on three countries, members of Era-Net network - Netherlands, Belgium and Estonia. The aim of the research was to define basic dimensions of Open Innovation, elements to legitimize development policy of Open Innovation, guidelines that are already present in current policies and what it is that could be developed further, as well as, from the comparison of policies of these countries, best practices, from which other countries could learn.

In the world of Open Innovation, public policy has to be complied with the behavior of innovative enterprises and with external conditions which motivate enterprises to practice them. Key behavioral aspects of enterprises in Open Innovation, that has been identified, are:

- forming networks;
- collaboration;
- corporate entrepreneurship;
- intellectual property management; and
- research and development.

The three basic external conditions, that motivate enterprises to get involved in Open Innovation, are:

- great amount of basic knowledge;
- highly educated and mobile work-force; and
- good access to financing.

If innovations are accepted as the open process in which companies systematically look for inflows and outflows of knowledge that certainly has implications on creating and implementing all policies, by which innovations are supported. In this context are identified policies, which has the most influence on Open Innovation (and the other way) and which, because of it, will be exposed to changes. Those policies are [4]:

- entrepreneurship policy;
- science policy;
- policy of intellectual property protection;
- competition segment policy;
- labor market policy; and
- policy of interaction.

Results of this research in Netherlands [4] have shown that, although innovations and economy of knowledge are among major pillars of Dutch government policy and innovative performance of that country can be considered good on the basis of different facts, there are still challenges that Dutch government faces with (private investments in research, development and innovations has to be considerably enlarged, lack of highly educated people, especially in technological areas, low level of interaction, valorization of research results). Netherlands has adopted strictly systematical approach to innovations in its policy. The system of Dutch policy already offers a broad range of guidelines which are referred to Open Innovation, but the challenge will be to develop or stimulate policies for: support for standards, support for customers' innovations, development of interaction skills, strengthening of technology markets, support for corporate entrepreneurship and creation of balanced drivers for research.

Research in Estonia has shown that in its development this country has passed through fast development of basic institutions and specific policies in two time frames. In the first one, the accent was on the development of basic institutions, structures of the country and transition (from the beginning until the middle of 1990s), which supposed the lack of coordination and synergy among different policy areas, which demand the Open Innovation context. From the middle of 1990s, bigger accent was on the development of coordination and capacity for achieving efficient horizontal policies (like Open Innovation). Considering that this kind of innovation policy is in function for a short period of time, there are no possibilities for its results analyses.

Applying the framework defined by VISION-Era Net project in Serbia, through analysis of state in identified areas, results show the following condition:

- investments in science and technology are limited;
- there is a positive improvement in number and quality of published papers, but no critical mass in any of domains;
- the age structure of researchers is worrying;
- there is a weak connection between science and industry;
- the current state in the area of intellectual property protection is also unfavourable;
- the number of registered patents is low and there is no technology market;
- in the area of education, not enough attention is focused on entrepreneurial and life-long learning;
- the industry functions on the basis of still unfavourable economical structure, with given natural and financial resources, technology and people;

- labour market shows the big degree of unemployment, huge redundancy of HR, slow rise of number of employees in private sector, weak mobility of work-force and lack of flexible forms of work;
- in the competition area, law on protection of competition is in its starting phase of application;
- all of this is also characterized by weakly developed interaction policy.

These are all elements which point on very limited range of guidelines that refer to Open Innovation, but their development or stimulation is going to be the challenge.

RESEARCH OF INNOVATION POLICY FRAMEWORK BASED ON OPEN INNOVATION IN AP VOJVODINA

In order to identify the existence of open innovation elements, as well as the role of the government in creation of innovation policy, the first survey of its kind is conducted in AP Vojvodina. The research included companies and policy makers and policy performers in the field of innovation. [8], [9], [10], [11].

Within the survey three groups of companies were interviewed: companies included in the Programme for co-financing plants for the application of new technologies in Vojvodina launched by the provincial government; spin off companies from Scientific and technological incubator at the University of Novi Sad and large privatized enterprises.

Within the policy makers and policy performers were interviewed: state and regional ministries responsible for science and technology; state and regional ministries responsible for economy; intellectual property agencies; chambers of commerce; Vojvodina Investment Promotion Fund (VIP); Business Advisory Service Program (BAS); University of Novi Sad representatives.

The focus of the interview was to find out their view on the concept of open innovation, the problems they have, as well as the level and quality of the governmental support in solving these problems in order to find improvements for policy making that would be based on the open innovation concept.

The interviews have been done with 23 companies in the period of 6 months (from February to July 2011) and 16 companies responded to interview, which is 70% of the surveyed sample. The respondents were at the position of directors or the persons responsible for innovation and technology development of the company. The same questionnaire, which consisted of 47 questions, was used for all companies. The questions were structured in three parts:

- first part consisted of the general questions about the company, forms of its organization concerning the research and innovation, previous innovation activities and cooperation with public institutions as well as their view on future development of their innovation activities;
- second part consisted of questions about their understanding of the Chesbrough definition of open innovation [2], their engagement with open innovation and cooperation with other companies in exercising innovation activities (if they were engaged in open innovation, what were the reasons for that, what problems they had, intellectual property protection issues etc.);
- third part consisted of questions about the need for government intervention in open innovation support, existence and quality of government measures to support open innovation and proposals for improvement in future.

The interview with policy makers and policy performers consisted on same questions concerning the definition of open innovation, their view on the problems that companies have in cooperation and innovation activities, measures taken to solve these problems and their view of future development. There were also group of specific questions on open innovation elements depending on the field of responsibility of interviewed institution (science, economy, intellectual property, university-economy relation etc.).

Most of the interviewed companies see open innovation as the collaborative effort with a number of individuals outside their organization to work on a project for mutual gain. The companies were mostly engaged in the acquisition of knowledge from outside sources, strategic alliance and collaboration and co development. The most important reasons for engagement in open innovation were their wish to bring “fresh blood” into the project to benefit from their different approach as well as believe that multidisciplinary approach could produce more successful output. Concerning the intellectual property issues most of them think that the existing system of protection does not provide high level of legal certainty, that the costs of transmission are high and that the existing system does not encourage market exchange of technology. The problems in practicing open innovation that they emphasized are:

- insufficient resources to implement innovation;
- obsolete technology;
- untrained staff ;
- difficulties to enter to the new market;
- more easily are accepted established and proven solutions;
- problem of the collection of patents (it is best to sell it together with product, it increases the value of the product, it is not easy to sell the patent itself).

Most of companies think that open innovations are important for economy of the province and that government should intervene in their support. They also think that there are not enough government policies or actions for raising awareness on their importance. [6], [7]. The most common mentioned proposals for improvement are:

- adoption and implementation of appropriate legislation,
- greater financial support, subsidies to expert employment,
- support in collaboration of interdisciplinary teams,
- organization of expert meetings and seminars as well as
- promotion of the application of useful innovations.

Policy makers have the same view on the open innovation definition and they agree that open innovations are important for the economy of the province. They also think that government should intervene. The actual government measures mostly encourage innovations that come from outside compared to those that domestic companies can sell to others. Most of them said that there are some measures that support innovations, but they agree that there are not enough measures that support open innovation which are not easy to use. The instruments that government should use to:

- make clusters with aim the fluctuations of ideas,
- stimulate innovative solutions for holders of innovative activities,
- reduce fees for patents,
- subsidize the costs for the introduction and application of innovations,
- organize trainings and seminars,
- strengthen cooperation between the research institutions,
- companies and consultants from different fields with aim to make research closer to economy,
- support in-house innovation and innovation coming from outside by innovation vouchers,
- create an environment that will motivate people,
- engage in innovation and to motivate the investment of private capital providing financial support through innovative funds.

THE INNOVATION POLICY MODEL

With this purpose, and on the basis of previously described researches, the following model is proposed, which anticipates all elements of Open Innovation, contributes to connecting all factors and has the enlargement of effects of innovation process, as the final result.

As basic areas of public policy, which should affect on driving Open Innovation in Serbia, have been identified policies in areas of science, research and development, education, economy and labor market. Each of identified policies by its measurements can influence on reaching more goals, which should be realized so favorable environment for stimulating Open Innovation could be created. Different ministries are in charge of each of identified areas, but for goal fulfillment, it is necessary collaborative work and measurement coordination of more ministries together. On the Figure 1, by differently colored arrows, is shown on which areas policy affects identified goals [12].

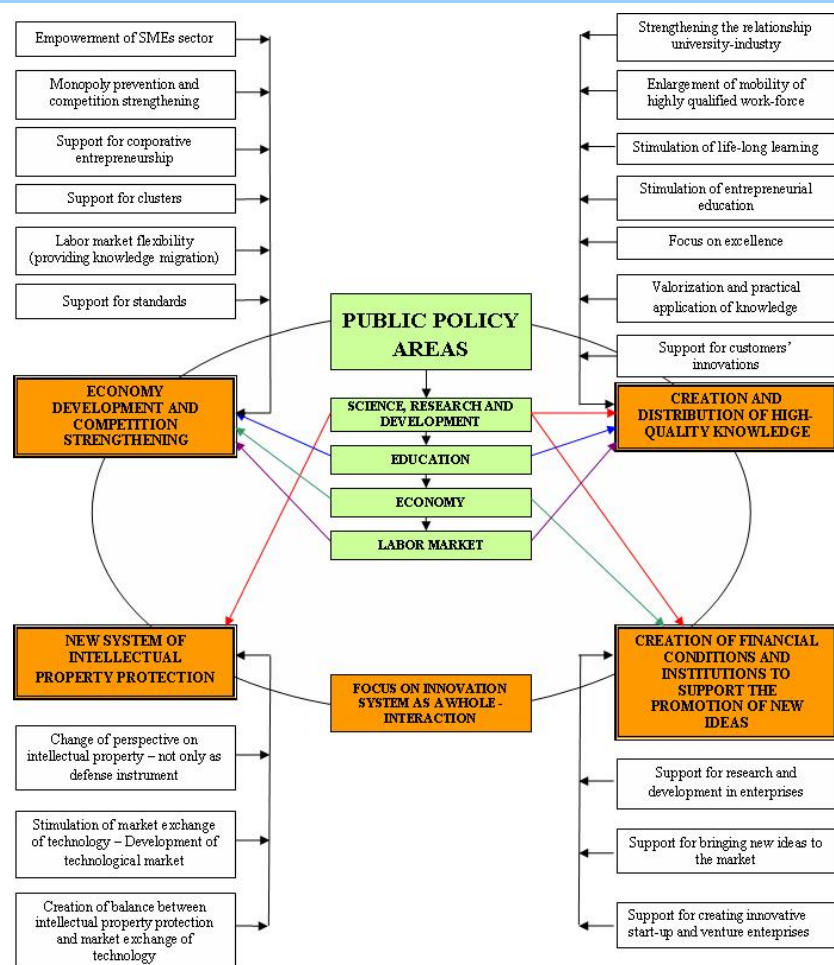


Figure 1. Public policy areas with focus on innovation [12]

Empowerment of SMEs sector, monopoly prevention and competition strengthening, support for corporative entrepreneurship, support for clusters, labor market flexibility and support for standards,

are the segments of first goal, whose development should be motivated by measurements identified policies. Segments of the second goal are strengthening the relationship between universities and industry, enlargement of mobility of highly qualified work-force, stimulation of life-long learning and entrepreneurial education, creation of knowledge base, focus on excellence, valorization and practical application of knowledge and support for customers' innovations. Third goal embraces segments of support for research and development in enterprises, support for bringing new ideas to the market and support for creating innovative start-up and venture enterprises. Segments of fourth goal are the change of perspective on intellectual property, stimulation of market exchange of technology and creation of balance between intellectual property protection and market exchange of technology.

Area of science, research and development has the influence on the most of goals which should be realized, primarily on creation and distribution of high-quality knowledge, as well as on new system of intellectual property protection, and on creation financial conditions and institutions to support the promotion of new ideas. Area of education, by its measurements, also has the influence on creation and distribution of high-quality knowledge, as well as on the economy development and competition strengthening through life-long learning of employees and higher level of education in society. Area of economy is directly concerned with economy development and competition strengthening, and also provides financial conditions and institutions to support the promotion of new ideas.

In this moment in Serbia, for policy creation in previously specified areas, the following ministries are in charge: Ministry of Science, Education and Technological Development, Ministry of Economy and Regional Development and Ministry of Labour, Employment and Social Policy, as well as certain provincial authorities in Autonomous Province of Vojvodina (Provincial Secretariat for Science and Technological Development, Provincial Secretariat for Education, Administration and National Communities, Provincial Secretariat for Economy and Provincial Secretariat for Labour, Employment and Gender Equality), and in relation with new system of intellectual property protection, Intellectual Property Office of the Republic of Serbia has the direct jurisdiction.

Four basic goals which should be achieved by policy measurements are:

- economy development and competition strengthening;
- creation and distribution of high-quality knowledge;
- creation of financial conditions and institutions to support the promotion of new ideas;
- new system of intellectual property protection.

There is pretty developed institutional frame in Serbia. Measurements which have been developed so far, mostly referred to institutional capacity empowerment (institution establishing and HR training), and less to direct financial support to enterprises for innovative activities. However, it is evidently that Open Innovation demand more than financial instruments. Because of that, it is considered that further development of measurements the policy, which based on Open Innovation, apart from creating financial conditions through tax stimulus, credit lines and funds of venture capital, should be focused on:

- Strengthening the interaction among all actors of innovation system, as well as development of corporative entrepreneurship, connection and collaboration among enterprises (e.g. to strengthen activities of existing institutions, like chambers of commerce and industry or agencies for regional development, which stimulate connection of the activities of different enterprises and other actors in the innovation system on the regional and national level). Examples of these measurements in Netherlands are: measurements SINTESES, ROM and Peaks in the Delta;
- Implementation and strengthening the measurements which refer to collaboration between science and industry and the valorization of that scientific knowledge (e.g. subventions for innovative programmes which involve more candidates, to stimulate interaction and spreading of scientific knowledge, to give financial stimulus to their R&D efforts, and to create a focus and mass of fundamental research in selected key areas; stimulating knowledge transfer into SMEs, improving interaction between SMEs and public research organizations - universities, technology institutes of the state, through vouchers for that purpose; subventions for innovative projects and programmes which have a goal to exchange knowledge, performed by consortium of one or more education institutes and one or more SMEs; support for start-ups based on technological programmes, through creation of favorable environment inside and outside of state research organizations - universities and other institutes; research grants, with the clause that their proposal includes the implementation of valorization of results into society). Examples of these measurements in Netherlands are: Innovation vouchers, RAAK (Regional Attention and Action for Knowledge circulation) - public private partnership, Valorization grants, Techno partner, Technological institutes and foundations, OASE - Open source of software;
- Creation of high-quality and mobile work-force through courses of entrepreneurship on all levels of education and improving the mobility of work-force on relation university-industry (e.g. forming knowledge networks in collaboration with regional enterprises, with special focus on

SMEs: application of research activities in SMEs; spreading knowledge in SMEs to improve the quality of expertise education through learning to perform research). Examples of these measurements in Netherlands are: Lecturing, Learning through work, Entrepreneurship and education action programme, Casimir-scheme of mobility and Migration knowledge desk;

- Strengthening consciousness of intellectual property and promotion of intellectual property usage and development of technological market. In most of named countries there are few policy measurements which stimulate proactive intellectual property management. There are usually financial drivers for getting the patent, but not for stimulating trade with them. To accomplish this, it is necessary first to develop system of intellectual property protection through informing and sharing information about patents through courses, brochures, presentations and workshops; sharing information about the way of using patent database; information services for SMEs, as well as training programmes and consultancy service for developing skills for usage of information about patents in SMEs and citizens; increasing knowledge in SMEs about standardization and increasing the number of SMEs involved in standardization process. Examples of these measurements in Netherlands are: OCNL - Dutch office for patents, Informing about patents project, NEN - organization for standard establishment, Projects for strengthening consciousness of standards;
- Support for customers' innovation, the way which represent new area that is still no covered with policy measurements in none of examined countries. In this area, it is clear that financial instruments are not the most important means for its development. The most of the customer-innovators modify or develop techniques, equipment or software to satisfy better their own needs. They share their innovations with others for free. Measures to support this activity should primarily be focused on creating the environment, or external conditions, that enable it. Examples of these measurements could be the government support in creating technological platforms, customer communities and storages of common intellectual property.

CONCLUSIONS

This is a pioneer research in the field of open innovation policy in AP Vojvodina. Having in mind low level of development of its innovation system, its economy burdened with many problems and financial constrains, this study has many limitations. A relatively small number of companies are engaged in innovation, and fewer practiced the application of open innovation in their work. Existing innovation policy in AP Vojvodina is insufficient affirmed and more in function of collecting political points rather than the development of enterprises innovation activity. From the results of interviews could be seen that the existing support from the provincial government was primarily financial, through the programme of plants for new technologies, support for clusters and finance of university research projects.

Even though it was the research with many limitations, its results showed that the government can play an important role in open innovation. This is not only giving money but support companies in the development of new ideas. There can be identified a gap between the instruments the government want to use and the government really use. To strengthen start ups and small and medium enterprises the government has to invest more to reduce the risks of start ups and companies. Companies recognize the need for open innovation, but only participate in open innovation when it is necessary for the production process. Because companies do not actively collaborate with knowledge institutes other than is necessary for the production process, companies do not know which knowledge is available and do not use this knowledge. The step forward in future should be the development of new model of innovation policy in the province improved by open innovation elements.

In this paper is proposed the policy model based on Open Innovation in Serbia, which should support increasing the number of actors in innovation transfer, the number of realized innovations and knowledge flow.

Through analysis of European countries' experience [4] in creating innovation policy based on the Open Innovation concept and comparative analysis with elements, which exist in these areas in Serbia, the model of policy based on the principles of Open Innovation in this country.

Considering that in the basis of the proposed model is the creation of innovative environment, where, by opening the boundaries of enterprises, will be created conditions for interaction of larger number of innovative subjects, that exist in that environment. Results of the research in enterprises in Serbia confirm the need for expansion of the collaboration with more actors in different organization forms. This should provide the usage of innovation capacities from more sources, significant improvement of innovative performances of the country and its competitiveness in international frames. Considering the fact that in Serbia there is still undeveloped and incomplete innovation system and that the economy of Serbia is not innovatively competitive, many constraints of this model are taken in the account.

These constraints could be expected in the meaning of difficulties in creating political consensus for the realization of this model, while effects of this kind of policy can be shown after long period of time, which is not attractive for achieving fast political points in the elections cycles. Considering that the application of this model requires the coordinated activity of different authorities and adoption of legal acts, in whose proposal and development more subjects take part, the limits in achieving coordination and compliance of their actions can be expected. Constraints could be seen also in the model testing, because the innovation policy based on this model is not yet in function, so it is too hard to carry out tests of its successfulness in this phase.

Further research should be focused on the examining of practice of Open Innovation on the level of the specific industry. Further development of tools is also necessary, as well as testing through quantitative research on bigger sample of enterprises. In that sense, it should be mentioned that this paper has no aim to statistically generalize bigger sample, but represents an attempt to, through case studies, illustrate the theory and to expand existing knowledge about his phenomenon.

Considering that Open Innovation require the functional system of intellectual property protection and efficient market of intellectual property rights, important directions of further research are protection time (when innovation protection is being performed), partnership and collaboration in the protection process, as well as change in perspective on intellectual property protection (openness and protection are not opposed categories).

REFERENCES

- [1] Andersson and Karlsson (2004) *Regional Innovation Systems in Small & Medium-Sized Regions, A critical Review & Assessment*, CESIS Electronic Working Paper Series, Paper No. 10, p.5
- [2] Chesbrough, H. W (2006), *New puzzles and new findings*. In H. W. Chesbrough & W. Vanhaverbeke & J. West (Eds.), *Open innovation: Researching a new paradigm: 15-33*. Oxford: Oxford University Press.
- [3] Chesbrough, H , (2003), *Open Innovation: The new imperative for creating and profiting from technology*, Harvard Business School Press: Harvard, MA
- [4] De Jong, J.P.J., W. Vanhaverbeke, T. Kalvet & H. Chesbrough (2008), *Policies for Open Innovation: Theory, Framework and Cases*, Research project funded by VISION Era-Net, Helsinki: Finland.
- [5] Freund, R. (2010) "How to Overcome the Barriers between Economy and Sociology with Open Innovation, Open Evaluation and Crowdfunding?" *International Journal of Industrial Engineering and Management (IJIE)*, Vol.1 No 3, pp. 105 - 109.
- [6] Freund, R. Anisic, Z. (2011): *Managing Uncertainty: The Key for Open innovation*. Proceedings of the 6th Worldconference on Mass Customization, Personalization and Co- Creation, San Francisco, USA.
- [7] Freund, R. Chatzopoulos, C., Lalic, D. (2011): *Reflexive Open Innovation in Central Europe*", Proceedings of the 4th International Conference for Entrepreneurship, Innovation, and Regional Development (ICEIRD2011), Ohrid, Macedonia.
- [8] Koldžin, D.(2009), *Creation of Regional Innovation Policy in AP Vojvodina*, proceedings of the XVI international conference „Technology, Culture and development“, Palić, Serbia, ISBN 978-86-904137-8-2, pp. 214-224
- [9] Koldzin, D., Anisic, Z. (2009): *Creation of Regional Innovation Policy in AP Vojvodina - Improvement of Innovation Policy Based on the Open Innovation Concept*, Proceedings of the XVI International Symposium „Technology, Culture and Development“, held in Palić 31st August - 2nd, ISBN 978-86-904137-8-2, pp. 224-233
- [10] Koldzin D. (2010) *Government instruments to support open innovation - Experiences from EU Countries*, Proceedings from 4th International Conference on Mass Customization and Personalization in Central Europe (MCP-CE 2010), Novi Sad, Serbia, ISBN 978-86-7892-277-0, pp. 106-111
- [11] Koldzin, D., Anisic, Z. (2011): *Contribution to the research of the innovation policy framework in AP Vojvodina based on open innovation*, Proceeding XV International Scientific Conference on Industrial Systems, Novi Sad, Serbia, September 14/16, 2011. ISBN 978-86-7892-341-8, pp.71-77
- [12] Koldzin (2012): *Development of the Innovation Policy Model Based on Open Innovation Concept - Ph.D. thesis (in Serbian)*, FTN, Novi Sad

