FACTA UNIVERSITATIS
Series: **Economics and Organization** Vol. 14, N° 4, 2017, pp. 345 - 357
https://doi.org/10.22190/FUEO1704345J

Review Paper

MODEL OF OPEN INNOVATIONS AND SMALL AND MEDIUM-SIZED ENTERPRISES DEVELOPMENT

UDC 330.341.1:334.012.63/.64

David Jovović

University of Kosovska Mitrovica, Faculty of Agriculture, Kosovska Mitrovica, Serbia

Abstract. *The paper discusses characteristics of the model of open innovations as an inseparable part of operations of contemporary enterprises and their influence on the development of small and medium-sized business. It starts from the viewpoint that small and medium-sized enterprises make great efforts to use their potentials for growth and development in the best possible way by using the model of open innovations. These efforts involve reliance to own innovation activities and use of external sources of innovations, i.e. the sources which promote the chain of values through external commercialisation of the right to intellectual property at their disposal, as well as commercialisation of the knowledge and innovations of others. These business entities have certain advantages in the innovation process which make them a suitable partner for network connectivity, since they are less bureaucratically organised and often have a pronounced motive to be more successful than large enterprises.*

Key words: *knowledge, innovations, concept of open innovations, small and medium-sized enterprises*

JEL Classification: O30

INTRODUCTION

In economic theory, the phenomenon of innovations has received great attention for the last twenty years. This is understandable when it is known that the capability of innovation predominantly determines possibilities of growth and development of enterprises and economy as a whole. Only those economies with a great number of enterprises which efficiently

Received August 28, 2017 / Accepted October 16, 2017
Corresponding author: David Jovović
University of Kosovska Mitrovica, Faculty of Agriculture, Serbia
E-mail: jovovicdavid1@gmail.com

commercially transform knowledge into innovations can provide high employment rate and income of the population, thus creating conditions for future sustainable economic growth.

Traditional model of business activity of an enterprise which functioned until the end of the twentieth century implied a model of closed innovations. The innovation activities of an enterprise were determined by the knowledge and technology at their disposal. The enterprises were not extremely interested in changing their successful business model and the established relations with their customers (Greenhalgh & Rogers, 2011). The enterprises tried to optimise the time of promotion of new products, which would provide new values for customers and creation of competitive advantages on the market (Mroczkowski, 2012).

The advanced development of science and technology, mass use of increasingly powerful information and communication technologies and the Internet, the availability of the large amount of information and knowledge, the change of structure and mobility of labour, market globalization, changes of habits, needs and wishes of customers, as well as a whole series of events directly or indirectly conditioned by globalization led to gradual obsolescence of the closed business model, and hence the concept of closed innovations in the last decade of the previous century. According to a more comprehensive explanation, business model is a system which shows how an enterprise selects its customers, defines and adjusts its activities, classifies jobs that should be done in and out of the enterprise, optimises its resources, comes on the market, creates products and services for its customers and makes profit (Pourdehnad, 2007). The open business model supports and improves cooperation with the environment, exchange of ideas, knowledge, means and technologies, intensifies innovative activities of an enterprise and better satisfies the needs of customers (Rahman & Ramos, 2011).

The model of open innovations (OI) was developed in order to enable an enterprise to respond to current demands related to innovation activities, development of new products, services, and markets, new methods of satisfying customers, protection and use of intellectual property. The model respects the necessity of mutual connection and cooperation between various enterprises in order to decrease potential risks and expenses of not only innovative activities but also entire business on the one hand, and on the other hand increase the efficiency of innovation process at the same time (Rahman & Ramos, 2011).

Besides numerous influences on the development of business in this century, the affirmation of the OI model significantly contributed to the promotion of a great number of new small and medium-sized enterprises (SMEs) which, thanks to joining ideas and necessary resources became an increasingly respectable segment of world economy. For example, the contribution of SMEs in the non-financial business sector is considerable in the EU. SMEs make up 99.8% of all enterprises, 57.4% of value added, and 66.8 % of employment. In 2015 just under 23 million SMEs in the non-financial business sector generated €3.9 trillion of value added and employed 90 million people (Annual Report on European SMEs 2015 /2016, p. 3).

With their flexibility and speed of reaction, SMEs reduce the time necessary for a new product to be developed and offered on the market. New model of business activity involves not only competitiveness between various enterprises, but also cooperation through diverse forms of strategic partnership, as well as creation of other more or less formalised forms of business cooperation. The establishment of cooperation on other bases is especially significant in the domain of innovations where the knowledge transfer has become fundamental for successful innovation process.

Both developed and developing economies focus on innovations, thus competing globally for talents, resources and market shares. Information trends and networks are spread over borders in the processes that were inconceivable before the development of the Internet, such as global introduction of mobile telephony and social networks and rapidly increased access to the Internet. Business models are redefined, jobs are redesigned and the number of SMEs increases (OECD, 2010).

SMEs are a driving force of contemporary economies due to the contribution which is reflected in technological innovations, employment, increase of export, dynamics of competition, etc. The capabilities of SMEs for innovations are of great significance because innovations provide competitive advantage to the enterprise, its branch of activity and economy as a whole. New and existing innovative SMEs contribute to the increase of productivity and competitiveness of economy, thus ousting the enterprises with lower productivity. Innovation is a powerful means for new SMEs to successfully come on the market and change current situation, while allowing the existing enterprises to maintain or improve their position on the market thanks to improving their innovativeness. Innovative SMEs participate in the knowledge transfer within the innovation systems, less as passive knowledge users and increasingly as the significant source of knowledge.

Bearing in mind the previously explicated statements, the aim of the paper is defined as an attempt to explain closer basic characteristics of the OI model and especially its significance for the development of SME sector.

Besides the introductory comments, conclusion and the literature references, the structure of the paper includes three sections. The first discusses the commercialised knowledge of innovations as a driver of economic development and specific source of dominance in contemporary conditions of manufacturing. The second explicates the logic of the OI model with special reference to commercialisation of knowledge in innovations often created outside of an enterprise. Finally, the third section investigates the advantages and limitations of the application of the OI model in SMEs.

1. The Commercialized Knowledge of Innovations Initiates Development and Becomes the Foundation of Economic Power

Throughout a major part of human history the management of territories and property over natural resources was the symbol of power and wealth of some countries. This began to change after the industrial revolution at the end of the eighteenth century. With each stage of technological development, the importance of knowledge increased in comparison to physical production factors (Mroczkowski, 2012). Nowadays, small countries without natural resources can have enormous economic potential, primarily thanks to their capability to commercialise knowledge of innovations. In last decades, mutually dependent and connected, radical technological innovations led to basic changes of economic structures and change of position of certain countries on the list of the most developed counties in the world (Cvetanović et al., 2012).

At the turn of the twentieth century it was traditionally considered that the research at universities or by independent researchers should be outsourced by industry (Haules, 1999). Even for pharmaceutical industry, which, at the time, dominated over commercial valorisation of knowledge this was the most favourable method to conduct scientific

research until the First World War. It was in the years between the two wars that the activities of research and development (R&D) gained affirmation within leading companies in industrially superior countries such as the USA, Germany and Great Britain (Mroczkowski, 2012).

The closed model of innovations functioned relatively well for some time. However, the competition in discovering optimum innovation processes especially intensified in the second half of the past century (Rotwhel, 1992). Many authors think that the period from 1950s until the end of the twentieth century includes five generations of innovations. Each of those generations was meant to improve or continue the previous model (Trott, 2002).

The innovations of the first generation were predominant in the nineteen fifties and sixties. They were based on the idea of R&D within a company as a key source of new technological solutions. Innovative solutions were a direct result of commercialisation of scientific discoveries which were made at enterprises. The model absolutely neglected customer and market needs as drivers of innovative activities in an enterprise.

In the nineteen sixties the second generation of innovations was promoted. This was also an innovation process with the linear trend but based on demands, i.e. unsatisfied market needs.

The idea which initiated the third generation of innovations was feedback. Communication and feedback together connected science and technology with market demands. The task of innovation process management primarily included promotion of integration within the sector of research and development, related to sales and market research.

The fourth generation of innovations was a result of increasing competitiveness between enterprises. Time became a significant factor of competitiveness, as well as the capability of an enterprise to provide quality standards and elicit ideas for improvement of innovativeness from customers and suppliers. At the same time, the enterprises realised that integration in R&D domain was a significant presumption of their technological and economic progress.

The fifth generation started in 1990s. It differed from the previous ones in its simultaneous occurrence, not following the foregoing generation. It arose in the period of significantly higher risks as a result of the increasing economic globalization. Due to the nature of such environment, enterprises had to maintain high levels of flexibility and responsibility.

With the help of open business models, enterprises can create significantly more ideas and include them in the process of creation of added value with external environment by using various methods. The knowledge that is transferred to other business partners on commercial basis provides enterprises with efficient use of own knowledge in the situations when they believe they cannot commercialise it (Chesbrough, 2007).

Out of five models, the first four belong to the category of closed innovations, since they are all characterised by the fact that the enterprise realises the activities of innovation process within the framework of own resources, while the fifth model is represented by OI (Chesbrough, 2006). Naturally, the mentioned generations of innovation process cannot be treated as final. On the contrary, "with great amount of confidence it can be stated that creativity and innovativeness are going to be most appreciated as both personal and group identifiers and the most reliable 'ticket for future' to each upcoming inhabitant of this

only planet. Therefore, future analysts of these issues will certainly speak about the sixth, seventh, eighth and who knows which generation of innovations" (Pokrajac, 2010).

The network model is in fact a kind of open innovation because it relies on externalisation in order to complete the activities necessary for the continuation of an innovative process. "The networks that exist between various enterprises are the means by which they join or exchange procedures and work together on the development of new ideas and abilities. The cooperation between enterprises in the domain of innovations can include the scope of tasks from the simplest (joint purchase of necessary inputs) to the most complex (cooperation in research and development activities) in the overall process of development and commercialisation of innovations. In cooperation it is possible to decrease risks and expenses, while at the same time increase the effects of development of innovations, hence it is often connected with their successful commercialisation. The level of cooperation depends on harmonisation of the available means, capabilities and business strategies of partners, which is reflected in transparency of the mutually set aims and abilities of the involved enterprises to fulfil them" (Cvijić et al., 2013).

The twenty-first century has brought enormous growth of economies led by innovations. New forms of competitiveness have begun to completely reshape the market of knowledge and innovations into global market which develops some new tendencies. The increasing expenses of R&D in public and private sectors lead to the increase of knowledge offer, i.e. the production of knowledge has become global industry. In turn, global competitiveness, especially in the sector of new technologies continues to increase the demand for knowledge. In fact, enterprises have entered global race for market-attractive innovations in the branches such as energetics, bio-pharmacy, new materials, and electronics. Multitude of institutions are involved in this competition at various locations where new knowledge is being created. This wide circle includes private enterprises, consulting sectors, state laboratories and numerous universities. All those organisations compete to find the fastest and most efficient routes to new knowledge – the knowledge that may be transformed in new or better products and services for the customers worldwide (Narayanan, 2001).In short, new ideas transformed into innovations are a key premise of economic success at all levels. Bearing this fact in mind, a theoretician of economy of knowledge, Paul Romer (2007) brilliantly noticed that the so-called meta-ideas were the most important for economic and social progress in this century. According to Romer, meta-ideas are related to how to support the production and exchange of other ideas. Pointing to the fact that the British invented patents and copyright in the seventeenth century, while citizens in the USA designed research at universities and practically first applied many significant innovations in the agriculture in the nineteenth century, and initiated rapid development of new models of research in the twentieth century, Romer comments that designing the institutions which will provide higher level of R&D activities in private sector is a challenge for industrial countries in this century. Globally networked innovation is exactly such a meta-idea for the twenty-first century. Therefore, innovativeness is becoming a priority in the actions of an enterprise. "Every enterprise should consider how to change its position from 'competitiveness for existence' to 'competitiveness for achieving preferential position' thanks to defining future innovative value which involves new business, economic and social-cultural models" (Lalić et al., 2012, p. 238). The model of OI is undoubtedly a significant instrumentation on this pathway.

2. THE OPEN INNOVATION MODEL

The OI model provides the growth of innovativeness due to the fact that it integrates creative potentials of a large number of people. Good ideas and inventions come from various, unexpected locations, not only from research laboratories, but also from other organisational units, from customers, suppliers, joint ventures, even from the public (Smith, 2006).

The OI model is an integral part of contemporary business model of an enterprise. The concept has vitally changed a predominant model of designing innovations in this century. Chesbrough (2006, p. 1) defines the OI model as utilisation of meaningful influx and drain of knowledge in order to advance internal innovations and their market extension based on external innovations. A number of analysts go a step further considering the OI model more complex than mere use of external ideas and technology. In their opinion it is the change of model of utilisation, management, employment and creation of intellectual property (West & Gallagher, 2006, p. 351).

The initiating idea of the OI model is a strategy of business enterprises based on commercialisation of knowledge of innovations, created often outside the organisation. Enterprises have to be capable of using both internal and external innovations in a profitable way (Afuah, 2003). Due to the fact that a great number of innovations are in an enormous network of inventors, these abilities of enterprises are mostly in the function of successful management over partnerships and network transactions (Cvetanović, 2011).

The OI model assumes that enterprises can and should use not only internal ideas and knowledge, but also external ideas and knowledge together with external and internal means for commercialisation of ideas and knowledge on the market. Many tools which are applied in the concept of OI (e.g. licensing, joint agreements on research and development, business angels, venture capital, "spin-off", etc.) appeared long before the model was realised in theory and practice, and they completely fitted in this model.

In the OI model, the innovation has to be adjusted to global environment. It has to enable internal or external knowledge transfer and include all stages of development (Rahman & Ramos, 2011, p. 471). The OI model develops in globalized environment where knowledge becomes widely available thanks to connections (primarily through the Internet), and where individual enterprises (SMEs above all) do not have enough resources to independently realize necessary R&D activities, but can instead cooperate, purchase, hire or license processes or inventions (such as patents, intellectual property etc.) to other enterprises, organisations or institutions (laboratories, institutes, etc.). Also, internal inventions which are a result of innovation activity of an enterprise but cannot be well commercialised on the market (changed strategy of business, or lack of resources for commercialisation) can be sold to other enterprises (e.g. through licensing, joint ventures, spin off, etc.), and thus generate additional income.

The OI model implies that enterprises can and should use external ideas, knowledge and technologies equally as internal, together with internal and external methods for commercialisation of innovation results on the market. In the OI model enterprises can continue to initiate and maintain innovations within an enterprise, while at the same time they can rely on alternative ways to present their ideas on the market and benefit from external knowledge. In the IO model it is clearly seen how input and output routes of knowledge transparently transform into economic value and how rapid development of a

product and marketing create ideas which lead to development in the chain of values (Vanhaverbeke, 2006).

Numerous factors have led to the development and application of the OI model. Obviously, technological intensity of production has increased in many branches, thus even the enterprises with respectable R&D sector are not able or are not ready to rely only on own technological development (Gassmann, 2006, p. 224). The innovation process becomes increasingly complex, whereby a great number of complex scientific problems demand interdisciplinary approach to research which, as a rule, results in great expenses and more pronounced risks in the process of innovation (Howells et al., 2003, p. 398). Thus it happened that the enterprises which are not competent enough in certain domains entrust other organisations or enterprises with the research, whereby still develop technological knowledge on their own in the domains that are most significant for them (the so-called hard technological core).

Contemporary enterprises need not have the latest or best knowledge at their disposal in order to succeed in the present conditions. The key of success is to combine the internal, already available knowledge well-timed with the available external knowledge and by using thus created knowledge, find new innovative solutions and gain benefits on the market. If open enterprises want the external knowledge and information to be beneficial and contribute to their better functioning, it is necessary to build own innovation capacity, i.e. to investigate the possibilities of creation of new knowledge within the enterprise. When they get new external knowledge it is important to properly adopt itand combine with the existing knowledge at the enterprise. External knowledge does not have any utility value for an enterprise if it is not integrated and combined with the internal knowledge. The quality of thus obtained network of internal and external knowledge determines the quality and efficiency of innovation process, i.e. innovation potential of an enterprise (Cvijić et al., 2012, p. 76). This means that enterprises have to be ready for establishing strategically significant connections with other enterprises that have knowledge, skills and experience, necessary for further successful development of innovation process.

The possibilities for enterprise to get significant ideas, knowledge and technologies externally is conditioned by the capability and availability of external suppliers, i.e. development and quality of external basis of innovation knowledge. The existence of available suppliers who can offer suitable quality (which often exceeds the quality which the enterprise can internally achieve) makes possible for enterprises to entrust certain functions in the chain of value to other enterprises, thus enabling them to concentrate only on those values in the chain which are the most beneficial for them, or which can be better realised in comparison to other enterprises on the market.

Due to mobility on the labour market the employees can leave their enterprises and go to other or found their own enterprises which they can finance independently or as a joint venture. The risk that the labourers who leave the enterprise simply take along key elements of the innovation process which was previously developed in an enterprise is real. It means that other (often competitive) enterprises can thus gain significant, previously developed innovation knowledge (West & Gallagher, 2006, p. 319). The increasing private investment creates considerable risks for the enterprises which largely rely on internal innovations, since greater possibilities for joint ventures increase the tendency of some employees to establish their own or join to the existing, newly founded

enterprises (Rigby & Zook, 2002, p. 83). They are interested in newly established enterprises since they consider their offer more favourable in terms of risk and earnings.

The existence of branch convergence is a factor which also influences the development of OI model. Branch convergence is the deletion of boundaries between economic activities due to convergence of ideas, technologies and markets (Choi & Valikangas, 2001, p. 426). It basically represents the influence of innovation development in one economic activity on the development of other activities. Convergence appears when the enterprises in one branch apply the knowledge which is fundamentally developed in other branches; thus successful innovations change and complement innovative and technological paradigm of other branches. The influence of innovations in information technologies on business in all other industrial branches can be taken as an example.

The OI model is especially suitable for application in service activities based on knowledge and high technologies where enterprises most often simultaneously offer products and services. Large enterprises often form separate organisational units which follow OI and strategies that are focused on innovation projects beyond basic economic activity of the enterprise, thus making efforts to keep pace with dynamic branches of economy.

Customers also have a significant role in the development of OI concept. Many customers are innovatively oriented; they tend to improve the existing products and services of the enterprise, thus becoming innovators themselves (Bogers et al., 2010). Customers as innovators often do experiments related to aesthetic and functional characteristics, purpose and terms of use of the existing products, provide ideas at beginning stages of development of new products and services, suggest new forms of relationships between the enterprise and customers, etc. Thus enterprises with the help of their customers as innovators reach adequate innovation solutions and satisfy needs on the market through new or improved products or service. The enterprises which apply open innovation model in their activity, include the existing and potential customers in the innovation process, thus increasing their innovative possibilities (Dogston et al., 2008).

The OI model has been developed as a response to current demand related to innovation activities of an enterprise, primarily in the domain of R&D and protection and use of intellectual property by the enterprise. The model emphasizes the need for more active cooperation between various enterprises in order to decrease potential risks and expenses and simultaneously increase efficiency of the innovation process and better commercialise the ideas on the market. It is especially suitable for SMEs which now, compared to the previous period, have the opportunity to influence market trends by joining ideas, innovation activities and investments. In new conditions the advantages immanent to SMEs are especially pronounced such as flexibility and speed of reaction to market changes. The model provides reduction of time necessary for the development of a product and its appearance on the market. SMEs have a chance to leave behind large enterprises, thus providing competitive advantage.

3. Possibilities and Limitations of the Application of the OI Model in SMEs

SMEs sector is often the most significant part of innovation efforts in a certain economy, unlike large enterprises which act as an integrator of overall innovation system (Cvetanović et al., 2016). Since in economy of knowledge SMEs operate in global environment it is necessary for them to establish cooperation with both larger enterprises in order to create better possibilities and increased use of their capacities, and other SMEs engaged in the same or different economic activities together with research centres, institutes, laboratories, independent researchers, universities and all other subjects which could contribute to their innovation development. The increase of global competitiveness and the increase of R&D expenses oblige SMEs to cooperate with external partners in order to promote new products and services on the market before their competitors. At the same time, the innovation will be better accepted if the users of products and services, either other enterprises or individual customers, become increasingly involved in the innovation process (De Backer, 2008).

Two aspects of cooperation are present between SMEs and other participants in the innovation process. The first is resource transfer (knowledge, ideas) from SMEs to other enterprises when the existing technological possibilities of SMEs are used externally. The second aspect is related to external to internal exchange where external sources of innovations are used for improvement of the existing innovation development in SMEs. SMEs combine both types of cooperation with their environment in order to improve innovation performances and maximise benefits from innovation efforts (De Vrande et al., 2008). Thereby, they can focus on four approaches to the OI model: joint R&D activities; b) joint development of a product; c) joint promotion of a product and d) attraction of similar enterprises to create positive environment by cooperation (West & Gallagher, 2006, p. 36). In order to develop SMEs successfully and commercialise new products and create remarkable innovation performances they have to cooperate with external partners (Pullen et al., 2008).

Successful strategy of the OI model for SMEs should find creative methods to utilise internal innovations and the available external innovations which contribute to the development of an enterprise. SMEs have certain advantages in the innovation process which make them a suitable partner for connection, since they are usually less bureaucratically organised and generally are more motivated to be more successful than large enterprises (Pullen et al., 2008).

Networks are globally considered valuable because they provide the solution for preservation of flexibility of productive values of SMEs (Acs & Audretsch, 1988). By networking, some of the barriers encountered on the way to creation of innovations in these business entities are removed without destruction of their key advantages. In this sense, a number of authors investigate how market uncertainties contribute to the increasing networking of SMEs. The conclusion is that in the situations when innovation process is a complex system which exceeds the framework of an enterprise, networks provide successful technological cooperation with very pronounced synergic effects (De Bresson & Amesse, 1991).

The advantages of SME networking include innovation chances, lower transaction costs, cost shares, increase of efficiency of innovation process, and increased production efficiency. Networks provide the share of risks, costs of studying and other expenses that

help technological convergence between enterprises, which results in the growth of manufacturing efficiency as well as economy of scope. Due to their integrated processes of production, each enterprise has to be concentrated on individual component of their joint final product and more complete access to information (Dirckinck-Holmfeld, 2009).

SMEs have a crucial role in diversification of innovations in numerous market niches, i.e. domains which are not attractive for large enterprises, bearing in mind possible relationship between potential benefits and risk level. With their activities they often change the limits of production and consumption while searching for the neglected possibilities of creating new jobs and improvement of labour productivity (Michael & Palandjian, 2004).

Lately, SMEs have become more important in the domain of creation of technological innovations. However, due to the fact that the capability of SMEs to compete on global markets is limited by internal and external conditions (Table 1), the cooperation between enterprises aimed at improvement of innovation has become a significant means by which these business entities overcome some of the barriers. The cooperation between SMEs and large enterprises is becoming a strong force in many industries today.

Table 1 Barriers of open innovation for SMEs

External barriers			Internal barriers		
Supply	Demand	Environment Resource	Resource	Culture/ human nature	System
Technological information	Customer needs	Government regulations	Lack of internal funds	Attitude of top management to risk	Out-of-date accounting system
Raw materials	Customers' perception of the risk of innovation	Anti-trust measures	Technical expertise	Employee resistance to innovation	
Finance	Domestic market limitation International market limitation	Policy actions	Management time		

Source: Rahman & Ramos, 2011, 480.

Some limitations make the application of the OI model in SMEs difficult. These enterprises have insufficient resources, hence their planning relates to medium time period at most. Real incapability of SMEs to make long-term plans significantly decreases their capability to access the results of external research. It is not always easy for SMEs to enter the sustainable chain of values on the market, since they are focused only on short-term market promotions. SMEs even do not often have well-developed medium-term planning of demand due to limited resources and lack of necessary network of contacts. Time mismatch of framework of research of external partners (e.g. universities) with the real needs of SMEs can make a problem, which often does not allow them to appear aggressively on the market with the proper product at the right moment. SMEs often have problems related to financing of research, lack of qualified staff and a small chance for replacement of adequate products on the market, limited possibilities to promote products etc. Besides, there is a large number of other internal and external barriers to innovations in SMEs which partly decrease and

complicate successful application of the model of open innovation, but they certainly do not reduce the significance of its application for successful innovation development (Hanna, & Walsh, 2002).

Changes in business environment (growth of income, increased number of market niches, technological changes and development of open innovations) decrease structural disadvantages of SMEs which arise from their limited possibilities for application of economy of scope and management of innovation processes. Innovative SMEs have become the most significant developmental potential of contemporary economy. However, due to conditions in which they operate, insufficiently motivating business environment which is not properly adjusted to the developmental needs of innovative SMEs, a large number of SMEs do not recognise the importance of innovations or do not have necessary conditions to completely realise their innovation potential.

Innovative SMEs are faced with numerous problems and barriers, primarily related to financing, availability of results obtained in research institutions, access to the international market, administrative barriers and possibility of engagement of qualified staff, etc. All these create the need for systemic, well-designed policies and specific supporting programs which should allow SMEs to use their development and innovation potential.

There is also disproportionate distribution of innovations within the SMEs sector between a small number of highly inventive SMEs with enormous potential for growth and a large number of SMEs without clearly expressed innovation orientation and great innovation potential. Therefore within the policy of stimulation of innovations, a clear difference between these two groups of SMEs should be made, i.e. it is necessary to understand and respect the differences in their business conditions, methods and motives for innovations.

SMEs are faced with significant barriers and limitations which have negative influence on their ability to innovate. These barriers are not the same for every enterprise, and the enterprises can have direct effect on their removal. Besides internal, significant barriers to innovations are external barriers which SMEs cannot directly influence, but are forced to adjust to them. These barriers arise from institutional and market environment that affects all small and medium-sized enterprises on the market.

CONCLUSION

The OI model has been developing since the end of the twentieth century. It reflects the efforts of an enterprise to use the available resources in order to acquire new knowledge and thus commercialise innovations. It prefers increasing mobility of labour, especially highly creative professional one. It accepts increasing business risks and initiation of business ventures, which is especially suitable for the development of SME sector. Key advantages of the OI model are greater possibilities of application of innovations, both own and from the environment. This suggests business model which is based on the decision whether cooperation is better than competition. The OI model is favourable for the development of SME sector, which has become increasingly important lately in the process of creation of technological innovations. Due to the fact that the capability of SMEs to compete on global market is limited by many conditions inside and outside the enterprise, the cooperation between enterprises in order to improve innovations has become a significant means by which these business entities overcome some of the barriers. The cooperation between SMEs and large enterprises is a considerable developmental force in many industries.

REFERENCES

Acs, Z. & Audretsch, D. (1988). Innovation in Large and Small Firms: An Empirical Analysis. *American Economic Review*, 78(4), 678-690.

Afuah, A. (2003). Innovation Management Strategies - Implementation and Profits. Oxford: Oxford University Press.

Annual Report on European SMEs 2015 /2016. Europian Commision.

Bogers M., Afuah A. & Bastian B. (2010). Users as Innovators: A Review, Critique and Future Research Directions. *Journal of Management*, 36(4), 857–875.

Chesbrough, H. (2006). Open Innovation: The New Imperative for Creating and Profiting from Technology, Boston, Massachusetts: Harvard Business School Press.

Chesbrough, H. (2007). Why Companies Should Have Open Business Models. *MIT Sloan Management Review*, 48(2), 22-28.

Choi, D. & Valikangas, L. (2001), Patterns of strategy innovation. *European Management Journal*, 19(4), 424-429.

Cvetanović, D., Nikolić, M. & Pokrajac, S. (2016). Impact of innovation on employment and income of small and medium-sized enterprises in the Republic of Serbia. *Facta Universitatis, Series:Economics and Organization*, 13(2), 187-203.

Cvetanović, D. (2011). Innovation processes synergy and management company. *Ekonomika*, 57(4), 139-148.

Cvetanović, S., Despotović, D. & Mladenović, I. (2012). The concept of technological paradigm and teh cyclical movements of the economy. *Facta Universitatis, Series: Economics and Organization*, 9(2) 149-159.

Cvijić, M., Borocki, J. & Lalić, D. (2012). Otvoreni modeli inovacija [Open models of innovation]. *Inovacije i preduzetništvo: alati za uspeh na tržištu EU - Zbornik radova*, Beograd: Univerzitet Singidunum, Fakultet za ekonomiju, finansije i administraciju i Centar za promociju nauke, 50-64.

De Backer, K. (2008). *Open innovation in global networks*. OECD Publishing.

De Bresson, C. & Amesse, F. (1991). Networks of Innovators: A Review and Introduction to the Issue. *Research Policy*, 20, 363-379.

De Vrande, V., V. De Jong, J., Vanhaverbeke, W. & De Rochemont, M. (2008). *Open innovation in SMEs: Trends, motives and management challenges*. 'SMEs and Entrepreneurship programme' financed by the Netherlands Ministry of Economic Affairs.

Dirckinck-Holmfeld, L. (2009). Innovation of problem based learning through ict: linking local and global experiences. *International Journal of Education and Development using ICT*, 5(1).

Gassmann, O. (2006). Opening up the innovation process: towards an agenda. *R&D Management*, 36(3), 223-228.

Greenhalgh, C. & Rogers, M. (2011). *Innovation, Intellectual Property and Economic Growth*. Princeton University Press.

Hanna, V. & Walsh, K. (2002). Small firm networks: A successful approach to innovation?. *R&D Management*, 32(3), 201-207.

Howells, J., James, A. & Malik, K., (2003). The sourcing of technological knowledge: distributed innovation processes and dynamic change. *R&D Management*, 33(4), 395-409.

Lalić, D. Boricki, J. & Gračanin, D. (2012). Analiza značajnih elemenata konkurentnskog potencijala malih i srednjih preduzeća u Srbiji [Analysis of significant elements of the competitive potential of small and medium enterprises in Serbia]. *Inovacije i preduzetništvo: alati za uspeh na tržištu EU - Zbornik radova*, Beograd: Univerzitet Singidunum, Fakultet za ekonomiju, finansije i administraciju i Centar za promociju nauke, 222-240.

Michael, S. & Palandjian, T. (2004). Organizational learning in new product introductions. *Journal of Product Innovation Management*, 21, 268-276.

Mroczkowski, T. (2012). *The new players in life science innovation: best practices in R&D from around the world*. New Jersey: FT Press.

Narayanan, V. (2001). *Managing Technology and Innovation for Competitive Advantage*. Englewood Cliffs, New York: Prentice Hall Longman.

OECD. (2010). *Assessing the Effects of ICT in Education Indicators, Criteria and Benchmarks for International Comparisons: Indicators, Criteria and Benchmarks for International Comparisons.* Ed. Scheurmans, F. & Pedro, F., Joint Research Centre- European Commission, OECD.

Pokrajac, S. (2010). *Preduzetništvo: izazovi i putevi „kreativne destrukcije“ privrede Srbije [Entrepreneurship: challenges and paths of "creative destruction" of the Serbian economy]*. Beograd: Mašinski fakultet.

Pourdehnad, J. (2007). *Idealized design - An “open innovation” process*. A presentation from the annual W. Edwards Deming Annual Conference, Purdue University, West Lafayette, Indiana.

Pullen, A., De Weerd-Nederhof, P., Groen, A. & Fisscher, O. (2008). Configurations of external SME characteristics to explain differences in innovation performance. *Proceedings of the High Technology Small Firms Conference 2008*: Twente University, Netherlands.

Rahman, H. & Ramos, I. (2011). Open Innovation in SMEs: From Closed Boundaries to Networked Paradigm. *Issues in Informing Science and Information Technology, University of Minho, Guimaraes, Braga, Portugal*, Volume 7, 471-487.

Rigby, D. & Zook, C. (2002). Open-market innovation. *Harvard Business Review*, 80(10), 80-89.

Romer, P. (2007). Economic Growth. in: Henderson, D. *Fortune Encyclopedia of Economics*, New York: Time Warner.

Smith, D. (2010). *Exploring Innovation*. McGraw-Hill.

Trott, P. (2002). *Innovation Managament and New Product Development*. Prentice Hall.

Vanhaverbeke, W. (2006). The interorganizational context of open innovation. In: Chesbrough, H., Vanhaverbeke, W. & West, J. (Eds.). *Open innovation: researching a new paradigm*. Oxford, 205-219.

West, J. & Gallagher, S. (2006). Challenges of open innovation: the paradox of firm investment in open-source software. *R&D Management*, 36(3), 319-331.

MODEL OTVORENIH INOVACIJA I RAZVOJ MALIH I SREDNJIH PREDUZEĆA

U radu se sagledavaju karakteristike modela otvorenih inovacija kao neodvojivog dela poslovanja savremenog preduzeća i njihovog uticaja na razvoj sektora malog i srednjeg biznisa. Pošlo se od stava da pomoću modela otvorenih inovacija mala sreddnja preduzeća nastoje da na najbolji mogući način iskriste mogućnosti za rast u razvoj. To nastojanje podrazumeva oslanjanje na vlastite inovacione aktivnosti, ali i na korušćenje spoljnih izvora inovacija, odnosno izvora koji promovišu lanac vrednosti kroz eksternu komercijalizaciju prava na intelektualnu svojinu kojom raspolažu i komecijalizaciju znanja i inovacija drugih. Ovi poslovni entiteti imaju određene prednosti u inovacionom procesu koje ih čini pogodnim partnerom za mrežno povezivanje, budući da su manje birokratski ustrojena i često imaju izraženiji motiv da budu uspešnija od velikih preduzeća.

Ključne reči: *znanje, inovacije, koncept otvorenih inovacija, mala i srednja preduzeća*