THE APPLICATION OF ONLINE PLATFORMS IN OPEN INNOVATION

Radul Milutinović, Biljana Stošić, Velimir Štavljanin

Faculty of Organizational Sciences, University of Belgrade
radul.milutinovic@fon.bg.ac.rs, biljst@fon.bg.ac.rs, velimir.stavljanin@fon.bg.ac.rs

Abstract: It is well known that innovation has been recognized as a crucial success factor for companies. The development of information technologies enabled integration of innovators (suppliers, customers, institutes) into innovation process by the use of IT-based tools. This facilitated the access to a large pool of ideas that can grow into innovation as new product/service, process. The connection of open innovation concept and information systems resulted in platforms for open innovation that enabled easier access, not only to customers, but also to other potential participants, who are willing to independently contribute in solving the specific problems of the company. Having in mind the importance of this contemporary approach, the main goal of the paper is the systematization of platforms for open innovation. Moreover, we presented platform classification, key elements of existed platforms design, as well as various examples of best practice of platforms for open innovation with recognized design elements.

Keywords: Open innovation, Innovation platforms, Customer involvement.

INTRODUCTION

Nowadays users have admission to a wide range of products and services, accordingly, companies are forced to find new ways to create and maintain competitive advantage. Cooperation with partners, even competitors, which have become a strategic imperative, has been used as one of the ways to solve this problem. Researchers in the field of strategy and marketing are increasingly focusing on cooperation with users in order to co-create the value. Collaboration with users can be realized in different parts of the business process, but one of the most important is the one which results in the value creation in the form of innovation [18].

The innovation process has changed significantly in the last decades and continues to change. It used to mean that companies are creating innovations by carrying out research activities within the company, solely with available resources - the principle of closed innovation ("not invented here"). With the development of industry, there are new factors that influence the changes in the innovation process, such as increased mobility of employees, increased quality and importance of university research, availability of different research, and the growth of venture capital investment [6]. The impact of these factors led to a change in the logic of existing models of innovation, which resulted in the emergence of a new model known as the open innovation model. Open innovation involves the use of both internal and external ideas, in terms of inputs for the innovation process, as well as the use of internal and external pathways for placement on the market. Thus, companies open their traditional internal innovation processes by including suppliers, users and other external relations [7][20].

Open innovation is of strategic importance to both large companies and SMEs [21], and represents

a very important issue for higher levels of management [9]. Hence, companies are increasingly experimenting with the introduction of new approaches that involve inclusion of a large number of different external participants and cooperation, aiming at information and knowledge exchange [8]. The open innovation model was built on the premise of expanding the network of companies and collecting new knowledge needed to create new products, services. The main driver of openness and involvement of users in the process of new product development is the development of technology, primarily internet and new web 2.0 tools. Online collaborations stimulate the development of new ideas and approaches that can lead to completely new solutions [2].

Over the past few years, there has been an increase in the number of online open innovation platforms, also known as collective intelligence systems [14]. The main reason is fast technological changes and the expansion of application fields of open innovation [19]. Moreover, internet enabled larger groups of users to access information that was previously exclusively available to companies themselves, as well as the ability to share their achievements with others. For manufacturers, internet technology allowed direct interaction with its customers, overcoming mediation through traders or organizations dealing with market research [17].

DEFINING OPEN INNOVATION PLATFORMS

The literature recognizes two overlapping streams in the field of open innovation [13]. The focus of the first stream, represented by Henry Chesbrough, is based on chances and opportunities such as: the acquisition of external experts and intellectual property rights, the achievement of strategic advantages, as well as many other ways to overcome the problems arising from the "not invented here" syndrome. The second stream, represented by Eric von Hippel, takes into consideration user and tool perspective. This stream is based on users' motivation to voluntarily contribute to the defined problem; the identification and the attraction of the appropriate participants; and the ways to design tools for open innovation.

Both of the aforementioned streams can be integrated into one approach known as a platform for open innovation. All types of open innovation

platforms, that is, IT-based tools for open innovation, share a common topical (Open innovation) and technical (Platform) foundation.

From the topical perspective, the open innovation platforms include IT-based tools that facilitate the application of open innovation. They enable the inclusion of potential participants, so-called innovators, into the innovation process. In accordance with the definition presented by Neyer et al. (2009), innovators can be internal (employees of R&D department), peripherals (other employees in the organization) and external (users, suppliers, experts). Open innovation platforms are based on voluntary participation of these three types of innovators, who can take part in different stages of the innovation process defined by the organizer, primarily in the search, selection and implementation of ideas.

The first step is to collect existing or new suggestions. The goal is to collect as many creative solutions as possible. The proposed solutions can be presented as short descriptions but, also, as solutions that can be implemented as such [1].

Next step is selection of the appropriate solution which can be done both by the experts and the community [4]. A typical approach to assessment in which community participates is done by using mechanisms (1) *summation* - number of votes for a solution; (2) *averaging* - using different scales (e.g. Likert's scale) (the platform of Threadless.com); (3) *consensus* - using qualitative estimates, that is, comments (for example, Osram LED - Emotionalize Your Light). Platforms that use a combination of previous mechanisms can also be found [11].

Finally, implementation is carried out. It involves transforming accepted solutions into products or services and their launching on the market. The pathway from suggestions to a final product or service can be expensive, so in practice companies often create prototypes before final implementation. In context of open innovation, prototypes are partly being created by the innovators [5].

From a technical point of view, the open innovation platforms represent a virtual environment that serves as an information exchange infrastructure. Most of them are in the form of a web platform with an interface to interact with users. Platforms provide interaction regardless of time or location constraints. Aiming at proper platform functioning, it is

necessary to provide appropriate hardware (servers), software (source code of a platform or web server) and services (internet connection). In accordance with the previous, open innovation platform can be defined as virtual environment that provides digital service, with the intention of creating innovations, enabling incentives to innovators in terms of time and location independence.

In the broadest sense, platforms for open innovation are the socio-technical systems that consist of social and technical subsystem. These two subsystems convert the input to the corresponding output within the environment in which the platform operates (Figure 1).
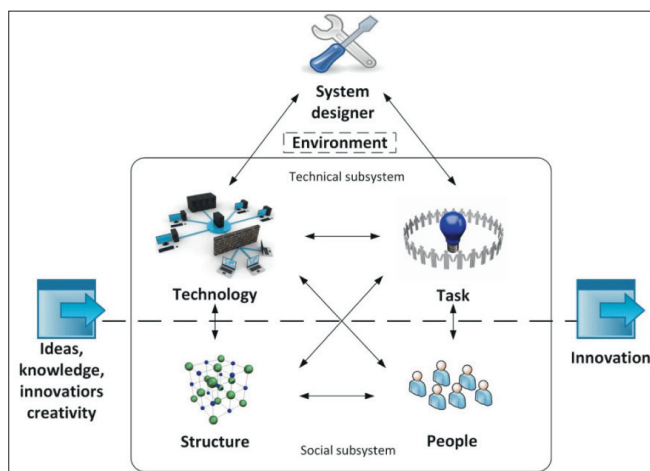

Figure 1. *Open innovation platform design*

The purpose of the technical subsystem (technology and task) is to define the challenges to be solved and how these challenges will be solved. The social subsystem implies people who participate and their structure, namely necessary knowledge, skills, reward system and structure of authority [13].

TYPES OF OPEN INNOVATION PLATFORMS

There are different IT-based tools used for open innovation. According to Moeslein and Neyer (2009), there are five classes: *Innovation competitions*, *Innovation communities*, *Innovation market places*, *Innovation toolkits* and *Innovation technologies*. This classification does not imply that classes exclude each other. Quite the opposite, there is often overlapping, namely, one platform can permeate different classes [13].

Innovation contests

Innovation contests in their basic structure have a long tradition and have influenced the development of both industry and society. Back in 1896, Napoleon III Bonaparte offered a reward for the one who invent the appropriate substitute for butter, in a way that it could be used by soldiers. In recent decades, this form of contest has become an integral part of modern business. One of the early examples of this kind of business was organized by the Fredkin Prize for Computer Chess 1997, which awarded a $100,000 prize to the one who makes a computer program that would be able to defeat Gary Kasparov - chess grandmaster at the time [3][13].

The application of innovation contests is experiencing an upswing with the development of information technologies, primarily internet, which enabled online competitions. Nowadays, high speed internet flow allows individuals, companies, public companies, and non-governmental organizations to organize this form of contests [17]. The contest starts when the organizer posts an open challenge/problem on the platform. Participants then develop and submit their contributions for a predetermined period. After that, a group of experts or other innovators makes an evaluation of the contributions. Evaluation results are used to determine the winning idea, which receives the award [12]. Thus, the focus of the innovation contest is reflected in the competitive challenges, moreover, in the opportunity to generate a large number of innovative ideas.

An example of this platform is Aufbruch Bayern, organized by the Government of Bavaria, with the aim of identifying the most innovative solutions for families, education and technological innovations. Citizens are asked to suggest ideas, existing projects, and best practices. The best suggestions have been implemented. A similar idea can also be found in the Go London Social Innovation Competition platform, where ideas are proposed on the question of how to increase the physical activity of London residents [3].

Innovation communities

Unlike the competitive approach to the innovation contest, the innovation community is gathering their members in order to jointly create innovation. Although innovation communities differ in structure, thematic focus and scope of social connections,

they are mostly based on common enthusiasm and knowledge related to a particular domain. Community members discuss new ideas for products and services, that is, on how to improve them. The interest in being a member of a community depends on the very characteristics of the community, such as language, netiquette, norms and individual motivation. Furthermore, communities can implement the characteristics of an innovation competition by setting challenges within the community. In that case, the challenge carries a smaller reward or even no reward, so as not to disturb the spirit of cooperation among community members [13].

Members of the online community can participate in all stages of an innovation project, from ideation, through prototyping to the development of a final solution. An example of including the online community in the innovation process is Audi and the development of the Audi Infotainment system. These systems represent the integration of modern communication technologies and entertainment in the domain of audio, video, navigation, telematics and user interfaces into the infotainment system of cars. Audi is a well-known automobile manufacturing company that gathers its fans and enthusiasts in the form of social communities around its brand. The company has a great community brand and organizes virtual meetings that everyone can access through the company's official website, non-commercial websites such as Audi clubs, forums, and other virtual communities dedicated to car enthusiasts [10].

Innovation market place

The innovation market place provides the opportunity to set the challenge for which innovators can give their solution proposals, or vice versa, innovators are setting up solutions to certain problems with the goal of finding someone who needs this solution. In this case, the innovation platform is the mediator between the organizer, who posts the challenges on the platform, and the community (innovators) that provides solutions to defined challenges. The organizer guarantees the innovator that he will pay the prize. The intermediary (platform), also, takes a percentage. The innovation market place ensures generating innovation by combining existing knowledge or approach (innovators) with

new areas of application (organizer challenges). A single project, within the innovation market, can be seen as an innovation contest [13].

The InnoCentive platform is one of the most renowned innovation market places, which serves as an outsourcer of scientific and technological solutions. The concept is very simple and clear. It is presented as a virtual innovation network for cooperation between companies, research organizations, university labs and free scientists. Companies that seek solutions to a particular problem post a challenge for which they are willing to give a certain prize. InnoCentive has the role of a broker that facilitates cooperation; defines intellectual property rights arising from cooperation; and guarantees the payment of the prize. A platform of this type should provide co-operation between party that can be called a seeker, and on the other hand, party that can be called the solver. Currently, there are over 380,000 registered inventors from over 200 different countries and over 2 thousand challenges. The prizes range from 0 to 1 million dollars (https://www.innocentive.com/).

Innovation toolkits

The innovation toolkit provides a virtual environment with limited space in which innovators can create innovative solutions for the defined process. By setting a limited space for the solution, the feasibility of the solution is ensured, bearing in mind that innovators, in this case, do not need to have specific knowledge in the field. On the one hand, the innovation toolkit limits the creativity of the innovator by setting a boundary, while, on the other hand, encourages creativity by giving the impulse in the direction where the contribution is expected [13]. The innovation toolkit helps the knowledge transfer that the innovators possess. The contributions given by innovators can be also considered as prototypes. Therefore, the search for ideas and their implementation is the main focus of this type of platform. A good example for these platforms is the Miadidas platform, which allows users to design customized snickers.

Innovation technologies

Innovation technology platforms represent a specific platform that enables the implementation

of ideas. They represent a platform or interface for transferring certain designs to rapid prototyping devices, such as 3D printers, 3D scanners, or lasers. Innovators are able to generate tangible prototypes from their crafted design. These prototypes have multiple uses in the innovation process. Compared to the innovation toolkit, the specifics and results of innovation technology go one step further, bearing in mind that virtual prototypes are transformed into the physical by using innovation technologies. Therefore, the main focus of these platforms is implementation. Good examples of these platforms are: Ponoko, which offers the ability to create and distribute a customized design using a configurator; eMachineShop for producing metal prototypes from CAD data; ShapeWays for the production of prototypes using different materials [5].

DESIGN ELEMENTS AND ATTRIBUTES OF OPEN INNOVATION PLATFORMS

With the advent of internet technology, new concepts of communication and user interaction have developed, such as forums, blogs, wiki, social networks. This group also covers innovation platforms that enable a wide range of applications. As already mentioned in the text, different types of platforms can be identified. Accordingly, different attributes and design elements can be recognized, with even more diverse characteristics and values that they can obtain.

Malone et al. (2010) have identified the basic elements or genomes, which can be used to describe the online platform dedicated to collective intelligence (innovation platform). For the classification of these elements, four questions are used: *What is being done? Who is doing it? Why are they doing it? and How is it being done?*. Consequently, to build a system of collective intelligence that should meet the expectations of the organizers, managers must ask these questions and give answers to them.

Question What? The first question to be answered is *What is being done?* In traditional organizations, the answer to this question is grounded on a mission or goal of the organization. In the case of innovation platforms, the answer to this question comprises two basic elements: *Create* and *Decide*. Participants in the process create a new solu-

tion (part of the software, a new design for a T-shirt, new taste), but also evaluate and select alternatives (decide whether to install a new module in Linux; choose the best design that will be printed on the T-shirt). By identifying the underlying goal it is determined which of these two basic elements should be started and mainly, in order to perform the work it is necessary to select at least one. The *Create* element almost always requires a *Decide* element to determine which of the created alternatives should be selected. A *Decide* element usually requires a *Create* item in order to generate the choices being considered.

Question Who? The next question is *Who is doing it?*. In this case, two basic elements are set: *Hierarchy* and *Crowd*. In a traditional hierarchical organization, the answer to this problem is answered when someone in authority delegates to employees or group of employees to perform a specific task. The *Crowd* element implies that the activity can be performed by anyone in the group. At the beginning, the crowd was used only for voting when choosing an alternative. Now everyone can submit a new article or update existing ones on Wikipedia. Anyone can suggest a new design that will be printed on the T-shirts, or participate in a voting for the best design (Threadless).

The main reason for using a *Crowd* element is to involve more people in the process. This means that the *Crowd* is useful in situations where (1) many people have the skills necessary to perform certain activities or (2) we do not know in advance who possesses the appropriate resources and skills. On the InnoCentive platform, companies often find people who will solve a particular problem with a reward for which the company has no solution. When the conditions for using the *Crowd* are not met, the *Hierarchy* is used. In cases where only a few people have the appropriate skills and when they know who these people are, they are simply assigned to execute these activities.

Question Why? This question is closely related to the question *Who?*. Also, closely related questions are *Why do people participate in activities? What motivates them to participate? What are the incentives?* This element includes a number of possible elements that can encourage people to participate in collective intelligence systems. Some of them

Table 1. Attributes of open innovation platforms

QUESTION [13]	DESIGN ELEMENTS [3]	ATTRIBUTES [3]						
What?	Issue specification: solution space for contribution	Low (L) (open topic)		Defined (D)			High (H) (specific topic)	
	Degree of elaboration: required level of contribution	Idea (I)	Sketch (S)	Concept (C)	Prototype (P)	Solution (S)	Evolving (E)	Mixed (M)
Who?	Media	Online (On)			Mixed (M)		Offline (Of)	
	Target group: description of participants	Specified (S)			Unspecified (US)			
	Organizer: platform operator	Company (C)		Public organization (PO)		Non-profit organization (NpO)		Individual (I)
	Participation: number of persons participating	Individual (I)			Team (T)		Both (B)	
Why?	Motivation: incentives for participation	Monetary (Mo)			Non-monetary (NM)		Mixed (M)	
How?	Runtime: task duration	Very short (VS)		Short (S)		Long (L)		Very long (VL)
	Tool for interaction	Innovation contest (IC)		Innovation community (ICm)		Innovation market place (IMP)	Innovation toolkit (IT)	Mixed (M)
	Evaluation: method for contribution ranking	Jury Evaluation (JE)		Peer review (PR)		Self-assessment (SA)		Mixed (M)

are *Money, Love, Glory*. Lately, most of the organizations rely on *Love* and *Glory* as motivational factors in comparison with traditional companies that rely mainly on *Money*.

Question How? The last element concerns the question *How is something done?*. In traditional organizations, the answer to this question is given by defining the organizational structure and process. The key determinant of the answer to this question is whether members of the crowd give their contributions and decisions independently or are they strictly related. Based on this connection, four elements are defined: *Collection, Collaboration, Individual Decision* and *Group Decision*. The first two elements are related to the *Create* item from the *What?*, while the other two are linked to the *Decide* element. Question *How?* is connected to the type of innovation platforms.

Unlike the previous approach to defining design elements by responding to the defined questions that Malone et al. (2010) recognized, Bullinger and Moeslein (2010) identified a framework of ten design elements, that is, attributes that characterize innovation platforms (Table 1).

Table 1 demonstrates the attributes specific to innovation platforms associated with design elements, identified in the work of Malone et al. (2010).

ANALYSIS OF SELECTED INNOVATION PLATFORMS BY IDENTIFIED ATTRIBUTES

For the analysis of different cases of open innovation platforms we selected some of the previously identified attributes. Each table field contains one or more values of the design elements/attribute, obtained from the set of values that a certain attribute can take (values in Table 1).

Table 2. An overview of different open innovation platforms based on design elements

Innovation platforms	Design elements/attributes:									
	Media	Tool for interaction	Evaluation	Issue specification	Degree of elaboration	Target group	Organizer	Participation	Motivation	Runtime
InnoCentive	On	IMP, IC	JE	L	M	S,US	C, PO, NpO	I, T	M	S, L
Yet2.com	On	IMP, IC	JE	L	M	S,US	C, PO, NpO	I, T	M	S, L
P&G - C + D	On	IC	JE	D	M	S,US	C	I, T	M	L
Dell - IdeaStorm	On	ICm	M	D	M	S	C	I, T	NM	L
Ninesigma	On	IMP, IC	JE	L	M	S,US	C, PO, NpO	I, T	M	S, L
Quirky	On	IC	M	D	I, S, C	S,US	C	I, T	M	L
MyStarbucks Idea	On	ICm	M	D	M	S,US	C	I, T	NM	L
Miadidas	On	IT	SA	D	I	S	C	I	NM	L
Lego Idea	On	IT, ICm	JE	L	I, S, C	S	C	I, T	M, NM	L
BMW's Co-Creation Lab	On	IC, ICm	JE	D	I, S, C	S	C	I, T	M	S, L
Go London Social Innovation Competition	On	IC	M	D	I	S	PO	I, T	M, NM	S, L
Doritos: Crash the Superbowl	On	IC	M	D	I	US	C	I, T	M	S, L
Shell GameChanger	On	IC, ICm	JE	D	I	S,US	C	I, T	M	L

It is very important to carry out such analysis of innovation platform cases both from the aspect of the organizer and from the aspect of the innovator (participant). From the organizers perspective, the analysis can serve as a foundation for good/bad examples that can be implemented in the same or similar way. The database (knowledge base) provides the opportunity to recognize the right elements of design in different cases, the type of innovation platform, the need for engaging mediators (innovation market place), the scope of stages from the innovation process in which innovators can engage, how innovators are motivated, and many other issues which can contribute to the success of one platform implementation. From the aspect of the innovator, it is also important to recognize the elements of the design, primarily the type of platform and the motivation elements.

It has to be acknowledged that this overview has limitations and that it does not explain the entire space for participation and collaboration related to open innovation. It is focused only on freely accessible online open innovation platforms. Wider view would add notably more aspects and potential attributes to be considered which would be difficult to handle in a single article.

Conclusion

With the development of information technologies, opportunities for developing open innovation platforms are growing. The number of collective intelligence cases is likely to grow in the future. In order to fully define the platforms, a lot of effort is required toward identification of all the elements that can be an integral part of the design of innovation platforms, the conditions in which they are useful, and the constraints in which these elements can be combined. For now, there is no well-defined framework that can guarantee success, but what can be found in literature and practice can serve as a good starting point. Having this in mind, the paper presents some of the design elements proposed by different authors, and different cases of the platforms for open innovation that apply recognized elements. The proposed systematization of

a number of platforms can significantly contribute to the future organizers in terms of the best practice, as well as the participants (innovators), to better understand on which platforms they could take part.

REFERENCE

[1]   Adamczyk S, Bullinger A and Möslein K (2012) Innovation contest: A review, classification and outlook. *Creativity and innvoation management, 21*(4), 335-360.

[2]   Bughin J, Chui M and Johnson B (2008) The next step in open innovation. *The McKinsey Quarterly, 4*(6), 1-8.

[3]   Bullinger AC and Moeslein K (2010) Innovation Contests – Where are we?. In *Americas Conference on Information Systems - AMCIS 2010 Proceedings, pp 28.*

[4]   Bullinger AC, Neyer AK, Rass M and Moeslein KM (2010) Community-based innovation contests: Where cooperation meets competition. *Creativity & Innovation Management, 19*(3), 290–303.

[5]   Bullinger A, Hoffmann H and Leimeist JM (2011) The next step - Open prototyping. *European Conference on Information Systems (ECIS).* AIS Electronic Library (AISeL).

[6]   Chesbrough H (2003) *Open innovation: The new imperative for creating and profiting from technology.* Harvard Business Press.

[7]   Chesbrough H (2006) *Open Business Models: How To Thrive In The New Innovation Landscape.* Harvard Business School Press.

[8]   Chesbrough H, Vanhaverbeke W and West J (2006) *Open innovation: Researching a new paradigm.* Oxford University Press on Demand.

[9]   Chesbrough H and Brunswicker S (2014) A Fad or a Phenomenon? The Adoption of Open Innovation Practices in Large Firms. *Research-Technology Management, 57*(2), 16-25.

[10]   Füller J, Bartl M, Ernst H and Mühlbacher H (2006) Community based innovation: How to integrate members of virtual communities into new product development. *Electronic Commerce Research, 6*(1), 57–73. doi:DOI: 10.1007/s10660-006-5988-7

[11]   Haller J (2012) *Open Evaluation - Integrating Users into the Selection of New Product Ideas.* Wiesbaden: Springer Gabler.

[12]   Haller J, Bullinger A and Möslein K (2011) Innovation Contests - An IT-Based Tool for Innovation Management. *Business & Information Systems Engineering, 3*(2), 103-106.

[13]   Hallerstede SH (2013) *Managing the Lifecycle of Open Innovation Platform.* Wiesbaden: Springer Gabler.

[14]   Malone T, Laubacher R and Dellarocas C (2010) The collective intelligence genome. *MIT Sloan management review, 51*(3), 21-31.

[15]   Moeslein KM and Neyer AK (2009) Open Innovation: Grundlagen, Grenzen, Spannungsfelder. In A. Zerfass, & K. M. Moeslein, *Kommunikation als Erfolgsfaktor im Innovationsmanagement - Strategien im Zeitalter der Open Innovation,* pp. 85–103. Wiesbaden: Gabler.

[16]   Neyer AK, Bullinger AC and Moeslein KM (2009) Integrating inside and outside innovators: a sociotechnical systems perspective. *R&D Management, 39*(4), 410-419.

[17]   Piller FT and Walcher D (2006) Toolkits for idea competitions: a novel method to integrate users in new product development. *R&D Management, 36*(3), 307-318.

[18]   Sawney M, Gianmario V and Prandelli E (2005) Collaborating to create: the internet as a platform for customer engagement in product innovation. *Journal of interactive marketing, 19*(4), 4-17. doi:10.1002/dir.20046

[19]   Stoetzel M, Wiener M and Amberg M (2011) Key differentiators of open innovation platforms – A market-oriented perspective. *10th International Conference on Wirtschaftsinformatik*, (p. 60). Zurich, Switzerland.

[20]   Stošić B and Milutinović R (2014) Possibilities Of Opening Up the Stage-Gate Model. *Romanian Statistical Review, 62*(4), 41-53.

[21]   Vanhaverbeke W (2017) *Managing Open Innovation in SMEs.* Cambridge University Press.

ABOUT THE AUTHOR

Radul Milutinović is Teaching Assistant of Innovation Management at the Faculty of Organizational Sciences, University of Belgrade, Serbia. He holds a BSc degree in field of Management and a MSc degree in areas of Project and Investment Management. Now, he is a PhD candidate. His primary areas of research are Innovation Management, Innovation Project Management and Intellectual Property. He has published numerous publications at national and international conferences and journals.

Biljana Stošić is Professor of Innovation Management at the Faculty of Organizational Sciences, University of Belgrade, Serbia. She holds a BSc degree in the field of Information Systems and MSc and PhD degrees in the area of Innovation and Technology Management. Her research interest is oriented towards Innovation Management, Project Management and Intellectual Property. She has authored and co-authored numerous publications at national and international conferences and journals. She is the author of Innovations in Technology - Theoretical Basis and Methods of Support; Innovation Management - Expert Systems, Models and Methods; Innovation Management - Innovation projects, Models and Methods.

Velimir Štavljanin is an Associate Professor of Marketing management and multimedia communications and a senior researcher in Laboratory for Multimedia Communications at the University of Belgrade, Faculty of Organizational Sciences. His areas of interests include Product and Brand Management, Digital Marketing, CRM, Multimedia and HCI. Štavljanin has a PhD in marketing from University of Belgrade, Faculty of organizational sciences.