Environmental factors in the diffusion of innovation model: diffusion of e-learning in a higher education institution

Sanjana Buć
Institute IGH d.d., Zagreb
Sanjana.buc@igh.hr

Blaženka Divjak
Faculty of Organization and Informatics
University of Zagreb
blazenka.divjak@foi.hr

Abstract. *The paper deals with the diffusion of e-learning model as an innovation in a higher education institution (university, faculty). Apart from the two basic phases in the process, namely the initiation phases – until the decision about the innovation has been made and the implementation phases which follows after that and two basic individual components of the diffusion of innovation model; previous related knowledge and perceived properties of innovation, the model described here recognizes the factors of the organization environment which influence its potential capacity to absorb innovation. The qualitative research disclosed five key factors of the social environment, six factors of the business environment and sixteen factors of the internal environment which have impact on the organization in the initial phase of the process of diffusion of e-learning in faculties in the Republic of Croatia.*

Keywords: e-learning, diffusion of innovations, absorptive capacity, higher education.

1 Introduction

Organizations in the system of higher education, especially faculties (colleges) and universities should fulfill a triple mission: to teach, do research and serve the society. In order to be successful in that, they must be innovative and strategically managed (Divjak & Begičević Ređep 2015). To accomplish their mission they have to satisfy three mutually contradictory requirements; increasing access – the increase in the number of students, improving quality and controlling cost (Bates & Sangra 2011). Applying information and communication technology (ICT) not only in administrative processes was recognized as one of the crucial ways to satisfy these demands. There are various expressions used in literature to describe ICT support in learning depending on which element of e-learning is being stressed; from definitions which stress the technological aspect (technology-driven definitions) to the ones which recognize e-learning as a way to approach knowledge (delivery-system-oriented definitions), the ones which see it as a communication and interaction tool (communication-oriented definitions), to the definitions of e-learning as a way to improve the existing educational paradigm (educational-paradigm-oriented definitions) (Sangrà, Vlachopoulos & Cabrer 2012).

We are going to use the definition of e-learning as proposed by Sangrà and co-authors in (Sangrà, Vlachopoulos & Cabrer 2012):

"*E-learning is an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning.*"

The panel of experts consulting according to the modified Delphi process in order to draft Horizon report (Johnson et al, Horizon report, 2016) five-year horizon for the impact of emerging technologies in colleges and universities across the globe agreed on two long-term impact trends: advancing cultures of innovation, as well as to fundamentally rethink how universities and colleges work. That supports the main idea of this paper connecting innovation and decision making process.

The Horizon panel recognized the technological developments that could support these drivers of innovation and change. Bring Your Own Device (BYOD), along with learning analytics and adaptive learning, are expected to be increasingly adopted by higher education institutions in one year's time or earlier. Further augmented and virtual reality, along with makerspaces, is estimated to be implemented

widely within two to three years, while affective computing and robotics are expected to be more prominent in colleges and universities within four to five years. However, e-learning is still not being adopted at the desired pace in Croatia although on global scale it is a very fast growing industry (Johnson et al, Horizon report, 2016). In order to examine this problem as good as possible, we can approach it from the position of adopting innovations. Here, Roger's theory of diffusion of innovation (DOI) can be useful (Gonçalves i Pedro 2012).

According to Rogers (2003), the author of DOI theory, the diffusion is "*the process by which an innovation is communicated through certain channels over time among the members of a social system*" (Rogers, 2003, p. 5). The definition itself contains the four basic elements of diffusion of innovation: (1) innovation, (2) communication channels, (3) time and (4) social system. Therein, the innovation is "*any idea, practice or object that is perceived as new by an individual or other unit of adoption. It matters little, as far as human behavior is concerned, whether or not an idea is objectively new as measured by the lapse of time since its first use or discovery*." (Rogers 2003, p.12).

In the first phase of the project called *Development of a methodological framework for strategic decision-making in higher education – a case of open and distance learning implementation* (Higher Decision, 2016) the conceptual DOI model in higher education was set and the research about the impact of environmental factors of the organization in higher education on its capacity to adopt innovation was conducted on the sample of e-learning as innovation. The results of the qualitative research described in this paper complement the results of previous studies contributing to the development of a model for the adoption of innovation in higher education organizations.

2 State of the art

In the last ten years, a lot has been said and written about the critical success factors of adoption of e-learning in the HE (Selim 2007), and various models of introducing e-learning in higher education have been developed (Begičević, Divjak and Hunjak 2007).

Reviewing the literature on the topic of e-learning published between 2001 and 2013, Singh and Hardaker (Singh i Hardaker 2014) summarize that published articles and research results on barriers and enablers to adoption and diffusion of e-learning were mainly focused on the importance of having an e-learning strategy; the role of social networks and social phenomenon of opinion leaders; top-down (which can become counter-productive) and bottom-up approaches to diffusion; the role of management; the importance of the administrative and technical infrastructure to support the adoption of e-learning, personal attitude towards innovation; demographic factors (age and gender); perceived time required for adoption and innovation; lack of mechanisms to control the implementation of e-learning.

It can be concluded that it is necessary to develop a theoretical framework to integrate research into the influence of exogenous factors and the impact of individual strategies in a single model (Singh and Hardaker 2014). On the other hand, although the theory of diffusion of innovation was recognized as a valuable theoretical framework for examining the adoption of innovation by individual organizations, previous studies were less concerned with the process of diffusion and processes which affect the adoption of innovations and more with factors outside communication itself, the transfer of innovation, such as attributes of innovation, which presents one of the main objections and at the same time guidelines for further contribution to the development of the theory of diffusion of innovations (Vishwanath & Chen, 2011).

3 Research problems

Conceptual model of the diffusion of innovation in the higher education system defines two principle phases of the diffusion process of the organization in the system of higher education using the example of the diffusion of e-learning as an innovation (Buć & Divjak, 2015): the initial phase (initiation) preceding the decision on the acceptance of innovation, and the implementation phase (implementation) following the positive decision on the acceptance of innovation.

While the results of previous studies regard specific elements of the diffusion process and the innovation itself, e-learning, the impact of the social system in the process of diffusion of this innovation is neither sufficiently considered, nor defined.

The conceptual model of diffusion of innovation in the higher education system on the example of the diffusion of e-learning as an innovation is based on a theoretical model of diffusion of innovation, but it is also complemented by the basic postulates of the concept of absorptive capacity. The foundations of the concept of absorptive capacity (ACap) were set by Cohen and Levinthal who defined absorption capacity as "the ability of companies to recognize the value of new, external information (external knowledge), to assimilate it and apply it to their business results" (an ability to recognize the value of new information, assimilate it, and apply it to commercial ends) (Cohen & Levinthal, 1990, p. 128) and consider it a key factor in innovation capacity of enterprises.

Most cited contribution to the development of the theory of absorptive capacity is the work of Zahra and Goerg in 2002 which defined the absorption capacity (ACap) as "*a set of organizational routines and processes by which firms acquire, assimilate,*

transform and exploit knowledge to produce a dynamic organizational capability" (Zahra & George, 2002, p. 186). From the very definition follow four dimensions of ACap: acquisition, assimilation, transformation and exploitation. Under the "acquisition" the authors understand the ability of a company to identify and acquire external knowledge that is critical to its business. "Assimilation" refers to the routines and processes that allow companies to analyse, process, interpret and understand the information obtained from external sources. By "transformation" authors mean the ability of companies to develop and improve their processes by combining the existing knowledge with newly acquired and assimilated knowledge. It is achieved by adding or deleting skills or simply interpreting the same knowledge in different ways. The fourth component, "exploitation", refers to the ability of the organization based on processes that allow the organization to improve, expand and use the existing competences or to create new competencies by installing the adopted and transformed knowledge into its business. The authors further categorized the four dimensions of ACap into two ACap components; "potential ACap" consists of acquisition and assimilation, whereas the transformation and exploitation are components of "realized ACap".

The research, whose description and results are shown below, was carried out in order to give answers to two research questions:

• What are the most influential environmental factors of an organization in higher education (a faculty) that affect the capacities of this organization for the acquisition and assimilation of innovation (on an example of e-learning)?

• How can the DOI model be applied to problems of diffusion of innovations in HE, especially in the adoption of e-learning at the faculty?

To answer these questions, a qualitative research was conducted and is described in detail in this paper.

4 Research methodology

In order to investigate the influence of the social system, that is to say of the environment of the organization on its ability to absorb and acquire innovation, a qualitative research was carried out to define the measuring instrument for the key factors of this particular environment for the recognition and acceptance of e-learning in faculties. In the development of instruments, the examples of the development of instruments were used that are specific to research in information sciences, such as for example, the development of a measuring instrument for assessing the performance of ePortfolio (Balaban, Mu & Divjak, 2013).

4.1 Creating initial set of items

To create an initial set of items for the purposes of this research, the starting point is the theoretical conceptual definition of the environment. According to Buble (Buble, 2000, p. 69), "*environment means the totality of the factors that affect the company's business which must be respected by the management when making decisions*." There is external environment and internal environment. Additionally, (Buble, 2006, p. 69) stated that external environment includes those segments of the environment which indirectly affect the company/organization. Buble further divides the external environment into the general or social environment and the business environment or the environment of the task. The main feature of general or social environment (macro-environment) is that it is not under the direct control of the company/organization. Business environment or the environment of the task (micro-environment) "is made of factors in the immediate environment of the company/organization which affect its ability to serve this environment." Internal (indoor) environment "represents that part of the total environment of the company, which is located inside it." It can be fully managed and influenced.

Initial set (initial pool) of items consisted, therefore, of three main groups of environmental factors and their sub-groups (e.g. a group of factors of internal environment consisted of subgroups: organizational structure, organizational culture and resources), and in each of these subgroups, as a result of completion of the literature review, individual factors were associated. Although it is not possible to determine the exact number of items which the initial set should contain, the general rule is the higher the initial set, the better it is, so it is not surprising that the initial set includes three to four times more items than the final scale, that is to say it should not be smaller than 50% of the final scale (DeVellis, 2003).

The initial set of items for the purposes of this study consisted of 22 items in the group of social environment factors, 12 items in the group of business environment factors and 39 items in the group of internal environment factors- in total of 73 items.

At the first Higher Decision project workshop, held 9th-11th July 2015 in Varaždin at the Faculty of Organization and Informatics, University of Zagreb a focus group was formed out of fifteen experts of different profiles in business and scientific activities. Every participant was requested to evaluate each factor and determine if the mentioned factor has influence on the diffusion of innovation in higher education or not, and this on two levels: on the level of each faculty and at the university level part of which the faculty is. In interviews with respondents significant inputs for the redefinition of certain factors were obtained, and also for the elimination of recurring factors and the addition of certain factors that were not previously identified.

The results of pre-testing and conclusions from the workshop are multiple:
• for the next stage of development of the measuring instrument it is necessary to use a questionnaire for the panel of experts for higher education, i.e. for key stakeholders in e-learning
• the questionnaire will only regard the examination of factors that affect the level of basic organization, a colleges
• only a basic classification of environmental factors will be considered: social, business and internal
• a total of 46 environmental factors to be included in the questionnaire for the next stage of development of the measuring instrument were defined by qualitative analysis of participants in pre-testing.

4.2 Testing the content and the construct validity of environmental factors

In the next step of the study, responses of experts in e-learning were collected through questionnaires which had been delivered to them by e-mail. In this way we tried to ensure the content validity of the instrument. In addition to the questionnaire, the respondents were submitted a letter explaining the objectives and ways of completing the questionnaire. A panel of experts involved in this phase of the study consisted of 10 experts in the field of e-learning. The questionnaire was developed in the form of MS Excel spreadsheet, and included 46 environmental factors of the organization. Respondents were supposed to determine the importance of each factor for the acquisition and assimilation of e-learning at the level of college by selecting one of the answers (1 not a relevant factor; 2 important but not critical; 3 important; 0 cannot give an answer). In addition, they could make comments for each of the factors as additional detailed observation with regard to its relevance, clarity of description, etc.

For the validation of content Lawshe's formula was used (content validity ratio, CVR):

$$CVR = \frac{(n - N/2)}{N/2} \quad (1)$$

where N is the total number of responses, n is the frequency of panellists who evaluated the item with 2 or 3 (a positive response to the assessment of the impact of a certain environmental factor). The minimum value of CVR coefficient for 10 respondents was 0.62 (Lawshe, 1975, pp. 567-568). After the completed analysis it can be concluded that 36 items passed the CVR test.

In the questionnaire the panellists were also asked to classify each of the listed environmental factors in one of the groups: SE - General or social environment of the organization, BE - Business environment of the organization, IE - Internal (indoor) environment of the organization and O - Other (factor not appropriate for any of the listed groups of environmental factors). Although respondents categorized all the offered factors, only those factors were included in the analysis of construct validity of the instrument which had passed the previous CVR test. The result of sorting environmental factors by groups is shown in Table 1. The calculated Cohen's kappa coefficient was 0,62 which shows good agreement of experts of this research with the classification factor according to theoretical divisions and the results of previous research in accordance with the conducted analysis of literature.

Table 1. Result of sorting environmental factors

	ASSIGNED GROUP				TOTAL
TARGET GROUP	**SE**	**BE**	**IE**	**n.o.**	
INTERNAL ENVIRONMENT (IE)	1	6	**161**	2	**170**
BUSINESS ENVIRONMENT (BE)	20	**63**	4	3	**90**
SOCIAL ENVIRONMENT(SO)	**49**	36	11	4	**100**
total	**70**	**105**	**176**	9	**360**
matching	49	63	161		273
accidental	19,44	26,25	83,11		128,81
Cohen's kappa:	0,62				

If an item has consistently been assigned to a specific category, it is considered that it has the validity of convergence with the particular construct and discriminant validity with the others. In this case, with 36 items, the judges (the panellists) have agreed about 27 items in total, divided into three main groups: 16 factors of internal environment, 6 business environment factors and 5 factors of social environment.

4.3 Qualitative analysis of research results

Final qualitative analysis of previously sorted environmental factors influencing the ability of faculty to acquire and assimilate innovation in the case of e-learning was conducted by two experts. The final distribution of environmental factors after the completion of the qualitative analysis is shown in Table 2.

Table 2 Environmental factors sorted into groups

GROUP OF ENVIRONMENTAL FACTORS	initially	after CVR	after sorting	After qualitative analyses
INTERNAL ENVIRONMENT (IE)	21	17	16	16
BUSINESS ENVIRONENT (BE)	13	9	6	6
SOCIAL ENVIRONMENT (SE)	12	10	5	5
total	**46**	**36**	**27**	**27**

Qualitative analysis has proved that it is necessary to reformulate one factor. Another factor, which was initially placed in a group of social environment, should be transferred to the group of business

environment, and two similar factors from the business environment should be merged into one. Therefore, the business environment group gets one more factor, but the total number remains the same. A group of social environment factors remains unchanged.

5 Discussion of results

Experts in the field of e-learning have recognized a total of 27 key environmental factors of an organization or a university which have an impact on the ability of the faculty to identify and acquire external innovative knowledge (e-learning), and to analyse, interpret and understand it so that the management could make a decision on its adoption. The result of the qualitative research is the classification of these factors into three groups (Table 3): factors of internal environment (16 of them), of business environment (6 factors) and social environment (5 factors).

Table 3 Environmental factors of faculties for acquisition and assimilation of e-learning

FACTORS OF INTERNAL FACULTY ENVIRONMENT	
IO02	Support of senior management at the faculty level
IO03	The level of IT expertise of the employees of the Faculty
IO04	Level of IT infrastructure at the faculty
IO05	Pro-innovative attitude of the faculty management
IO06	Faculty funds available for R & D
IO08	Formalization of the rules, procedures and communication channels at the Faculty
IO09	Availability of human resources with the necessary knowledge and skills within the Faculty
IO10	Strategic planning of the adoption of new technologies and innovations at the Faculty
IO11	Systematic training of employees of the Faculty
IO13	The extent of education of the top management at the Faculty
IO14	The attitude and motivation of employees towards changes and lifelong learning
IO15	Available time within the faculty for acquiring new knowledge and technologies
IO16	Communication within the Faculty (formal and informal)
IO19	The exchange of knowledge as part of the work process
IO20	Organizational culture within the faculty which encourages innovation
IO21	Culture of mutual trust and cooperation within the Faculty
FACTORS OF BUSINESS ENVIRONMENT OF THE FACULTY	
PO01	Pressure of competitors in the higher education and research
PO04	The needs of the client, i.e. students and project partners to implement e-learning
PO06	The requirements of the labor market - the need for qualified staff educated at the college
PO07	Availability and support of suppliers of ICT software, equipment and services
PO09	Support of partners who work with teams from the faculty on joint projects involving ICT
SO06	Cooperation with foreign partners in the research, educational and development projects
FACTORS OF SOCIAL FACULTY ENVIRONMENT	
SO02	Government support for innovation through the adoption of regulations and incentives for innovation
SO04	Pressure of the government to set standards in the higher education system with requirements for the implementation of e-learning
SO07	The globalization of higher education and research
SO10	The intensity of technological change

Some of these environmental factors in Table 3 were identified in the model Begičević et al as significant direct criteria for the decision on the selection of the appropriate method of application of e-learning in colleges (Begičević, Divjak & Hunjak, 2007): human resources, ICT infrastructure for e-learning, or, indirectly through strategic readiness criteria, or legal and formal readiness for e-learning implementation. However, this model does not include external environment factors, as criteria for the decision on e-learning implementation. External environmental factors, such as the influence of the size and structure of the market - via seller behaviour and via buyer behaviour – as well as common regulatory environment, which may be a slowing factor in some cases and accelerating in mandating a particular technological standard, and which may affect a decision on the adoption of innovation, have nevertheless been recognized in some other models of diffusion of innovation (Hall, 2013).

In the group of factors of internal faculty environment there are subgroups related to management support, attitude and expertise; training and motivation of employees; flexibility of key processes; availability of infrastructure and funding as well as organizational culture.

Among factors of business environment the following subgroups can be recognized: needs of students and labour market; pressure of competitors and cooperation with partners on common projects.

Factors of business environment cannot be straightforwardly transferred to higher education because customer-based HE service originated from US-UK context is not accepted in continental Europe. However new policy EU documents adopted after 2010 put special stress on the development of employability in HE. It is noticeable within the Europe 2020 strategy (European Commission, 2010c) called *A Digital Agenda for Europe* (European Commission, 2010a), whose main aim is to define the key role that ICT will play in the upcoming decade if Europe wants to succeed. *A Digital Agenda for Europe* is supported by the *Agenda for new skills and jobs* (European Commission, 2010b) and *A New Skills Agenda for Europe* (European Commission, 2016), which are focused on supporting activities aimed at stimulating initiatives for employability of graduates.

In the group of factors of social environment there is a very strong subgroup of factors related to the role of government in supporting innovation and quality

standards development. Finally, factors of globalization and fast technology change are listed in that group.

6 DOI model in higher education

The analysis of previous studies of diffusion of innovation at the level of the organization and the results of the qualitative research has shown that the initial conceptual model of diffusion of innovations in HE can be upgraded in the model shown in Fig. 1.

Process of diffusion of innovation of e-learning through HE organization (faculty, higher education institution) starts by raising awareness on the need to adopt e-learning. This need can follow from the necessity, such as participation in a project with foreign partners, or to occupy or keep the existing position on the market, i.e. conservation of competitiveness or owing to the growing need of students for the application of this innovation.

In order for the management of a higher education institution to decide about introducing this innovation, it is necessary to perform the analysis of business opportunities and risks which follow after the decision on adoption or decision on non-adoption of innovation, as well as cost estimate, to provide required resources (finances, people, space, information and communication equipment, required licenses etc.). The team, work group for strategic planning, prepares the strategic plan for adoption of innovation, and the top management of the organization, or some other decision making body, adopts it and reaches a decision on moving on to the implementation phase. Therefore, the team shall include members of the organization with different authorities and responsibilities, from persons that have the possibility to lead this process throughout the organization, decision makers that are authorized to provide required resources, persons that will be able to monitor the progress of the process and manage the changes in the process, to persons that might be directly impacted by innovation adoption, motivated persons that might contribute to the process.

After reaching a decision on e-learning adoption, it is necessary to prepare a detailed action plan for its implementation. It shall include all required adjustments/changes of the existing work processes, starting from e-learning implementation on a selected pilot project by the team designated for implementation, then training and providing user support for the wider use, through continuous work with e-learning, as a widely accepted method of work in an organization, and the assessment of what was achieved and finding new ways and means to improve the entire work process (Fig. 1). Since the e-learning implementation is in many aspects technology-driven it is important to monitor implementation process very closely and adopt the action plan continuously. At the same time by use of learning analytics additional valuable information can be obtained in order to evaluate learning and teaching goals of e-learning implementation.

The process itself is affected not only by the previously acquired relevant knowledge and perceived characteristics of innovation, but also by the factors of social and external business environment, as well as factors of the internal environment of the particular organization in higher education.

There are several limitations of our research of environmental factors influencing initiation stage in e-learning adoption in HE. First of all, the research was conducted only in Croatia and with a rather small group of experts. Croatian HE system differs in a few crucial aspects from other EU systems. Especially governance of public HE is not clearly divided between state, university and faculty level in the sense of (de Boer et al., 2007). Furthermore, in Croatia the program agreement approach to HE governance is still lagging behind western EU countries. Then, the survey was conducted about the impact of environmental factors on the potential absorptive capacity, but not on the absorptive implementation capacity of the organization in higher education for the implementation of e-learning as an innovation, after the decision on its acceptance has been made. Finally, in higher education institutions that are “knowledge factories”, quite a lot of innovation can occur if supported and cherished.

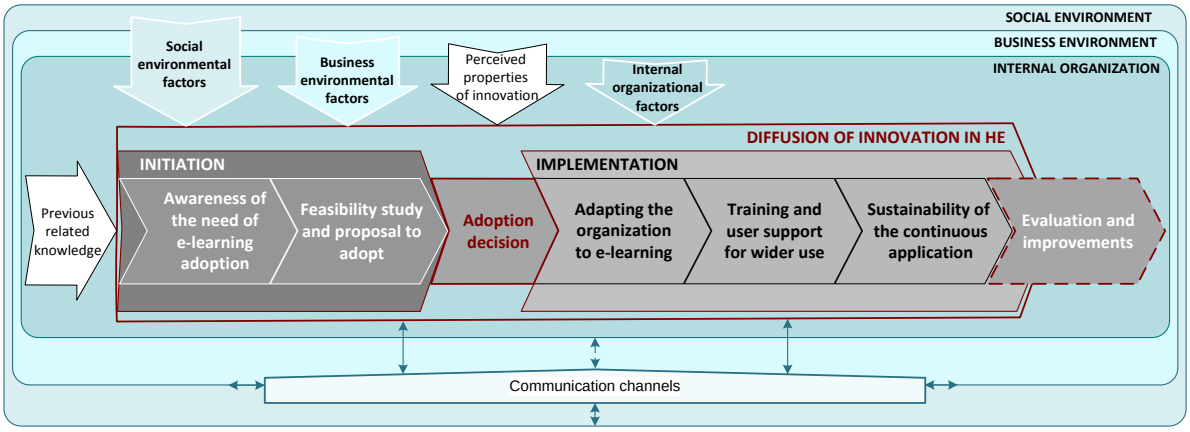

Figure 1 DOI model in HE

Therefore absorption capacity for innovation should be complemented by enabling capacity for creation of innovation.

On the other hand environmental factors of the developed DOI model recognized in this research related to e-learning as innovation are to certain extend transferable to other innovations within higher education context. The further research towards it can be done.

7 Conclusion

Through the proposed model of diffusion of innovation at the level of higher education institutions (universities and faculties) the problem of adopting innovations such as e-learning is c holistically. The very process of adoption of innovations at the organizational level according to Rogers' theory of diffusion of innovation has been complemented by the final phase "Evaluation and improvements", the phase in which the usefulness of the adopted innovation is assessed, and at the same time its improvements, i.e. starting of the new innovation cycle is made possible. The social system influences the process of diffusion of innovation through three basic levels: the social environment, the business environment and the internal environment of the organization, and this during the whole cycle of diffusion of innovation, which takes some time.

The time required for the initial part of the process, before making a decision on the adoption of innovations depends on the potential absorption capacity of the organization to accept innovation, while the implementation phase under the influence of an implementation of the absorption capacity of the organization to adopt the innovation. The study, which is described in this paper, identifies environmental factors, and social systems that affect the potential absorptive capacity of the organization to adopt innovation based on the case of the adoption of e-learning by universities and faculties in Croatia.

Such upgrading of diffusion of innovation models with the concept of absorptive capacity provided scientific contribution to the further development of these theories.

There are several limitations of this research. The first is related to the specifics of HE in Croatia. Then, the survey was conducted taking into account just the first phase of the developed DOI model. Finally, HE institutions are capable of producing their own innovations and it is not clear if the model captures that processes fully. Further research about inner innovation process should be performed. Additionally future research should show which capacities an organization needs to have in order to implement innovation, not just to adopt it. The last recommendation for further research is directed towards assessment if the factors identified here are transferable to other innovations within HE system.

Acknowledgments

This work has been partly supported by Croatian Science Foundation under the project Higher Decision IP-2014-09-7854.

References

Balaban, I., Mu, E., & Divjak, B. (2013). Development of an electronic Portfolio system success model: An information systems approach. Computers & Education, 60, 396–411.

Bates, T., & Sangra, A. (2011). Managing Technology in Higher Education: Strategies for Transforming Teaching and Learning. San Francisco: Jossey-Bass/John Wiley & Co.

Begičević, N., Divjak, B., & Hunjak, T. (2007). Prioritization of e-learning form: a multicriteria methodology. Central European Journal of Operations Research, 15(4), 405-419.

Buble, M. (2006). Menadžment. Split: Ekonomski fakultet.

Buć, S., & Divjak, B. (2015). Innovation Diffusion Model In Higher Education: Case Study Of E-

Learning Diffusion. Proceedings of the IADIS International Conference e-Learning, (pp. 205-207). Las Palmas, Spain : IADIS International Association for Development of the Information Society.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. Administrative Science Quarterly(35), 128–152.

DeVellis, R. F. (2003). Scale development: theory and application. London: Sage Publications.

De Bour, H., Enders, J., Schimank, U. (2007). On the way towards a new public management? The governments of education system in England, the Nederland's, Austria and Germany. In D. Jansedn (ed) New forms of governments in research organizations. Dorhdecht: Springer.

Divjak, B., & Begičević Ređep, N. (2015). Strategic Decision Making Cycle in Higher Education: Case Study of E-learning. Proceeding of the International Conference on E-learning 2015,(pp. 19-27). Las Palmas, Spain: IADIS International Association for Development of the Information Society.

Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., and Hall, C. (2016). NMC Horizon Report: 2016 Higher Education Edition. Austin, Texas: The New Media Consortium.

European Commission. (2010a). A Digital Agenda for Europe.

European Commission. (2010b). An Agenda for New Skills and Jobs: A European contribution towards full employment.

European Commission. (2010c). Europe 2020 - A strategy for smart, sustainable and inclusive growth.

European Commission. (2016). A New Skills Agenda for Europe: Working together to strengthen human capital, employability and competitiveness.

Gonçalves, A., & Pedro, N. (2012). Innovation, e-Learning and Higher Education: An Example of a University ' LMS Adoption Process. World Academy of Science, Engineering and Technology, 6(6), 258–265.

HigherDecision, n.d. *O projektu.* [Online] Available at: http://higherdecision.foi.hr/o-projektu [Accessed 16 05 2016].

Rogers, E. (2003). The Diffusion of Innovations (5th ed.). New York: The Free Press.

Sangrà, A., Vlachopoulos, D., & Cabrer, N. (2012). Building an inclusive definition of e-learning: An approach to the conceptual framework. The International Review of Research in Open and Distributed Learning, 13(2), 145-159.

Selim, H. M. (2007). Critical success factors for e-learning acceptance:Confirmatory factor models. 49, 396-413.

Singh, G., & Hardaker, G. (2014). Barriers and enablers to adoption and diffusion of eLearning. A systematic review of the literature – a need. Education+ Training, 56(2/3), 105-121.

Vishwanath, A., & Chen, H. (2011). Towards a Comprehensive Understanding of the Innovation-Decision Process. U A. Vishwanath, & G. A. Barnett (Ed.), The Diffusion of Innovation: A Communication Science Perspective (pp. 9-32). New York: Peter Lang Publishing.

Zahra, S. A., & George, G. (2002). Absorptive capacity: a review, reconceptualization, and extension. Academy of Management Review, 27(2), 185-203.