

Impact of lifelong learning on innovative processes in EU countries

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Abstract

The paper is devoted to the research of the state of lifelong learning in context of conditions of formation of innovative-oriented model of economy. The introduction outlines the importance of knowledge and innovation, the role of high-tech technologies in the processes of working activities of employees in forming of human capital of the country. The next stage was the research of scientific papers by the issue of lifelong learning. The aim of the paper is to continue the previous researches about the importance of lifelong learning for the employees, enterprises and countries in general and to put forward the hypothesis about the impact of lifelong learning on the innovative processes in current conditions of economy's development. In the paper a descriptive method is used - to disclose the existing information about lifelong learning, a graphical method - to demonstrate the constituent elements of the system of lifelong learning in conditions of development of innovative integrated structures and economic and mathematical modeling - to establish the relationship between lifelong learning, the global innovation index and indicator of state of cluster development of countries. In the paper the above-mentioned indicators of European countries of 2016 were analyzed, the source of which were the statistical information of international materials, in particular: Eurostat, Global Competitiveness Report and Global Innovation Report.

Key words: Knowledge, Modern innovative oriented economy, Lifelong education, Lifelong learning, Education innovation clusters, EU.

JEL Classification: A23, I25, J11, M00, P46

1 Introduction

According to the current conditions the development of country's economy without the stimulation of innovative orientation is impossible. The basis of innovative economy is high-tech production, which stipulates the increasing of the requirements for the professional qualification level of employees, in particular, the value of the intellectual component of employees. In addition, the intensive ascertainment in the production's process the knowledge-intensive technologies creates the need in regularly improvement of knowledge, skills and abilities of employees, which necessitate the creation of an effective system of lifelong learning and strengthening the factors which improving motivation for professional development.

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Thus, the aim of our scientific research is analysis of importance of lifelong learning under the conditions of innovative model of economy and relationship between lifelong learning and innovative-integrated structures on the example of EU's countries.. For the solving of this aim we consider that it's necessary to analyze the next goals. For the solving of this aim we consider that it's necessary to analyze the next goals: analysis the Global Innovation Index, the Indicator of state of cluster development and the Indicator of Lifelong Learning among the 30 EU's countries and the grouping the countries by these indexes. We put forward the following hypothesis that there is a statistically significant correlation between Global innovation index, the Indicator of state of cluster development and the Indicator of Lifelong Learning.

2 Methods

From standpoint of the methodology of our research in first phase of implementation, which are based on the research of foreign and Ukrainian literatures and the analysis of the results of one's own research. In our own research, we used the method of analysis and synthesis. The relationship between Global innovation index, the subindex of state of cluster development and Lifelong learning. These indicators have been selected from Eurostat Database, for the year 2016, the Global Competitiveness Report 2016, the Global Innovation Report 2016. The analysis has been carried out using Statistica Package.

3 Lifelong learning in innovative model of economy

Lifelong learning is a scope of researches of many scientists in different countries. Various forms of adult education and contents are analyzed by Rabušicová and Rabušic (2008), then professional adult education for example by Mužík (1999), Plamínek (2010), Veteška (2013) and Rabušicová (2013). Lifelong learning has been linked to a variety of benefits, for the individual, the economy and wider society (Field, 2009). Besides, the model of lifelong learning can help to the education systems have trouble finding ways of adapting to the need for innovation and including creativity in current teaching and learning processes (Sahlberg, 2009).

Knowledge and innovation are the main sources of progress in modern innovative oriented economy. Indeed, knowledge plays a key role in increasing human capital, which is one of the main drivers of economic progress and sustainable development in knowledge societies. It is not primarily what individuals know or do not know, but their skills in acquiring, utilizing, diffusing and creating knowledge that are important for the future.

Innovation is the extraction of economic and social value from knowledge. It involves putting ideas, knowledge and technology to work in a manner that brings about a significant improvement in performance. It is not just an idea but rather an idea that has been made to work. This means that innovation and entrepreneurship are required. Therefore, living in and working for a world of innovations requires fundamentally different attitudes, knowledge and skills from the citizens.

One of the traditional advantages associated with clusters of firms has been their capacity to engender greater innovation and to transform this innovation into economic growth. These "education innovation clusters" tend to draw people and resources from at least four regional sectors including education, the private sector, higher education and philanthropy.

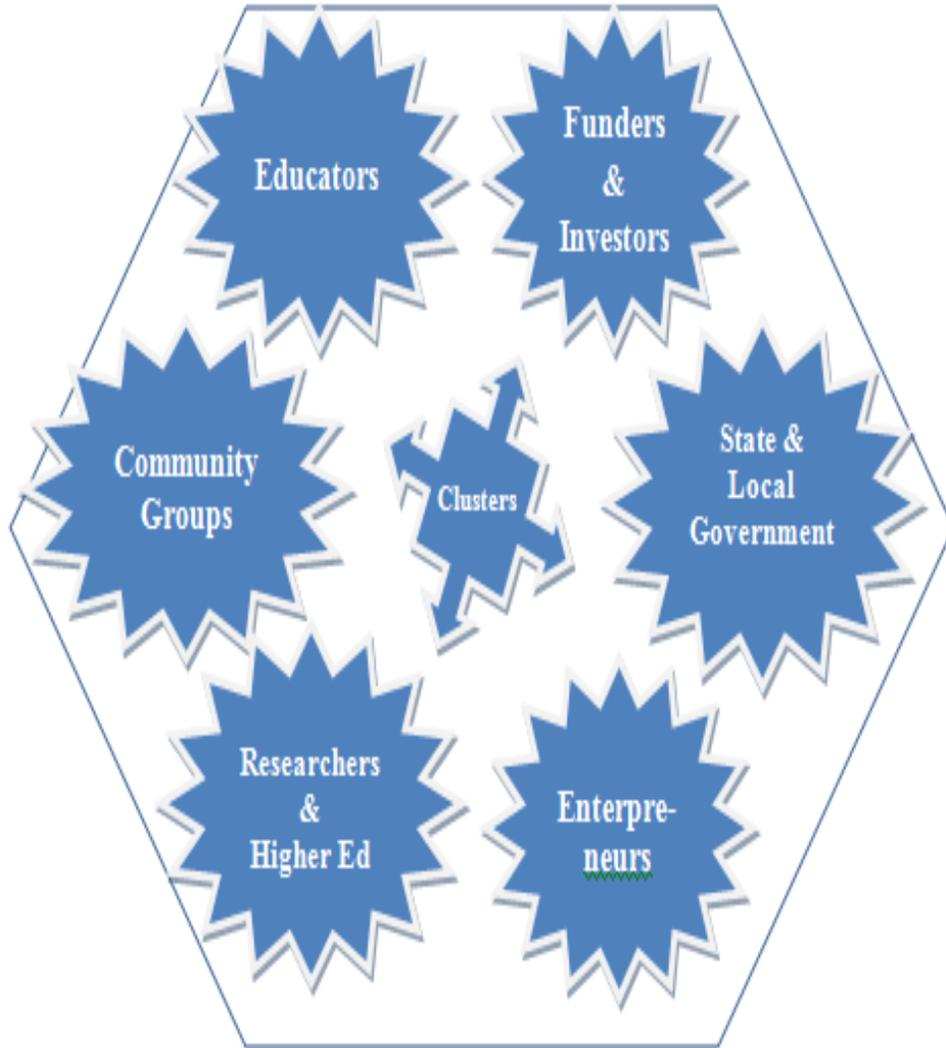


Figure 1 Stakeholders of clusterization
Source: Authors' own elaboration

In order to be able to contribute successfully to the development of innovation in the sustainable knowledge economy, education systems need to include working with and learning from innovations as a part of education policies. Innovations linked to future development and changes have three characteristics that are also relevant to lifelong learning.

The aim of many knowledge society strategies is an innovative society that provides security, happiness and prosperity to all citizens in ecologically sustainable ways.

The introduction of the high technologies into the production process creates the need to improve the knowledge and skills of the employees, the implementation of the continuous lifelong learning and appropriate incentives for the professional development. Lifelong learning is becoming more and more important for the countries that want to be competitive in the global knowledge economy. So the era of the 21st century is not only a new landmark development but, above all, a

transformational shift to the intellectualization as the process of the saturation of the information environment by the intellectual assets (Levchenko et al., 2017).

Lifelong education and learning are essential for achieving that dream. Nations’ dreams and visions differ in detail but the main idea is the same. For example, Himanen (2007) has suggested that for Finland this dream would be a genuinely caring and creative Finland. All modern national and multi-national strategies include the idea of creativity and innovation. Economic policies, especially at the time of fiscal disorder, count on strengthening investments in innovation and technology. Ecological sustainability will only be achieved through further creative solutions to emerging global problems. In fact, as Sachs (2008) eloquently asserts in his book *Common Wealth*, the global challenges of over-population, energy shortages and climate change can only be solved by new collaborative and creative actions of all nations. How can global education policies promote better mutual trust among nations, companies and individuals that is the conditional basis for risk-taking and creativity? Both trust and creativity are needed to fulfill the global dream of a secure, safe and ecologically sustainable world for all.

Over the last few years, educators, entrepreneurs, funders, and researchers have been joining forces to spur learning innovation in specific regions of the country and equip young people with the skills they need in a changing economy.

Analyzing the research, was conducted by Levchenko (Levchenko et al., 2017), we can observe a positive tendency of increasing the indicator of lifelong learning during the analyzed period. Under the influence of the 4th Industrial Revolution, the authors identified the interdependence between the global competitiveness index and lifelong learning, therefore, we are putting the next hypothesis about interrelation between the global innovation index, lifelong learning and the indicator of state cluster development in conditions of innovative-oriented economy.

The correlation analysis was conducted with using the programme Statistica 12.0, the achieved results are shown in Table 1.

Table 1 The Pearson’s correlation coefficient between the global innovation index, lifelong learning and indicator of state cluster development in 2016

	Global innovation index	Global cluster index	Lifelong learning
Global innovation index	1	0,9053	0,8249
Global cluster index	0,9053	1	0,7789
Lifelong learning	0,8249	0,7789	1

Source: Authors’ own elaboration

As we can see from Table 1, the value of the pair correlation is more than 0.5, which is evidence of a linear correlation between variables, namely: the strongest relationship is observed between the Global innovation index and the State of cluster development (0.905), that is, in the conditions of innovation-oriented economy the unification of countries not only on the territorial basis, but on the innovative vector which is chosen by the countries has a key role. An important factor for lifelong learning is countries’ ability to introduce the new technologies, to take into account the experience of leading countries, and cooperate with them in the direction of innovation development, like as confirmation of this view, we can observe a value of correlation between Lifelong learning and Global innovation index (0,8249), more less interrelation, but notable, in

correlation's coefficient between indicator of state of cluster development and Lifelong learning (0.7789).

Next, we consider to model 3D surface Plot of Lifelong learning against Global innovation index and State of cluster development, which is shown in Figure 2.

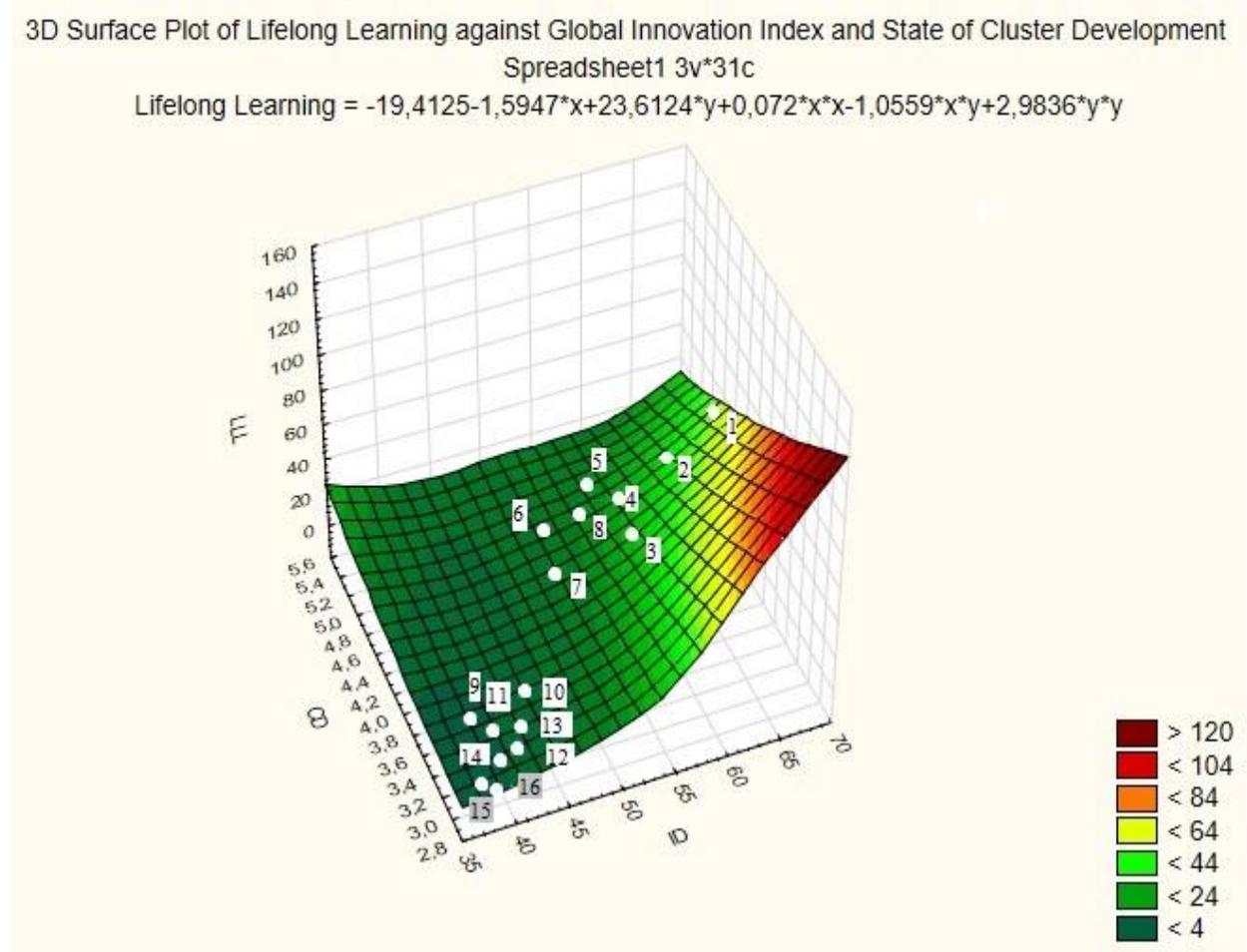


Figure 2 3D surface Plot of Lifelong learning against Global innovation index and State of cluster development

Source: Authors' own elaboration [date of release: 2016 EU, The Global Competitiveness Report 2016, Global Innovation Report 2016]

Note: LLL- Lifelong learning, ID- Global innovation index, CD- State of cluster development

1 - Switzerland, 2 - Sweden, 3 - Denmark, 4 - Finland, 5 - Netherlands, 6 - Norway, 7 - France, 8 - Luxemburg, 9 - Poland, 10 - Cyprus, 11 - Bulgaria, 12 - Latvia, 13 - Hungary, 14 - Lithuania, 15 - Romania, 16 - Croatia

Also, we guess that grouping of EU countries in different blocks for the indicators lifelong learning, global innovation index and state of cluster development, where the lifelong learning (from Figure 2) is the main can be found the common characteristics of the country strategy of such instrument as lifelong learning, the results of which are shown in Table 2.

Table 2 The grouping of EU countries for the indicators of Lifelong learning, Global innovation index and state of cluster development

The blocks of indicator of lifelong learning	Countries with coordinates of points according to the 3D surface Plot (LLL, ID, CD) (figure)	Characteristics of the main features of lifelong learning of countries
Highest 24,7>	Switzerland (32,9; 66,3; 5,1) Sweden (29,5; 63,6; 5,0) Denmark (28,9; 58,5; 4,6) Finland (26,1; 59,9; 4,9)	Lifelong learning for all is an important priority for Nordic cooperation on education. It covers all types of education, learning and lifelong skills enhancement in the traditional education system, in adult and continuing education, in ongoing vocational training as part of working life, and in a variety of other contexts in which people learn and develop their knowledge, skills and competencies.
High 24,7-16,5	Netherlands (18,8; 58,3; 5,3) Norway (19,5; 52,0; 5,2) France (19; 54,0; 4,6) Luxemburg (17,6; 57,1; 5,2)	The professional training is carried out both in the workplace and directly at the enterprise, financing for retraining goes centrally, as well as from the taxes of employers. The professors involved in training, in-service training and retraining are the ultimate goal that affects to the social and production state. The state is interested to share and to develop the lifelong learning to provide the increasing of productivity
Average 16,5-8,3	Austria (14,8; 52,6; 4,8) Estonia (14,8; 51,7; 3,8) United Kingdom (14,7; 61,9; 5,3) Slovenia (11,9; 46,0; 3,5) Spain (9,5; 49,2; 4,3); Portugal (9,6; 46,4; 4,2) Cheque Republic (8,6; 49,4; 3,8) Germany (8,4; 57,9; 5,4)	The model of lifelong learning is being implemented to the state's programs, but hasn't the permanent character, as result the involving of lifelong learning is not very popular among the employees
Lowest <8,3	Ireland (6,5; 59,0; 4,9) Belgium (7; 52,0; 4,6) Italy (7,9; 47,2; 5,4) Malta (7,5; 50,4; 4,2) Slovakia (3; 41,7; 3,9) Turkey (5,7; 39,0; 3,8) Poland (3,7; 40,2; 3,7) Cyprus (7,1; 46,3; 3,8) Bulgaria (2,1; 41,4; 3,6) Latvia (6,8; 44,3; 3,5) Hungary (5,9; 44,7; 3,4) Lithuania (5,8; 41,8; 3,3) Romania (1,4; 37,9; 3,2) Croatia (3,2; 38,3; 3,0)	Unlike previous groups, the model of lifelong learning in these countries is starting to develop, but despite on its importance - employees are not interested to start of involving, because there are lack of interest in this model employers and state in general. And in this conditions, these countries can not effective operate in innovative model of economy and be involved in creation process a new type of collaboration - clusters

Source: Authors' own elaboration

So, from Table 1, we can see, that the countries (Switzerland (32,9; 66,3; 5,1), Sweden (29,5; 63,6; 5,0), Denmark (28,9; 58,5; 4,6), Finland (26,1; 59,9; 4,9), Netherlands (18,8; 58,3; 5,3), Norway (19,5; 52,0; 5,2), France (19; 54,0; 4,6), Luxemburg (17,6; 57,1; 5,2), placed in the first quadrant with a value of lifelong learning from 17,6 to 32.9 - are characterized of high level of involvement of employees in lifelong learning, where an alternative form of professional training is used, which is considered like as the most effective form of training of qualified personnel, since the gradual and parallel increasing of the complexity of training and work accelerates the development of

modern processes, besides, for this group a high level of innovation activities, which, in turn, promotes the development of innovative-oriented structures is characterized too.

4 Discussion

We are agree with a view, that education and training are necessary for future innovations, but innovations are also needed to improve education systems according to the Slovenian EU Presidency in the field of education and training (Slovenian Presidency of the EU2008).

The obtained results of our research are confirmed our hypothesis about strong relationship between such indicators as Lifelong learning, Global innovation index and state of cluster development, besides the results are shown that the lifelong learning influences on the innovative processes in economy of EU countries, the correlation coefficients are evidence of this aspect, particular correlation coefficient between Global innovation index and state of cluster development is 0,905, Lifelong learning and Global innovation index is 0,825, which indicate about "direct" connection between these indicators (if one of them will increase, the value of other will increase too). As a result, we compared the countries by these indicators, first of all, for the leading-countries (Switzerland, Sweden, Denmark, Finland). Where we see that the countries which pay more close attention and implement the effective models of lifelong learning have more intensive pace of innovation development of their economy. Furthermore, in such countries educational policy covers all types of education, learning and lifelong skills enhancement in the traditional education system, in adult and continuing education, in ongoing vocational training as part of working life, and in a variety of other contexts in which people learn and develop their knowledge, skills and competencies.

5 Conclusion

Thus, summarizing the above, we have to conclude about the following: the main components of the development in the context of modern innovative economy are knowledge and innovation, which are in close interaction with each other. During our research, we analyzed the level of impact of lifelong learning and clusterization on the innovative component of the country's economy. The value of the correlation coefficients between these indicators are a quite high, this indicates about the direct dependence of these indicators and high impact on each other. The countries are grouped by the level of lifelong learning, the level of innovation in the country and the level of state of cluster development, and the peculiarities for each groups of countries are revealed. Therefore we consider, in current conditions, one of the effective instruments for the ensuring processes which are needed for innovative-oriented model of economy is the cluster structures, which allow the introduction of innovative technologies, using the experience of developed countries. Exactly, cluster structures are most innovative oriented and effective, and that's why the increasing of their quantity leads to the increasing of innovation activity of enterprises in country's economy and as result - sustainable development and national security.

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