

## The Impact of Lifelong Learning on the Country's Development in Dimension of Innovative Oriented Economy: Comparative Analysis

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### Abstract:

Under the conditions of knowledge-based economy and under influence of the 4th Industrial Revolution education has become a strategic factor of social development and achieving of this goal will be possible only through the population's involving the lifelong learning.

The purpose of this paper is to determine the dependence between competitiveness of any country and level of its lifelong learning under conditions of development knowledge-based economy. Particular actuality is associated with necessity of the lifelong learning in the process of working in dimension of innovative oriented economy. The study covers the relationship between the level of lifelong learning and level of the country's development, the impact of lifelong learning on it. As a result, it was defined, between competitiveness and level of lifelong learning exists a close relationship. The matrix shows the 4 groups of countries with different levels of competitiveness and lifelong learning. The achieved results of created matrix suggest that the instruments of Nordic model of lifelong learning is the most effective, as the results, these countries.

**Keywords** higher education; lifelong learning; knowledge-based economy; 4th Industrial Revolution; innovative oriented economy

**JEL Classification:** A23; D83; I23; O10; O47

### Introduction

The emergence of the global innovative oriented economy, where the center is has put a premium on learning throughout the world. Ideas and know-how as sources of economic growth and development, along with the application of new technologies, have important implications for how people learn and apply knowledge throughout their lives.

Now, the key four pillars of the knowledge based economy are:

- 1) economic institutional regime, which provides incentives for the efficient creation, dissemination, and use of existing knowledge;
- 2) education through an educated and skilled population that can use knowledge more effectively;

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- 3) information infrastructure to facilitate the effective communication, dissemination, and processing of information;
- 4) innovation consisting of organizations that can tap into the stock of global knowledge, assimilate and adapt it and create local knowledge.

This changes the role of universities, in particular, not just to train high level human manpower, but in context of knowledge based economy, which are now increasing critical, also as generators and disseminators of knowledge: R&D, Spin-off of high tech firms, Licensing of technology, Contract research with firms and public research, Consulting services.

The universities are also becoming important players in helping develop national competitiveness and development strategies. But under these conditions at the very center of what developing countries have to do to improve their prospects are improving access and quality of education; retraining and lifelong learning.

Thus, under conditions of the acceleration of updating the knowledge, the requirements of society are increasing to the quality of vocational education, constantly technology of training are updating, economic conditions are changing, in which the higher educational institutions work, exacerbated by competition on the market of educational and scientific services, the position of the state is changing to the higher education.

The scientists observed this trend: the more educated person, the more it needs to constantly update its knowledge. This explains the desire for career growth and demand for such employees, improve mobility, increase wages and personal motivation to develop. So, in a knowledge based economy education has become a strategic factor of social development and achieving this goal is seen as lifelong learning.

Lifelong learning is becoming a necessity in many countries. It is more than just education and training beyond formal schooling. A lifelong learning framework encompasses learning throughout the lifecycle, from early childhood to retirement, and in different learning environments, formal, nonformal, and informal. Opportunities for learning throughout one's lifetime are becoming increasingly critical for countries to be competitive in the global knowledge economy.

Lifelong learning is education for the knowledge economy. Within this lifelong learning framework, formal education structures - primary, secondary, higher, vocational, and so on—are less important than learning and meeting learners' needs (Lifelong Learning in the Global Knowledge Economy: Challenges for Developing Countries. The International Bank for Reconstruction and Development / The World Bank).

### **1. The idea of lifelong learning: Literature review**

The idea of lifelong learning is a new educational reality, which should be continued for the whole of your life. This idea is based on the emerging information society. Lifelong learning is not a new idea because in 1926 Eduard Lindeman had developed the main arguments in the meaning of adult education (Marcinkiewicz 2011).

Lifelong Learning has become the key leitmotif of education policy at the turn of the new Millennium (EC 2000, OECD 1996, UNESCO 1996). As a new and near-universal meta-discourse of policy, it seeks to address the secular trends which in all countries place heavy new demands on education, including those of demographic ageing, increasing cultural pluralism and social diversity and, not least, of the rise of the knowledge-based economy (Green 2003, OECD 1996). Within Europe, it has been charged with a major role in achieving the Lisbon Summit goals of making Europe the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion. In other words, Lifelong Learning is seen as crucial for the realization of the so-called Knowledge Economy. However, there are many different visions and models of Lifelong Learning, just as there are many different visions of the Knowledge Economy. The main hypothesis of this paper,

The purpose of the paper is to determine the dependence between competitiveness of any country and level of its lifelong learning under conditions of development knowledge-based economy. Especially, this issue is actual on the stage of strengthening of integration of components of Triple Helix, which impacts on the possibility of creating innovative-integrated structures. In this paper, we try to answer the following questions:

- What are the modern trends in Higher Educational Space in comparison with different countries?
- Why the lifelong learning is needed in current environment of knowledge-based economy?
- The correlation-regression analysis between Competitiveness of countries and level of lifelong learning and the possibility of modeling a matrix.

### **2. Research Results**

A knowledge-based economy relies primarily on the use of ideas rather than physical abilities and on the application of technology rather than the transformation of raw materials or the exploitation of cheap labor. It is an economy in

which knowledge is created, acquired, transmitted, and used more effectively by individuals, enterprises, organizations, and communities to promote economic and social development (World Bank Institute 2001c, World Bank 1998d). Knowledge can either be codified and written down or tacit and in people's heads.

The knowledge-based economy is transforming the demands of the labor market in economies throughout the world. But the ways for each country are not similar. Besides, the features and challenges of the knowledge at such society are being changing. The new trends include the following. In addition, the Table 1 shows how these trends are inherent to some countries.

Table 1. The characteristics of trends of higher education under conditions of knowledge-based economy in different countries

Trends	World	Ukraine	Poland	Czech Republic	Austria	Germany	USA	Norway	UK
Higher enrollment rates, especially in higher education	+	-	+	-	-	+	+	+	+
Older students in higher education	+	+	+	+	-	+	-	-	-
More participation of workers in continuing education	+	-	+	+	+	+	+	+	+
Growing need for training in ICT skills	+	+	+	+	+	+	+	+	+
Internationalization of higher education and training	+	-	+	+	+	+	+	+	+
Increasing private provision of education and training	+	-	-	+	+	+	+	+	+

Source: constructed by the author in accordance with Appendix 1.

The process of preparing employees to compete in the knowledge economy requires a new model of education and training, a model of lifelong learning. A lifelong learning framework encompasses learning throughout the life cycle, from early childhood to retirement. It includes formal, nonformal, and informal education and training. Formal education and training includes structured programs that are recognized by the formal education system and lead to approved certificates. Nonformal education and training includes structured programs that are not formally recognized by the national system. Examples include apprenticeship training programs and structured on-the-job training. Informal education and training includes unstructured learning, which can take place almost anywhere, including the home, community, or workplace. It includes unstructured on-the-job training, the most common form of workplace learning.

So, lifelong learning is crucial in enabling employees to compete in the global economy. As we can see at Table 2, the current society is changing the role of education, the direction and the relationship between participants of the educational process and expanding its capabilities. The traditional learning model differs from lifelong learning methods in important ways.

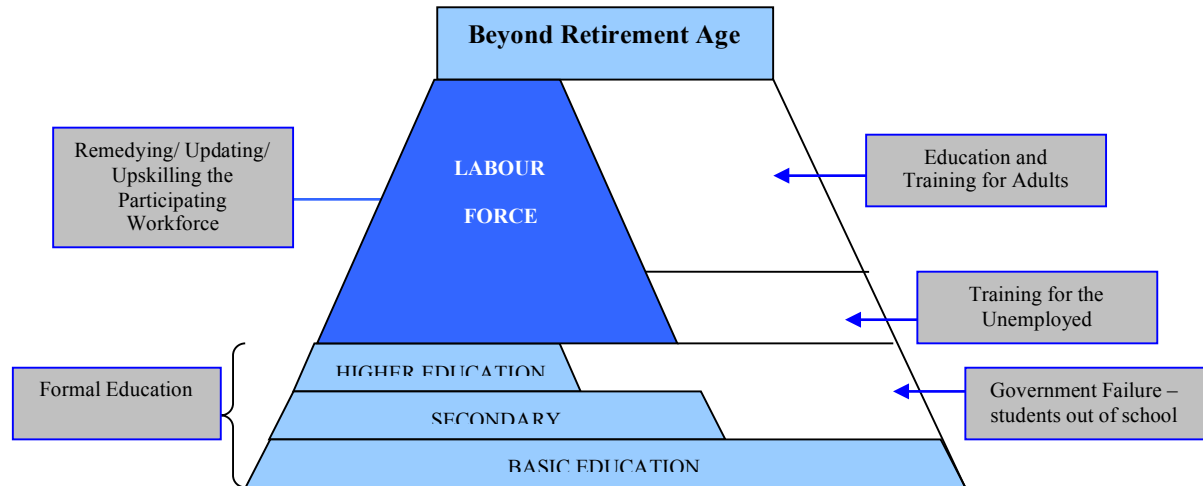
Table 2. The comparative characteristic of traditional and lifelong learning

Traditional learning	Lifelong learning
The teacher is the source of knowledge	Educators are guides to sources of knowledge
Learners receive knowledge from the teacher	People learn by doing
Learners work by themselves	People learn in groups and from one another
Tests are given to prevent progress until students have completely mastered a set of skills and to ration access to further learning	Assessment is used to guide learning strategies and identify pathways for future learning
All learners do the same thing	Educators develop individualized learning plans.
Teachers receive initial training plus ad hoc in-service training	Educators are lifelong learners. Initial training and ongoing professional development are linked.
Good learners are identified and permitted to continue their education	People have access to learning opportunities over a lifetime
The teacher is the source of knowledge	Educators are guides to sources of knowledge

Source: constructed by the author in accordance to the World Bank.

As we see, lifelong learning is more effective decision by ways of obtaining. It's not only educational process at different types of educational institutions, also process anyway and the main – the understanding the need of lifelong learning and desire of receiving. The need for the emergence of lifelong learning we can see in the picture below. Formal education is not able to cover all population of the world throughout their life, it can give some basics skills, abilities and competencies, on base of which a person can continue their professional development.

Figure 1. The necessity in lifelong learning



Source: Authors' own elaboration.

We must affirm, that education helps reduce poverty; if developing countries do not promote lifelong learning opportunities, the skills and technology gap between them and industrial countries will continue to grow.

During this (from 1970's) time, manufacturing began to be shifted into less developed countries to cut production and labour costs at the same time as overseas markets were explored for the export of products. The idea of a 'world economy' became more commonplace, and communication systems expanded with the evolution of electronic technology. In the West, there was an increased demand for skilled labour in what became known as a 'knowledge economy', leading to an interest in generating a more educated workforce (Gouthro 2017).

In the knowledge economy, there can be no doubt that for the individual, continuing to learn, whether by formal or non-formal means, is the key to gaining employment and income stability. The longer one has engaged in formal education and training as reflected in one's skills and qualifications, the higher one's income and the more likely one is to be employed (Power and Maclean 2011). This issue turns out the main reason that well educated and trained individuals earn higher incomes is that they have higher knowledge and skill levels, that is, higher qualifications are simply a proxy for more skills (Maclean and Wilson 2009).

Learning throughout life leads to improved human capital and labor productivity, and this in turn is the major contributor to economic development (Banks 2008). Thus, at present, the main tool of the general evaluation of the competitiveness of countries is the Global Competitiveness Index, which is compiled of 113 variables that detail the competitiveness of the countries of the world. It was this indicator that we defined as the main resultant the economic development of the countries of the world.

To quantify the strength of the relationship, we can calculate the correlation coefficient. In algebraic notation, if we have two variables  $x$  and  $y$ , and the data take the form of  $n$  pairs, then the correlation coefficient is given by the following equation:

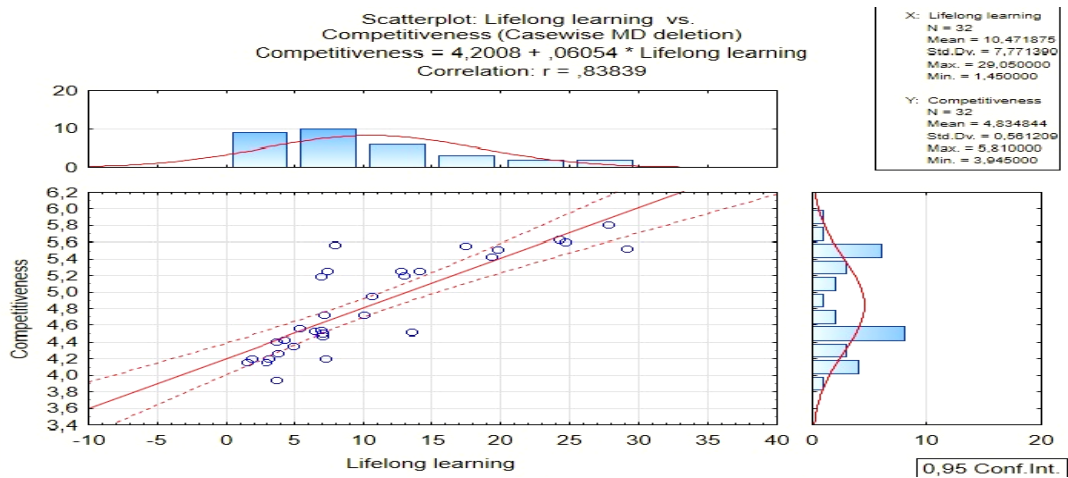
$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}}$$

where:  $\bar{x}$  is the mean of the  $x$  values, and  $\bar{y}$  is the mean of the  $y$  values.

This is the product moment correlation coefficient (or Pearson correlation coefficient). The value of  $r$  always lies between  $-1$  and  $+1$ . A value of the correlation coefficient closes to  $+1$  indicates a strong positive linear relationship (*i.e.* one variable increases with the other). Further, according to our hypothesis, calculate the degree

of relationship Competitiveness and Lifelong learning, taking into account the indicators of countries of EU in dynamic (2006 and 2016).

Figure 2. The ratio of correlation between *Competitiveness* and *Lifelong learning*



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

A correlation coefficient shows the degree of linear dependence of  $x$  and  $y$ . In other words, the coefficient shows how close two variables lie along a line. In our occasion,  $y$  (Competitiveness) is dependent variable and  $x$  (Lifelong Learning) - independent variable. The relationship between competitiveness and lifelong learning depicted in Figure 2 has a really high correlation of 0.83.

Besides, we consider, that the modelling of regression model can be useful in process of our analysis. The purpose of regression analysis is to analyze relationships among variables (in our analysis - Competitiveness and Lifelong learning), where the results serve the following two purposes: a) answer the question of how much  $y$  changes with changes in each of the  $x$ 's ( $x_1, x_2, \dots, x_k$ ), and b) Forecast or predict the value of  $y$  based on the values of the  $X$ 's.

Call:

`lm(formula = form, data = data)`

Residuals:

Min	1Q	Median	3Q	Max
-0.56749	-0.18197	-0.04802	0.10044	0.89950

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	4.263344	0.104574	40.77	< 2e-16 ***
LLL	0.048471	0.007246	6.69	2.45e-07 ***

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.3422 on 29 degrees of freedom

Multiple R-squared: 0.6068, Adjusted R-squared: 0.5932

F-statistic: 44.75 on 1 and 29 DF, p-value: 2.448e-07

Statistic significance of the model:

H0: model is not statistically significant

H1: model is statistically significant

p-value:  $2.448e-07 < 0.05$  we reject null hypothesis and we approve alternative hypothesis that model is significant. This model describes 59,32 % of variability of dependent variable (Competitiveness)

Statistic significance of the variables:

H0: variable is not statistically significant

H1: variable is statistically significant

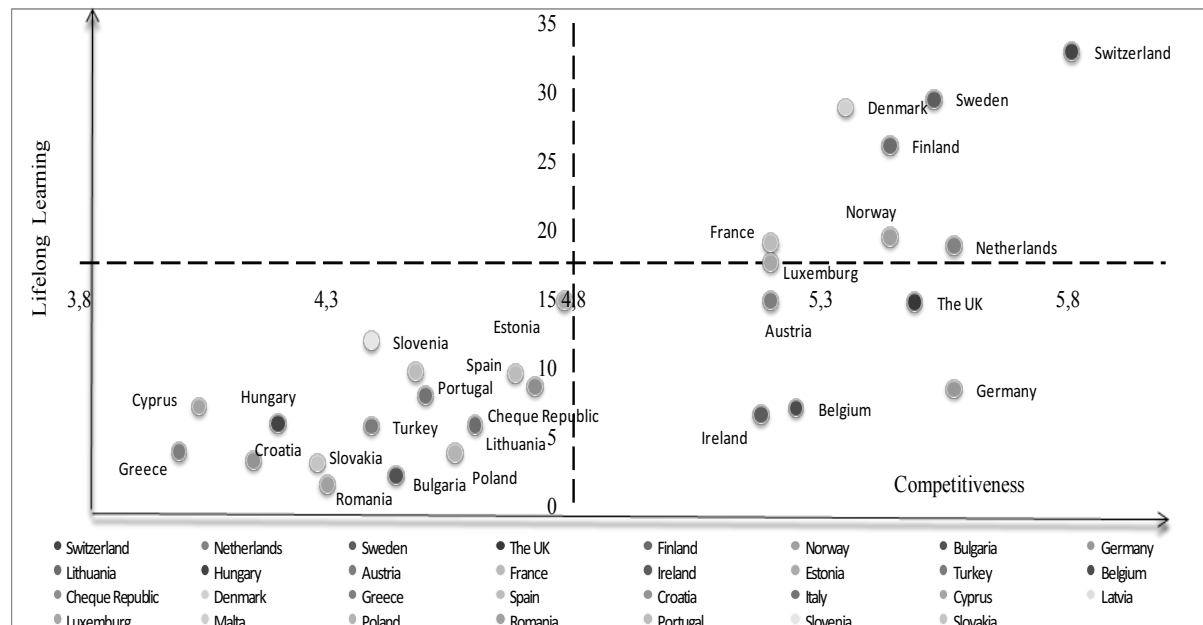
p-values:  $2.45e-07 < 0.05$  (LLL) we reject null hypothesis for both variables and we approve alternative hypothesis that variable lifelong learning is significant.

Interpretation the results:

Ceteris paribus: if the lifelong Learning (level of its) will increase by one percent Competitiveness of country will increase by 0.048% ~ 0.05 %.

Next, we consider it necessary to group countries in a matrix, which consists of indicators for the competitiveness of countries and level of lifelong learning (Figure 3).

Figure 3. Matrix of Competitiveness and Lifelong learning of European Countries



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

As are shown in the matrix (Figure 3), to the countries, which located on the "stars" position of Matrix, include the following: Switzerland, Sweden, Denmark, Finland, Norway, France, Netherlands, Luxembourg. They are characterized by a high rate of lifelong learning, as evidenced by an increasing in the trend towards lifelong learning and the majority of the high rate of competitiveness.

To verify the availability of the direct relationship between the level of wages in these countries and indicators of lifelong learning and competitiveness, we are analysing, these indicators of the top countries and outsiders, for example, the minimum wage in Switzerland consists of 5.716,65 Euros and accordingly, involving in Lifelong learning - 32,9%, in Denmark - 5.064,53 euros and 28,9% of lifelong learning, Norway - 4.557 euro and 19,5%, while in Croatia - 782,86 euros, and lifelong learning - 3,2%, in Poland - EUR 453, lifelong learning - 3,7%, in Romania - 275 euros and 1,4% of lifelong learning.

So, through the made comparative analysis, we found the following conclusion, that the greater level of coverage of lifelong learning, the higher rate and the competitiveness of the country's population is financially secured, as evidenced wages. Instead, Ukraine, salaries are comparatively low, namely 122 euros in 2012 and 110 euros in 2017, which in 10 times less than in developed countries. Concerning the process of involving of lifelong learning in Ukraine - insignificant. Issue of lifelong learning is actual in whole world and the attention to its is increasing each year. But, unfortunately, not in Ukraine. As the evidence, the quantity of searching in this field in the world Internet search engines: Lifelong learning - 174000000, professional development training - 156000000 and human development - 54400000 and, for example, the same words in Ukrainian Internet search engines, in Ukrainian or Russian language - 2400000, 636000 and human development - 1890000, which underlines about the lack of interest from the side of searcher of information, ie lack of motivation to teach the essence "lifelong learning". This can be explained by the lack of a clear relationship between wages and educational levels, ie value added in wages, which makes de-motivation to involve of process of lifelong learning.

## Conclusion

In the paper we demonstrate that the dissemination of process of lifelong learning is one of the trends inherent in the evolutionary stage of the educational space and the strengthening of the competitiveness of the economies of the world, because, in terms of process of clustering, as a form of innovative restructuring at current stage of development of global economy, it is an extremely important aspect of the quality of the workforce. Of course, as we defined, between competitiveness and level of lifelong learning exists a close relationship. The matrix shows the 4 groups of countries with different levels of competitiveness and lifelong learning. The achieved results of



created matrix suggest that the instruments of Nordic model of lifelong learning is the most effective, as the results, these countries.

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### References

- [1] Banks, G. 2008. Australia's Productivity Challenge and Human Capital. Presentation by the Chair of the Productivity Commission. Brisbane: Eidos Institute. August, 2008.
- [2] Green, A. 2002. The Many Faces of Lifelong Learning: Recent Education Policy Trends in Europe. *Journal of Education Policy*, 17(6): 611-626.
- [3] Levchenko, O.M., Levchenko, A.O., Horpynchenko, O.V., and Tsarenko, I.O. 2017. The impact of higher education on national economic and social development: comparative analysis. *Journal of Applied Economic Sciences*, Volume XII, Summer, 3(49): 850 – 862.
- [4] Maclean, R. 2005. Re-orientating TVET for Sustainable Development (Special Issue), Prospects: Quarterly Review of Comparative Education. Volume XXXV, No. 3, September. International Bureau of Education, Geneva.
- [5] Marcinkiewicz, A. 2011. Institutions of higher education and the idea of lifelong learning. *Journal of Education Culture and Society*, 1: 5–18. DOI: <http://dx.doi.org/10.15503/jecs20111-5-18>
- [6] Patricia, A., and Gouthro 2017. The promise of lifelong learning. *International Journal of Lifelong Education*, 36(1-2): 45-59. DOI: 10.1080/02601370.2017.1270067
- \*\*\* Educational expenditure statistics – Eurostat. Available at: <http://ec.europa.eu/eurostat/data/database/>
- \*\*\* European Commission 2000. A Memorandum on Lifelong Learning at website. Available at: <http://europa.eu.int/comm/education/life/memoen.pfd>
- \*\*\* Lifelong Learning in the Global Knowledge Economy: Challenges for Developing Countries. *The International Bank for Reconstruction and Development / The World Bank*
- \*\*\* OECD 2015. Education at a Glance 2015: OECD Indicators. OECD Publishing. Available at: [http://www.oecd-ilibrary.org/education/education-at-a-glance-2017/a4-2-tertiary-attainment-among-adults-who-have-at-least-one-parent-who-attained-tertiary-education-by-type-of-programme-and-age-group-2012-or-2015\\_eag-2017-table33-en/](http://www.oecd-ilibrary.org/education/education-at-a-glance-2017/a4-2-tertiary-attainment-among-adults-who-have-at-least-one-parent-who-attained-tertiary-education-by-type-of-programme-and-age-group-2012-or-2015_eag-2017-table33-en/)
- \*\*\* The International Bank for Reconstruction and Development. *The World Bank*. Available at: <http://www.worldbank.org/en/who-we-are/ibrd>
- \*\*\* The Global Information Technology Report 2016. *World Economic Forum*. Available at: <https://www.weforum.org/reports/the-global-information-technology-report-2016>
- \*\*\* The Global Competitiveness Report 2016-2017. Available at: <https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1>
- \*\*\* OECD (Organisation for Economic Co-operation and Development) 1996. Lifelong Learning for All. Paris: OECD.
- \*\*\* UNESCO 1996. Learning - The Treasure Within. Report of the International Commission on Education for the 21st Century. Paris: UNESCO.

## Appendices

Appendix 1

Countries	Indicators													
	Higher enrollment rates, especially in higher education* (GCI)		Percentage of adults who have attained tertiary education, by_type_of_programme_and_age_group* (Ed. at Glance)		More participation of workers in continuing education (GCI)		Networked Readiness Index* (GIT)		Networked Readiness Index* (GIT)		Increasing private provision of education and training. 2004/2016 (Eurostat)			
	2006	2016	2006	2016	2006	2016	2006	2016	2008	2014	pub	pr	pub	Pr
Ukraine	14	11	12399**	25781	75	804,1	N/A	64	N/A	N/A	N/A	N/A	N/A	N/A
Poland	21	25	18	27,7	58	3,7	13	42	m	1,2	71,4	28,6	72	28
Czech Republic	38	32	14	22,1	34	8,6	16	36	5,1	3,1	95,3	4,7	87	13
Austria	32	15	18	30,5	17	14,8		20	12	4,2	90,3	9,7***	84	16
Germany	32	35	24	27,6	16	8,4	28	15	m	4,5	100	a	92	8
The United States	4	5	39	45	7	N/A	17	5	3,3	0,3	73,6	26,4	72	28
Norway	5	21	N/A	43	10	N/A	100	4	1,9	N/A	86,2	13,8***	83	17
The United Kingdom	23	36	N/A	43,4	9	14,7	N/A	8	14,1	1,5	a	100***	a	100

Source: Authors' own elaboration [The Global Competitiveness Report 2016; Education at a Glance; The Global Information Technology Report; Educational expenditure statistics - Eurostat]