

Human Capital, Innovation and Flexibility of the Labor Force as a Source of Economic Growth¹

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Abstract

Dominant sources of the economic growth in the 21st century are human capital, innovations and flexibility of labor force. The aim of this paper is to identify the problems associated with current trends in the development of new technologies. These trends have had various negative consequences, such as: irreversible loss of many jobs, the emergence of structural unemployment and the subsequent transfer of labor force between economic sectors. One way to mitigate the negative effects of these processes is to support the formation of human capital, strengthening the competent adaptability and mobility of labor which will help to build social and emotional resilience to shocks in labor markets. At the same time, more demands are and will be placed on a man than in the past, not only at the level of knowledge, willingness to acquire professional knowledge, but also at the level of more commitment, perseverance, creativity, purposefulness, ability to get ahead and achieve something, ability to carry a certain amount of risk and responsibility for his personal progress as part of human capital of an individual. A close relationship between the creation and transfer of knowledge in the information society creates for everyone a challenge to sustain and enrich their competencies continuously. Since humans are continuously learning, human capital is constantly forming and developing. In the paper following research methods have been used: analysis, synthesis, induction, deduction, historical-logical method, secondary sources and case studies.

Key Words: Human capital, labor market, technological innovation, knowledge, workforce flexibility

JEL Classification: E 24, O 3, O 4

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1. Introduction

Empirical analyses suggest that successful emerging economies are now based on knowledge (knowledge-based economy). Authors that write about the post-industrial society, informational society or knowledge-based society (J. Naisbitt, 1982; R. Dahrendorf, 1991; P.F. Drucker, 1993) agree that education, knowledge and information become the most important source of value and wealth. The economic concept of human capital was introduced into economic theory by Milton Friedman; the further elaboration of the concept is associated with economists claimed to the Chicago school, especially T.W. Schultz and G. Becker. Investment in education, as a part of a human capital, is currently viewed as one of the most important tool for increasing the competitiveness of an economy, it increases the flexibility and professional mobility of labor force, it contributes to the growth in labor productivity, it allows the labor force to adjust the fluctuations of the economic cycle and so moderate the social problems. In our paper I will discuss the impact of human capital and investment into science and education on competitiveness and economic growth of the Slovak economy as an indicator of its innovative position, including a comparison with the countries of Visegrad Group.

Slovakia is a small highly open economy with high share of industry on GDP. Automotive is the dominant industrial sector with key companies: KIA, PSA, Volkswagen and Jaguar Land Rover. Slovakia produces highest number of cars per capita in the world. Education as influential factor on formation of human capital is a key prerequisite of technological advancement and innovation. My motivation for this paper is to show problems and paradoxes connected with formation of knowledge-based economy in Slovakia.

In the chapter "Literature review" I summarize concepts dealing with technological innovations, investments into human capital as key factors for economic growth in the 20th and 21st century. Chapter "Methodology" presents research questions and data. "Results and Discussion" chapter is presenting research results with comments. Last chapter "5. Conclusions and Recommendations" concludes suggestions resulting from research results for Slovakia.

2. Literature Review

In the early '90s of the 20th century, there have been an come up of new technologies in the advanced economies, which have had a significant impact on their functioning. These new technologies effectuated a significant change – to the traditional factors of production, such as land and working capital, knowledge and Innovation began to be assigned as separate factors of production. Consequently, processes associated with the impact of new technologies on an economy are considered as factors conditioning the transition of an economy to a new quality level, which is often designated as knowledge economy. This qualitatively new stage of development of economies is also called society based on knowledge, awareness and information.

The process of globalization, in particular massive development of information technology, have facilitated an easier accessibility of knowledge, which at the same time became an important determinant of economic growth. The ability of individuals and countries to benefit from the knowledge economy largely depends on human capital, viz. education, skills, talents and abilities of people (OECD, 2007). The concept of human capital is associated with education, teaching, health and other activities that are part of an individual's life. In this context, there is a common assertion that nations invest in human capital, knowledge, education, health and its values. Thus, creating and increasing the level of human capital is significantly associated with investments in education.

In the context of Europe 2020 (European Union growth strategy for this decade), investment in education are considered to be a key priority. This requires in particular political actions and initiative by public authorities, especially those responsible for education. The task now is to elaborate and adopt intelligent investment policies to promote the development of human capital for an overall improvement of employment, economic growth and social inclusion. The European Commission clearly reveals the dual challenge faced by European countries. First, it is necessary to focus on "priority of public investment in education and professional practice" because "it is the key to an increase of productivity and economic growth". Secondly, it is crucial "to find more efficient ways for allocation of available financial resources that might require structural reforms of education systems" (COM, 2012).

Economic growth in the knowledge-based economy is clearly associated with increasing role of human capital. Investments in education increase the total income (G. Becker, 1996), (M. Friedman, 1970). Income from investment in human capital (for example wages, pensions and wealth) is currently higher than the returns on investment in other areas. Empirical analyses suggest that successful emerging economies are already based on knowledge (knowledge-based economies). The economic expression of human capital was introduced into economic theory by Milton Friedman (1970), and it was further elaborated by economists identifying themselves with the Chicago School, especially by T. W. Schultz and G. Becker. The Chicago School of Economics understands the education process as the process of investing into human skills. It applies knowledge generally applicable to investment process. The School understands education not as the process of consumption and the money spent on it not as consumer expenditures (reducing the savings rate). The Chicago School understands education as a human capital and cash expenditures on education relate to investment expenditures. In economic theory, we know Becker's economic approach regarding to decision about education, which is well elaborated in his book *The Human Capital* (1964). Becker assumes that in all fields of human decision-making (including education), man applies the same principle: compares the costs and benefits in each decision.

The costs of education as an investment consist not only of explicit costs such as tuition fees, the cost of literature sources or study aids, but also by opportunity costs, which depend on the amount of time needed to obtain the education. This value is often expressed through the net lost wages as income from second best opportunity that one does not collect, yet it is a part of investment in education. Inspired by the work of Mincer (1974), there has been given more attention to empirical research and investment in human capital. For the importance of education and job training for the formation of human capital, there was used a simple regression analysis of the relationship between wages and years of education, which was extended by a rough estimate of the job training and practical work experience after finishing school education.

Human capital has unlike physical capital a specific character. Its proprietor is man, who possesses certain skills which he can obtain primarily in education and practical experience. Human capital is education with learning process at all types of schools, cultivated on the basis of gifts and talents. It is also supported by personal characteristics of a human such as persistence, purposefulness, communicability and it is completed by behavior, garment and overall appearance. The human capital theory was significantly enriched by Becker (1962) and Oi (1962) by distinction between general preparation or knowledge and specific training based on knowledge. School education largely allows obtaining general human capital used in several companies, whereas specific knowledge on the level of one company – specific human capital is useful only in the company which is providing the education. Specific human capital should thus be captured in the accounting as one of the main assets of the company. Investments that are intended for use in a particular company must be shared both by employers and by employees, too (both parts should seek to make maximal rent). Rent and divergence of interests (arising from specific investments) play a crucial role in the modern theory of the company organization.

Investments in human capital are one of the sources of economic growth (Schultz, 1963). The idea of the links between human capital and economic growth is used in formalized models of endogenous growth, which revived the issue of human capital in the late '80s and '90s.

The breach of the concept of human capital into economic theory was also supported by other factors. One was the emergence and gradual increase, and thus the availability of databases with empirical data. These databases contain data of various countries and, in addition to the underlying macroeconomic and demographic indicators, they traditionally include non-economic variables such as education and health care. Another factor was the emergence of measures and studies quantifying the degree of knowledge and skills of individuals, which enabled empirical studies of the relationship of human capital and the economic success of individuals as well as entire economies. Finally, the endogenous growth theory developed in its boom the concept of space for more intensive exploration of new, previously hidden growth

factors, and thus paved the way for more intensive investigation of human capital (Knight, 1996).

The specificity of human capital is reflected in the mechanism of its production or reproduction. The bearers of human capital are people. Creating human capital means working with the individuals, tutoring and educating them. It is an area, in which economics is confronted with psychology, pedagogy and other sciences concerning individuals. Even investments in human capital do not go as far as the investment in physical capital. This makes it difficult to observe the interrelationships of human capital and other economic variables. The impact of the state on the amount of human capital in the economy is realized through a number of specific institutions. They are primarily schools of all levels, further extracurricular activities, training facilities and workplaces, academies of sciences and others. Indirect institutions are also active in this process - libraries, the Internet, autodidactic tools, pedagogical programs and other. So, the state does not invest directly in individuals, but in institutions that increase human capital in individuals. A very important institution that creates human capital is the family. An individual acquires basic knowledge and skills in the family. Each parent has some human capital that is to some extent transferred to children (Dobeš, 2003). Depending on how much time the parent spends with their children, how intensely and with what kind of love (Becker, 1996, calls it social capital), the human capital of parents is transferred to the human capital of children. The state does not have the opportunity to intervene directly in family processes, but it can positively influence the transfer of human capital in families by appropriate family support policies.

Creating the human capital is primarily about transferring human capital from one person to another. Human capital itself is therefore a very important part of creating new human capital. Such interconnection creates a self-empowering (or self-debilitating) effect. A higher number of human capital in the society allows faster growth of human capital. On the contrary, if the amount of human capital is reduced (for example by reducing investment), an additional reduction in the creation of new human capital can be expected due to the decline in the source of its own creation. Human capital thus has a two-fold role: it is its creator and the result of its work. The accumulation of human capital increases its impact on economic growth (Goetz, Hu, 1996).

Educated person, who is disposing of high human capital and willing to use existing opportunities to acquire new knowledge, can change the work position, which gives him certain independence for a specific job. This concept of job security is broader and means a sustained participation of a person in the working process, which creates an active employment on the mobile labor market. One of the premises for improving the situation on the labor market and reducing unemployment in the conditions of globalization, when there is an acceleration of technological change, is increasing the flexibility of the labor force. Flexibility is generally

perceived in a broader context as customizing salaries, spatial mobility, new forms of employment and work organization and ability of maximal utilization of human capital.

Bishop (1994, according to Blundell et al., 1999) speaks of innovation as a link between human capital and the performance of an economy. In his study, he observed 7.8-percent impact of education on innovation rate of work. Investment in education is related to progress in science and provides the opportunity for innovation and quality improvement. Similarly, Schultz (1963) states that the ability of people to adapt to a changing economic environment or a new technology, is closely related to the extent of their human capital. Human capital thus has a positive impact on the creation of new technologies through innovation, while helping to adapt the society to the use of new technologies. The low level of social and human capital is projected to a low level of technical progress in the economy. These studies indicate that there are several channels, in which human capital has impact on Gross Domestic Product (GDP). The synthesis of these activities is resulting in the effect of determining the economic performance by human capital.

Investments in capital goods as well as investments in human capital are related to technological changes and technical progress. Labor productivity significantly influences the ability and readiness of people to develop, invent and use new, more modern and more efficient technologies. Increase of labor productivity is supported by product and technological innovations anticipated by inventions. An invention is a new idea, the result of human creativity. The invention itself does not produce an economic effect. Innovation is an application of invention to economic practice, requiring entrepreneurial investment (Lisy et al., 2005). The father of the theory of innovation is an Austro-American economist of the 20th century, J. A. Schumpeter, who, unlike neoclassical economists, emphasized the dynamic aspect of the economy. According to Schumpeter, an economy has to not only grow but also evolve, by promoting new combinations, i.e. innovation (Lisy et al., 2011). The introduction of innovation fundamentally changes the functioning and structure of an economy. This mechanism of extinction of ineffective firms and the emergence of new, more efficient structures Schumpeter calls "creative destruction" (Lisy et al., 2011). An example of creative destruction that also influences regional development can be seen in current clusters where innovative businesses associate with universities, financial institutions and public authorities (e.g. Silicon Valley - IT technologies).

3. Methodology

3.1 Research Questions

In our paper we describe two research questions. One is the exploration and comparison of the innovation performance of the Slovak economy with respect to human capital as a prerequisite for economic growth. The second question is focused on the analysis of the current

state of tertiary education and investment in education in the Slovak Republic as a prerequisite for the formation of human capital. In the contribution are used following methods: analysis, synthesis, induction, deduction, historical-logical method, secondary sources and case studies. In the end author suggests some suggestions for increasing of the competitiveness of the Slovak Republic.

3.2 Data

The basic data base used in this contribution is the Eurostat database, the OECD and the database of the Slovak Center of Scientific and Technical Information.

We understand research and development as a creative work done systematically to expand the knowledge base (including knowledge of an individual, culture and society) and to use this knowledge to develop new innovations. Eurostat's research and development (R&D) expenditure statistics are compiled on the basis of the guidelines set out in the Frascati Manual (2002 edition) published by the OECD. In some countries, the transition to the 2015 guidelines started. R&D statistics include internal spending, meaning all research and development expenditure spent by enterprises or institutions in each sector of the economy in the EU Member States. R&D intensity for a given country is defined as total R&D expenditure, expressed as a percentage of Gross Domestic Product (GDP).

4. Results and Discussion

Competition based on low labor costs, low taxes, and low innovation in the domestic business sector may at some point ensure high growth rates. However, this type of competition is not demographically neutral. The aging population is exerting pressure on the expansion of the public finance spending, particularly in the area of health, social and retirement care. In the age of the knowledge economy, research and innovation are the primary source of economic growth. A country that has the ambition to increase its competitiveness must invest in science education and technological innovation, so that it must invest in human capital.

The Competitiveness Index denotes the country's potential to achieve sustainable economic growth over the medium term and the ability of companies to move forward in the future. It reflects the way the country is managed. It's basically a sort of perspective. In particular, the quality of public institutions or government policies in relation to the creation of an entrepreneurial environment is assessed. If the country moves up in this ranking, its businesses will likely be more successful in foreign markets in the future.

Among the most important objective factors contained in the WCY index of the Institute for Management Development in Switzerland, are the levels of economic growth, national wealth, investment flows, trade and balance of payments, employment, price levels, development and deficits of public budgets, labor productivity, education, technology levels, research, health care, and other indicators. The WCY index covers 61 countries including Slovakia. For several

years, Switzerland has been at the top of the list. In 2016, it was followed by Singapore, the US, and the Netherlands.

Slovakia's position on the Competitiveness Index was markedly negative by the economic crisis of 2008, which was fully reflected in 2009. Slovakia was in 2015 just ahead of Hungary, which is in 48th place. It should be noted that Slovakia was among the highly competitive countries (30th place) between 2007 and 2009, which it has not managed to maintain for the rest of the year.

Compared to the closest neighbors, Slovakia is behind the Czech Republic (29th) in the terms of best-performing business environment, which is also the most successful country in the Visegrad Group (V4), and which has improved up to four places this year. Next is Poland, which is on the 33rd place, improving by 3 places.

The main cause of the deplorable state of science in Slovakia is a misunderstanding of the knowledge-based economy, as well as the role of science in promoting the competitiveness of the economy in the information age.

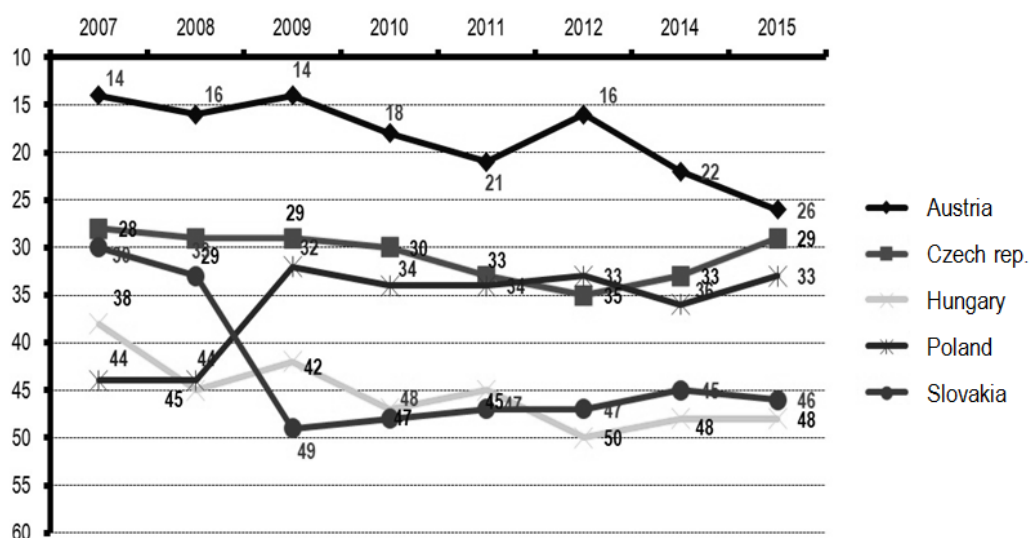
The level of competitiveness is regularly evaluated by the World Economic Forum (WEF) through the Competitiveness Index, which is based on a survey of entrepreneurs. In this terms, the views of top entrepreneurs and managers of major international companies are assessed. In 2016, Slovakia was ranked 65th among 138 countries in the world.

Table 1: Ranking of the SR in the Competitiveness Index (WEF)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Ranking SR	41	46	47	60	69	71	78	75	67	65

Source: alianciapas.sk

**Figure 1: Competitiveness Index of Selected Countries
(by World Competitiveness Yearbook - WCY)**



Source: World Competitiveness Yearbook 2007-2015

Paradoxically, despite the worse position of the Slovak Republic in terms of competitiveness, the economic growth rate is more than 3 % after the economic crisis after 2015 in Slovakia, as we can see in the Table 2.

Table 2: GDP growth of Slovak Republic in % (including forecast)

Year	2016	2017	2018 (forecast)	2019 (forecast)
GDP growth (%)	3.3	3.4	4.0	4.2

Source: Education at a Glance 2016, OECD

Nowadays, the science is undoubtedly the main engine of the economy of the developed countries. The level of investments in science provides the competitiveness of the economy and the living standards of the population. Investments in science and the number of people working in science (in the developed countries) are growing steadily.

The evidence is the amount of countries that have transformed in a very short time from underdeveloped to emerging and advanced economies. The process was made by the economic policies that boosted economic performance through growth in science and research expenditures (e.g. South Korea spends on science about 4 % of its GDP expenditures). European Union, in Strategy Europe 2020, highlights the needs of expenditure increasing on science and research to 3 % of GDP.

Table 3: Expenditure on research and development in 2006 and 2016

	As % of GDP	As % of GDP	Total in mill. EUR	Total in mill. EUR
Country/Year	2006	2016	2006	2016
Slovak Republic	0.48	0.79	217	641
Hungary	0.98	1.21	900	1,372
Czech Republic	1.23	1.68	1,527	2,963
Poland	0.55	0.97	1,513	4,112
EU Countries	1.76	2.03	216,330	302,220

Source: Eurostat, Statistical Office of the Slovak Republic

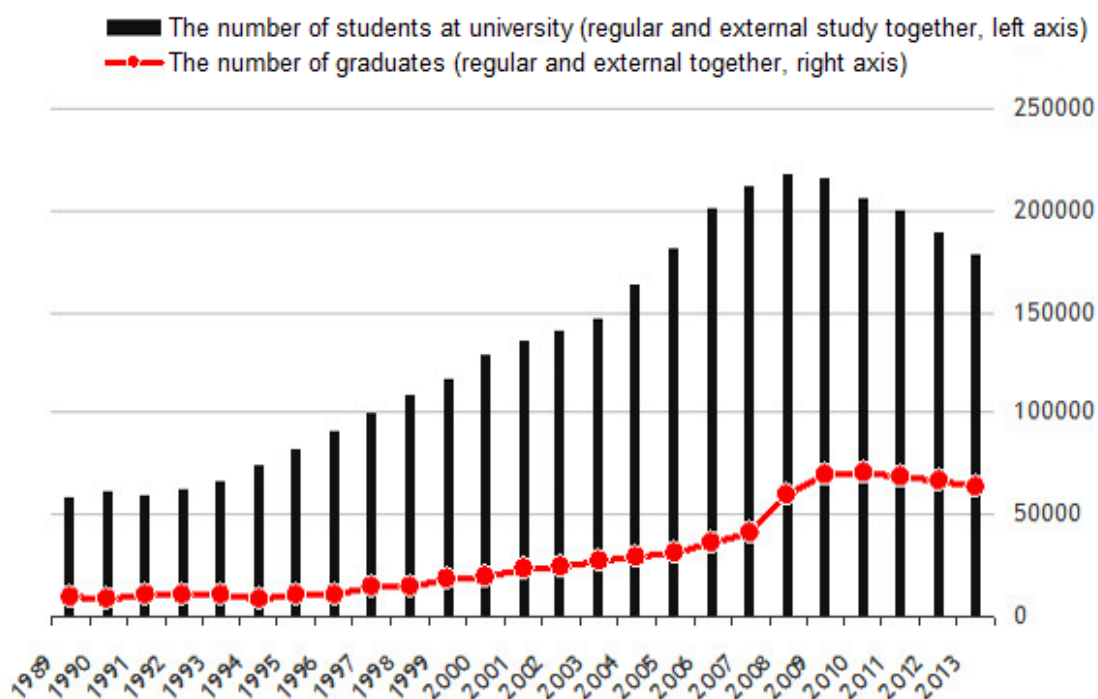
Despite the increase, research and development spending in the EU remains low compared to other major economies. For example, in 2011, it achieved 4.04 % of GDP in the Republic of Korea, and 3.38 % in Japan. In the US, spending on research and development was 2.91 % of GDP in 2012. One of the main objectives of the Europe 2020 strategy is to increase the R&D expenditure ratio to GDP, which should boost the competitiveness of the economy. The EU Lisbon Strategy has set the Union's state as the target of spending 3% of GDP on research and development by 2020. The R&D expenditures of northern European countries are the highest among the countries of the Union. In 2013, it was Finland (3.32 % of GDP), Sweden (3.21 %) and Denmark (3.05 %) followed by Germany (2.94 %) and Austria (2.81 %). Within the V4 countries, the Slovak level of R&D expenditure is the lowest. In 2015, science and research spending in Slovakia increased up to 1.19 % of GDP. This relatively significant increase was

due to a significant increase in available funding (67.5 %) for science and research from the EU Structural Funds (state resources increased by only 11.8 %). The target, declared by the Slovak government to increase expenditures up to 1.20 % of GDP, is only little ambitious and does not create a prerequisite for Slovakia's approach to human capital creation and competitiveness in V4 countries and technologically advanced EU countries (Eurostat).

The main cause of the deplorable state of science in Slovakia is a misunderstanding of the knowledge-based economy, as well as the role of science in promoting the competitiveness of the economy in the information age. As shown in Table 3, spending on science and research for the period 2006 to 2016 has grown overall in Slovakia as well as in the V4 countries. The total volume of these expenditures in the Slovak Republic is the lowest of the V4 countries and is considerably behind the EU average.

Paradoxically, on the other hand, in the Slovak Republic, number of students and university graduates increases, as it is shown in the following Figure 2.

Figure 2: Development of the quantity of students and university graduates in the years 1989 - 2013 in the Slovak Republic



Source: Institute of Information and Prognosis in Education, Statistical Office of the Slovak Republic

However, when we compare group of people at the age of 30-34 with university education to the same group in neighboring countries, Slovakia has the lowest share of university educated people in this age group (along with the Czech Republic), as we can see in the Table 4.

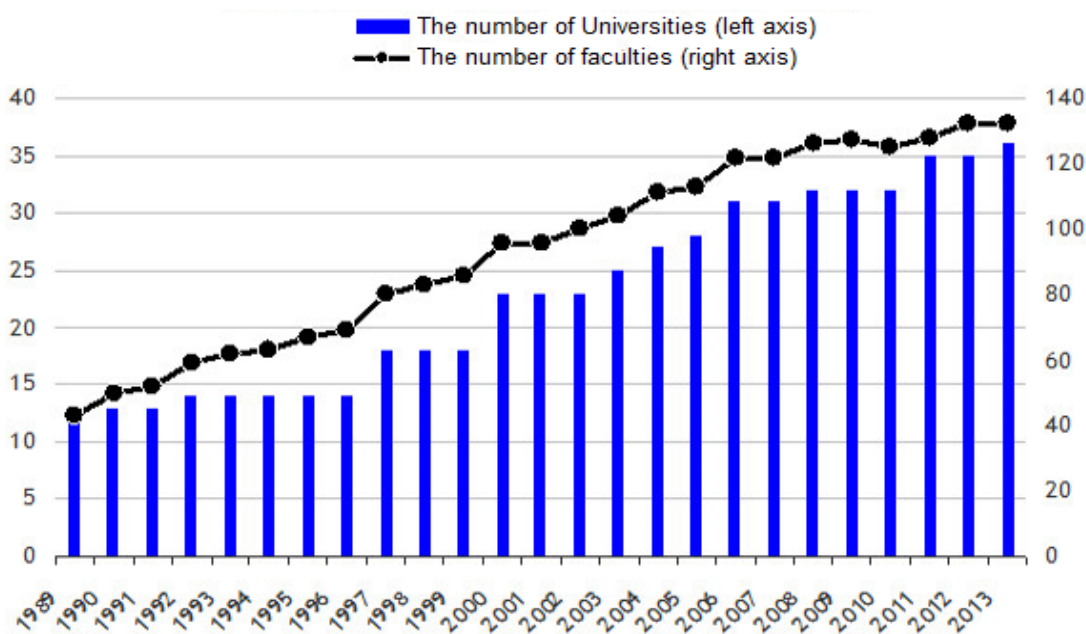
Table 4: Distribution of tertiary education graduates by field in the year 2015 (%)

Country	Education	Social and Humanities Science	Natural Science	Technical Science	Health and Welfare Science	Other
Slovak Republic	13.1	40.3	8.4	12.7	17.5	8.1
Hungary	16.2	44.6	6.5	15.5	7.9	7.7
Czech Republic	10.1	38.8	8.7	14.5	10.0	9.7
Poland	13.5	41.7	7.2	15.1	13.2	9.3
EU 28 Countries	9.3	42.8	10.3	13.9	13.7	5.4

Source: Eurostat, Statistical Office of the Slovak Republic

If we look closely at the development of the amount of universities, colleges and faculties in Slovakia, the Slovak Republic represents European curiosity – the sovereign first place in the number of colleges and universities per 100,000 capita. This means that the network of existing universities and colleges is excessive and neither corresponds to the needs of the labor market nor the financial resources of the state. It is not possible to simultaneously achieve both – quality and quantity.

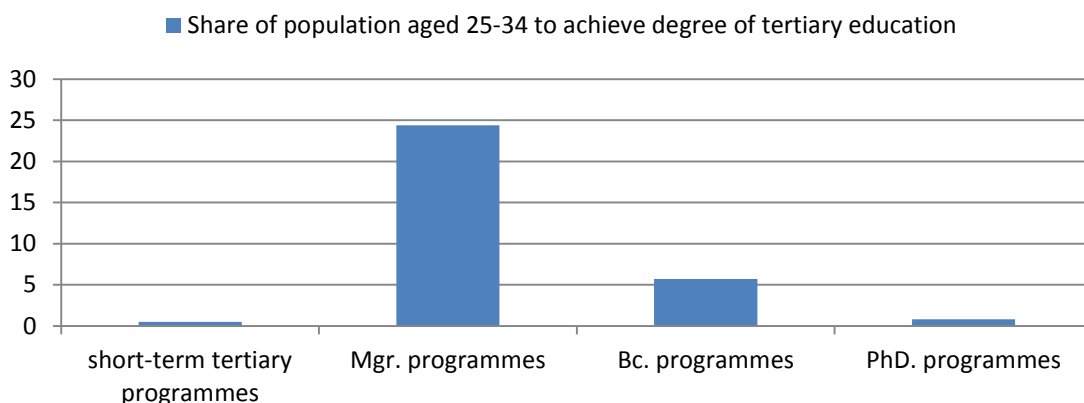
Figure 3: Development of the amount of universities and faculties in the years 1989 - 2013 in the Slovak Republic



Source: Eurostat, Statistical Office of the Slovak Republic

As the Figure 4 shows, in the Slovak Republic, students prefer the Master's program to bachelor programs. Short tertiary programs are only a little preferred. Such a tertiary education structure is inadequate, as it is costly, and often comparable with a bachelor's degree.

Figure 4: Share of population aged 25-34 to achieve degree of tertiary education in Slovak republic (2015)



Source: Education at a Glance 2016, OECD

Slovakia always had and yet still has a skilled and educated workforce. Unfortunately this enormous potential of human capital is Slovakia not possible to fully utilize. This proves the data of “abroad departure” of graduates of high schools and universities, respectively an increase of unemployment of graduates. This trend is unacceptable in relation to the creation of conditions for the knowledge-based economy and in the problem of youth unemployment, as well. We believe that in this case, the irreplaceable role is in the “hands” of state. The government must create the conditions for the application of the capable, talented and educated people for the benefit of the national economy and regional development. In particular, it is necessary to create such a (financial) mechanism that stimulates sciences, research institutes, schools and universities that produce new know-how, knowledge, and account for a source of inventions, innovations; and represent the condition for development of industries that define the knowledge-based economy with a high level of human capital, too.

5. Conclusions and Recommendations

For Slovakia, as a small and open economy, it is essentially important to focus on the development of the human capital as the first pillar of the knowledge-based economy. As our analysis indicates, Slovakia unfortunately does not make use of this potential to a full extent. Yet, there have not been adopted significant reforms in the sphere of education, science and research support, or in the innovative environment, too. The area of education, science, research and innovative environment has been underfunded for a long time, the financial resources are the lowest over a long period in a comparison to V4 countries. Moreover, despite the increasing number of university graduates, the number of unemployed graduates is rising. Requirements of employers do not meet with the graduates’ qualification structure in the labor market. For both reasons, creating conditions for forming human capital and solving high unemployment rate problem, the state should primarily support high school and university graduates actively and create conditions for their implementation on the labor market, as well. As a crucial

problem, there appears a need to change education, science support and funding system in Slovakia. The state should support those sciences, schools, universities or scientific workplaces, which work effectively and prepare appropriate graduates or scientific workers. The role of the government in forming human capital and knowledge-based economy bases should be much more active (than it has been up to now) and it should, either by means of finances or its activities, support the formation and development of cooperation and relationships among companies, universities or high schools.

This paper has proven that education system in Slovakia is not up-to-date with the requirements of modern knowledge economy. However, the problem is not only on the side of government and companies. Namely, too many university students are studying social sciences whereas the labor market is searching for technically oriented graduates. Universities are already offering technical study programmes, and yet high school students do not show interest in them. In this situation, combined efforts from government and companies could help - they could provide scholarships and future job contracts in order to attract potential students.

References

- alianciapas.sk. 2016. [Online]
 <http://alianciapas.sk/category/pravidelne_aktivita/sprava_o_globalnej_konkurencieschopnosti/>
- Becker, G. S. 1962. Investment in Human Capital: A Theoretical Analysis. *Journal of Political Economy* Vol. 70. pp.9-49
- Becker, G. S. 1996. Teorie preference. Praha: Grada Publishing.
- Blundell, R. 1999. Human capital investment: The returns from education and training to the individual, the firm and the economy. *Fiscal studies*, 20, s. 1-23.
- Dobeš, M. 2003. Human capital and performance of economy. *Individual and Society*, 2003, Vol. 6, No. 2.
- European Commission. 2012. Rethinking education: Investing in skills for better socio-economic outcomes. *Communication from the European Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions*. COM, 2012, 699 final [Online]
 <<http://eur-lex.europa.eu/legalcontent/EN/TXT/?qid=1389776578033&uri=LEX:52012DC0669>>
- Eurostat. [Online] <<http://epp.eurostat.ec.europa.eu>>
- Friedman, M. 1970. A Theoretical Framework for Monetary Analysis. *Journal of Political Economy* Vol. 78, No. 2 (Mar.-Apr. 1970).
- Goetz, S. J., Hu, D. 1996. Economic growth and human capital accumulation: Simultaneity and expanded convergence tests. *Economics Letters*, 51, s. 355-362.
- Knight, J. 1996. Human capital in economic development. *Oxford Bulletin of Economics and Statistics*, 58, s. 5.
- Mincer, J. 1974. Schooling, Experience and Earnings. New York: Columbia University Press for the National Bureau of Economic Research.
- Ministry of finance of Slovak Republic 2017.
 <<https://www.finance.gov.sk/LoadDocument.aspx?categoryId=11154&documentId=15584>>
- Oi, W. Y. 1962. Labor as Quasi-fixed Factor. *Journal of Political Economy* Vol. 70, pp. 538-555.
- OECD. 2016. Education et a Glance. [Online]
 <<https://www.finance.gov.sk/LoadDocument.aspx?categoryId=11154&documentId=15584>>

- OECD. 2007. Human Capital: How what you know shapes your life. *OECD – Insights*. [Online]
<<http://www.oecd.org/insights/humancapitalhowwhatyouknowshapesyourlife.htm>>
- Romer, P. M. 1989. Human Capital and Growth: Theory and Evidence. *NBER Working Paper No. 3173*, Nov. 1989. [Online]
- Schultz, T.W. 1963. *The Economic Value of Education*. New York: Columbia University Press.
- Statistical Office of the Slovak Republic. 2018. [Online]
<<http://slovak.statistics.sk/wps/portal/ext/Databases>>
- World Competitiveness Yearbook. 2007-2015. [Online]
<<http://www.imd.org/wcc/world-competitiveness-center-rankings/world-competitiveness-yearbook-ranking/>>