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EDUCATION AND SCIENCE AND ITS IMPORTANCE IN PROCESS OF SUPPORTING ECONOMIC GROWTH AND COMPETITIVENESS IN THE EUROPEAN UNION AND SLOVAK REPUBLIC[3]

Keywords: education, higher education, research and development, economic growth, competitiveness, the European Union, the Slovak Republic

ABSTRACT: As a part of its long-term strategic objectives, the European Union has set efforts to increase internal cohesion, improve economic growth levels, which will strengthen its position in the world economy area and also strengthen its competitiveness vis-à-vis other key players in the world economy. The level and quality of education, as well as the level and quality of science and research, are key areas for achieving this goal. Thus, the main attention at the level of the European Union and its individual member states should be focused on the implementation of systemic measures aimed at improving the educational process and research activities in all aspects (legislative, personnel, financial, procedural, etc.). The article focuses on the definition and analysis of the main developmental trends and tendencies in the area of education and support of science and research in the area of the European Union and the Slovak Republic.

JEL: I25, O31, O32

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INTRODUCTION

Recently, the role of education and science has gained key importance in economic, social and politic, field of live, modern economy and society. In the variety of strategic documents of the European Union and its member states education, research and development have main priority as key factors of economic growth, development and increasing competitiveness position on regional and global level. Education, new knowledge, skills and competences, as well as the formation and promotion of creative and critical thinking, are fundamental prerequisites that have shifted and moved human society toward a higher level of development, more efficient organization, transparency and support for economic growth and economic prosperity. A skilled and educated workforce is one of the active factors contributing to the dissemination of new knowledge and creating innovation and supported increase of the quality of innovation potential of the country. Effective functioning innovation mechanisms played the key role of the economic growth and increasing of competitiveness on the regional and global level.

Educated people have a higher degree of trust among themselves. Higher education leads not only to an economically successful society, but also to an effective functioning of democratic society. We can see education as an effective tool in politics and decision-making processes. In a democratic-based society, educated people are involved in decision-making on some levels of political system of the country and usually are active persons in its political life.

THE ROLE OF EDUCATION IN THE EUROPEAN UNION AND THE SLOVAK REPUBLIC

Education and training are one of the key factors of economic growth, development and strengthening competitiveness position of country and society in regional and global level. The European Union and its member states also pay attention to these factors, which are key goals of high variety strategies oriented on economic growth and development. Education,

training and increasing level of hard and soft skills of work force are one of main goals which are integrated in the specific strategy of economic development in recent time implemented in European integration area, called Europe 2020. In Europe 2020 strategy is main focus in this area paid to two main goals. First is oriented on reduction of the rate of early leavers from education and training to less than 10% in the group of people aged 18–24 years. Second goal from these group, is oriented on the implementation of specific tools of education policies on supranational and national level which can result in increasing share of the population of the European Union aged from 30 to 34 years having completed tertiary education to at least 40% (Smarter, greener, more inclusive, 2019). Young people which are in the group of people with lower level of education, and with lower level of sills and knowledge, face many problems closely connected with poverty and social exclusion. Comparison of selected data shows that in European integration area number of people aged 18–24 years who early finished education and training decreases continually since 2002, from 17,0% in 2002 to 10,6% in 2018 (Smarter, greener, more inclusive, 2018; Smarter, greener, more inclusive, 2019) which shows figure 1.

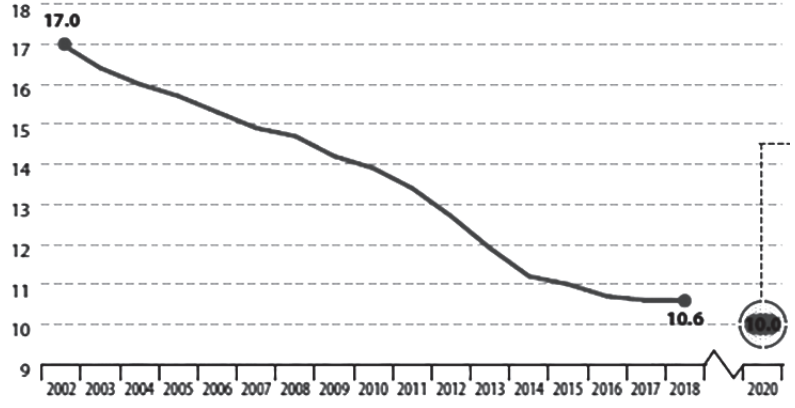

Figure 1. Early leavers of education and training – population aged 18–24 years 2002–2018

Source: Smarter, greener, more inclusive, 2019.

All member states of the European Union have own national rates which can be implemented into their national reform programmes and are closely connected with targets presented in the Europe 2020 strategy. Goal oriented on reduction of early leavers of education and training in population of the European Union aged 18–24 years, has also specific and wide variety rates on the national level.

The range of national targets varries from 4% for Croatia to 16% for Italy. In general, we can say that in 2018 the member states of European integration area reached different level in the process of implementation of the goal in specific national conditions. For example, some member states reach the lowest proportion of early leavers with rate less than 5%, member states: Croatia, Slovenia, Lithuania, Greece and Poland. However, we can see countries which reach the highest rate of the goal, for example: Spain (17,9%), Malta (17,5%) and Romania (16,4%). In 2008–2018 some member states of the European Union reached positive trend in reducing the number of population early leaving education and training, especially Portugal (reduction form 34,9% to 11,8%), Spain (reduction from 31,7% to 17,9%) and Malta (reduction from 27,2% to 17,5%) (Smarter, greener, more inclusive, 2019). Some member states in 2008–2018 reached negative trends in the process of implementation of goal oriented on reducing the number of early leaving education and training. In 2018, five member states reached higher share of the rate in comparison with 2008 – Slovakia, Sweden, Czech, Hungary and Romania). Positive information is that in 2018 17 member states already reached the target of 10% (Smarter, greener, more inclusive, 2017; Smarter, greener, more inclusive, 2018; Smarter, greener, more inclusive, 2019). Figure 2 shows the development trends.

As was mentioned, the second goal of the Europe 2020 strategy, which is implemented in European integration area is oriented on the implementation of specific tools of education policies on supranational and national level which can result in increasing the share of the population of the European Union aged from 30 to 34 years having completed tertiary education to at least 40%. The process of implementation of the goal shows that all member states of the European

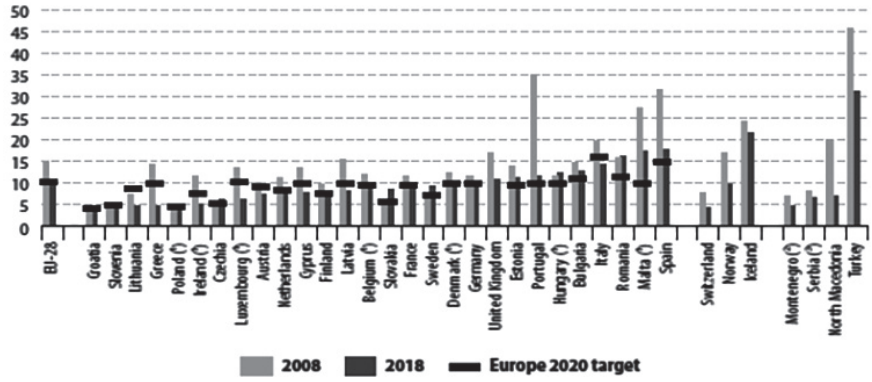

Figure 2. Early leavers of education and training in the EU member states and selected countries (population aged 18–24 years) 2008 and 2018

Source: Smarter, greener, more inclusive, 2019.

Union made progress in this field. Generally, we can say that years 2002–2018 the rate of population of the European Union aged from 30 to 34 years increased from 23,6% to 40,7% (Smarter, greener, more inclusive, 2019). Measuring rates reach ed by the member states of the European Union shows that all member states made important progress in the process implementation of the goal. Positive development trend in this field is supported by processes closely connected with changes the in system of financing of higher education and implementation of Bologna process reforms realized in member states (Smarter, greener, more inclusive, 2018; Smarter, greener, more inclusive, 2019). Positive development trends in the process of implementation goal oriented on increasing the share of the population aged 30–34 years ing the having completed tertiary education shows figure 3.

The goal oriented on increasing share of the population of the European Union aged from 30 to 34 years with complete tertiary education has also specific and wide variety rates on national level. The range of national targets varries from 26% for Italy to 66% for Luxembourg. European integration area has had positive development trend in the process of implementation of the goal, especially member states from northern and central Europe. They have the highest share of population with complete tertiary education. In 2008–2018 nineteen

member states reached and overcome the target of 40%. In a specific period 2008–2018 some eastern member states reached positive development in the process of implementing its national targets, especially Slovakia and Czech Republic. However, the lowest level in the process implementation of the goal was observed in Romania (24,6%) and Italy (27,8%) (Smarter, greener, more inclusive, 2019). Figure 4 shows development trend.

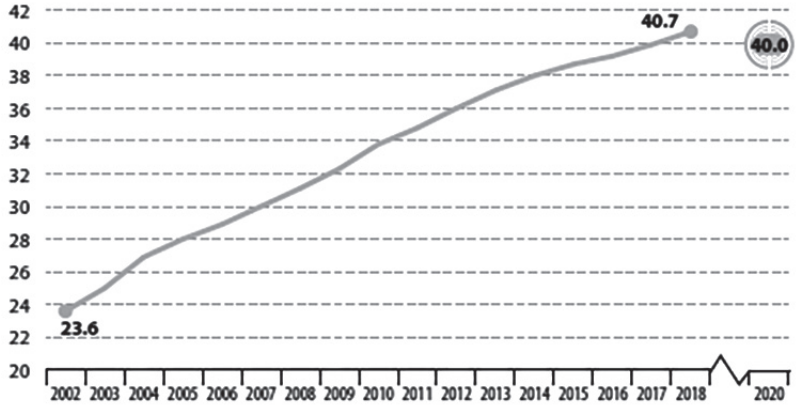

Figure 3. Population aged 30–34 years with complete tertiary education (2002–2018)

Source: Smarter, greener, more inclusive, 2019.

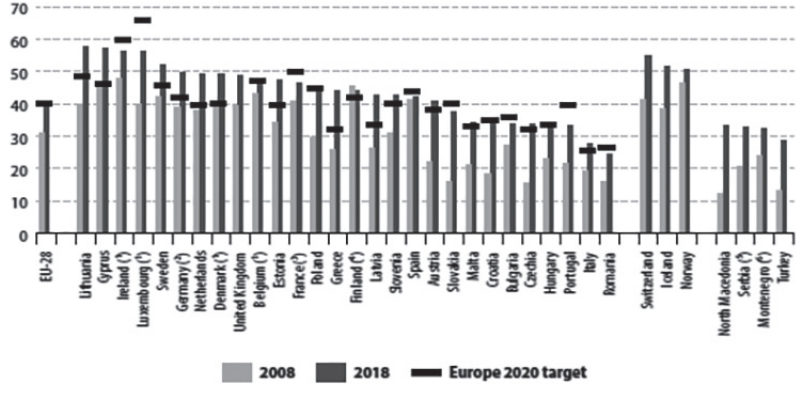

Figure 4. Population aged 30–34 years with complete tertiary education in the EU, member states and selected countries 2008 and 2018

Source: Smarter, greener, more inclusive, 2019.

QUALITY OF HIGER EDUCATION – COMPARISON

The quality of higher education is reflected in QS World University Rankings (QS WUR). The Slovak Republic is represented in the first thousand for the period 2012–2020 by three universities – Comenius University in Bratislava, Slovak University of Technology in position # 751 – 800 and Technical University of Košice in position # 801–1000 (QS WUR, 2019). However, none of the Slovak universities is represented in this the ranking for the whole time period. Comenius University appeared for the first time in this ranking in 2016, when it also achieved the best ranking at position # 651–700. In 2017, Comenius University recorded a decline in ranking. The other two Slovak universities found themselves in QS WUR only in 2019.

Compared to other V4 countries, Slovak universities have the worst ranks as well as the total number of universities represented. In the case of the Czech Republic, four Czech universities ranked QS WUR, 16 in the case of Polish universities and 6 in the case of Hungarian universities. At the same time, we must state that only in the case of Slovak universities, none of the universities in this ranking is represented in the entire monitored period 2012–2020. All four universities are represented in the Czech Republic, six in the case of Poland and four in the case of Hungary. The best place in ratings among the V4 countries reached in 2020 Charles University (# = 291), the Jagiellonian University (# = 338), University of Szeged (# 501-510) and finally the Comenius University (# 751-800) (see Table 1).

Table 1. QS World University Ranking

	University	2012	2014	2015	2016	2017	2018	2019	2020
SK (3)	**Comenius** University	-	-	-	**#651** - 700	**#651** - 700	**#701** - 750	**#751** - 800	**#751** - 800
	Slovak University of Technology	-	-	-	-	-	-	**#751** - 800	**#751** - 800
	Technical University of Kosice	-	-	-	-	-	-	**#801** - 1000	**#801** - 1000

	University	2012	2014	2015	2016	2017	2018	2019	2020
CZ (4)	**Charles** University	**#=286**	**#=233**	**#=244**	**#=279**	**#=302**	**#=314**	**#=317**	**#=291**
	Czech Technical University in Prague	**#501** - 550	**#451** - 460	**#411** - 420	**#451** - 460	**#501** - 550	**#491** - 500	**#531** - 540	**#=498**
	Masaryk University	**#551** - 600	**#551** - 600	**#551** - 600	**#551** - 600	**#601** - 650	**#551** - 600	**#571** - 580	**#551** - 560
	Brno University of Technology	**#601+**	**#651** - 700	**#651** - 700	**#601** - 650	**#651** - 700	**#601** - 650	**#651** - 700	**#651** - 700
PL (16)	**Jagiellonian** University	**#401** - 450	**#=376**	**#=371**	**#411** - 420	**#431** - 440	**#461** - 470	**#=411**	**#=338**
	University of Warsaw	**#=398**	**#=338**	**#=335**	**#=344**	**#=366**	**#411** - 420	**#=394**	**#=349**
	Warsaw University of Technology	**#601+**	**#601** - 650	**#651** - 700	**#651** - 700	**#601** - 650	**#601** - 650	**#601** - 650	**#521** - 530
	University of Lodz	**#601+**	**#701+**	**#701+**	**#701+**	**#701+**	**#801** - 1000	**#801** - 1000	**#801** - 1000
	Nicolaus Copernicus University	**#701+**	**#701+**	**#701+**	**#701+**	**#701+**	**#801** - 1000	**#801** - 1000	**#801** - 1000
	University of Wroclaw	**#701+**	**#701+**	**#701+**	**#701+**	**#701+**	**#801** - 1000	**#801** - 1000	**#801** - 1000
	Adam Mickiewicz University	-	-	-	-	-	**#801** - 1000	**#801** - 1000	**#801** - 1000
	AGH University of Science and Technology	-	-	-	-	-	**#801** - 1000	**#801** - 1000	**#801** - 1000
	Wroclaw University of Science and Technology	-	-	-	-	-	**#801** - 1000	**#801** - 1000	**#801** - 1000
	University of Gdansk	-	-	-	-	-	-	**#801** - 1000	**#801** - 1000

	University	2012	2014	2015	2016	2017	2018	2019	2020
PL (16)	**University** of Silesia	-	-	-	-	-	-	**#801** - 1000	**#801** - 1000
	Cracow University of Technology	-	-	-	-	-	-	**#801** - 1000	**#801** - 1000
	Poznań University of Technology	-	-	-	-	-	-	**#801** - 1000	**#801** - 1000
	Lodz University of Technology	-	-	-	-	-	-	**#801** - 1000	**#801** - 1000
	Warsaw University of Life Sciences	-	-	-	-	-	-	-	**#801** - 1000
	Gdansk University of Technology	-	-	-	-	-	-	-	**#801** - 1000
HU (6)	**University** of Szeged	**#501** - 550	**#501** - 550	**#551** - 600	**#501** - 550	**#501** - 550	**#501** - 550	**#=470**	**#501** - 510
	University of Debrecen	**#601+**	**#601** - 650	**#601** - 650	**#601** - 650	**#651** - 700	**#651** - 700	**#601** - 650	**#601** - 650
	Eötvös Loránd University	**#551** - 600	**#551** - 600	**#601** - 650	**#601** - 650	**#601** - 650	**#651** - 700	**#701** - 750	**#651** - 700
	Corvinus University of Budapest	**#551** - 600	**#651** – 700	**#701+**	**#701+**	**#701+**	**#801** - 1000	**#801** - 1000	**#801** - 1000
	University of Pécs	-	-	-	-	**#701+**	**#751** - 800	**#701** - 750	**#651** - 700
	Budapest University of Technology and Economics	-	-	-	-	**#701+**	**#751** - 800	**#801** - 1000	**#801** - 1000

Source: own processing by QS World University Rankings.

EDUCATION AS A SOFT POWER FACTOR

In the area of education as a soft power factor within EGPI, the situation in the V4 countries and Slovakia is significantly different (see Table 2). As in the case of the overall worst placement of Slovakia (63rd place) within the EGPI, we also achieve the sovereign worst placement (56th place) in the case of education. What is striking is the development in the last three years, when Slovakia achieved the biggest drop of 7 places, while the course was relatively balanced. A similar situation was recorded by the Czech Republic, which has been the only one in the long term since 2011 that has been experiencing a long-term decline of 8 places, which culminated in 30 places in 2017. The Czech Republic thus recorded the most significant overall drop in the monitored indicators among all V4 countries in the period under review. Slovakia and the Czech Republic, as the only two countries among the V4 countries, recorded a decline in education. Hungary, unlike Slovakia, has since 2016 strengthened its position in the ranking by 4 places, to the current third position among the V4 countries and a total of 34 places. Poland has seen the most positive development in education. Poland has been steadily strengthening its overall position since 2010 (34th place) and currently ranks the best in the 20th place among the V4 countries. At the same time, we can state that in the monitored period 2010–2018, in 2017 the greatest difference in the table position was reached among all V4 countries in the area of education. Poland is best placed in 20th place but it is 56th place in Slovakia.

Table 2. Elcano Global Presence Index – Education

V4		2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
Slovakia	**Education index** / rank	**2,3** / 62	**8,4** / 53	**10,5** / 50	**11,4** / 50	**11,7** / 50	**13,0** / 49	**14,0** / 49	**13,6** / 49	**12,4** / 56	**12,3** / 56
Czech Republic	**Education index** / rank	**25,9** / 23	**40,9** / 24	**46,2** / 22	**49,6** / 23	**50,9** / 25	**51,2** / 26	**51,9** / 26	**52,0** / 28	**52,8** / 30	**52,2** / 29

V4		2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
Poland	**Education index** / rank	**14,3** / 38	**22,7** / 34	**24,2** / 34	**27,0** / 34	**30,3** / 32	**35,4** / 30	**43,7** / 29	**54,8** / 25	**67,5** / 20	**66,7** / 20
Hungary	**Education index** / rank	**19,0** / 31	**19,4** / 37	**20,6** / 37	**21,5** / 38	**22,6** / 39	**26,4** / 38	**29,3** / 35	**27,1** / 38	**32,2** / 34	**31,9** / 34

Source: own processing by Elcano Global Presence Index

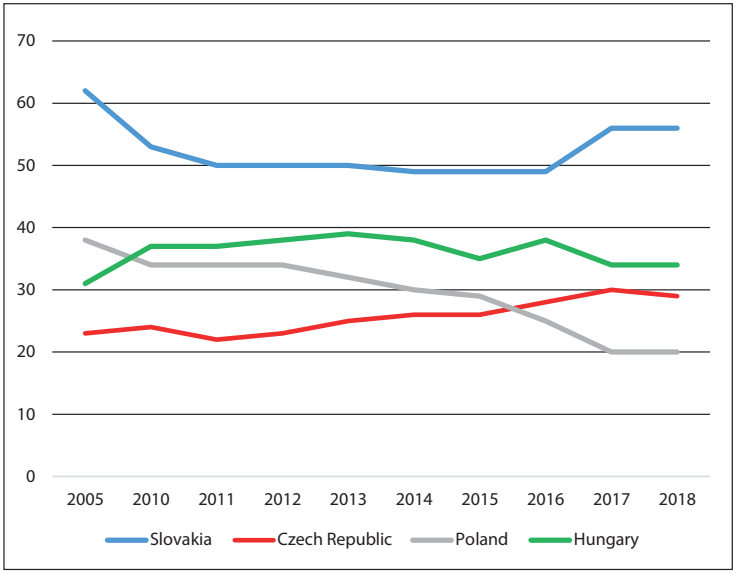

Figure 5. Order of the V4 States within the EGPI – Education

Source: own processing by Elcano Global Presence Index.

THE ROLE OF RESEARCH AND DEVELOPMENT IN THE EUROPEAN UNION AND IN THE SLOVAK REPUBLIC

Research and development is also one of the main factors closely connected with economic growth and increasing position of competitiveness. Results of research and development are main basis for innovation implemented not only in economy, but also in other sectors of human life.

Research and development is result of creative work of qualified labor force and specialists. In recent years, research and development have main importance on global, supranational, regional and local level. Gross domestic expenditure on research and development (GERD) presents key indicator by which we can measure and compare level of R&D activity performed in economy. The relation between the level of GERD and gross domestic product (GDP) is usually known as R&D intensity. On comparison with other actors of world economy, we can say, that R&D intensity of the EU-28 in 2015 reach 2,04%. The highest R&D intensity among group of countries named G20 in 2015 reaches South Korea – 4,23% (The EU in the world, 2018).

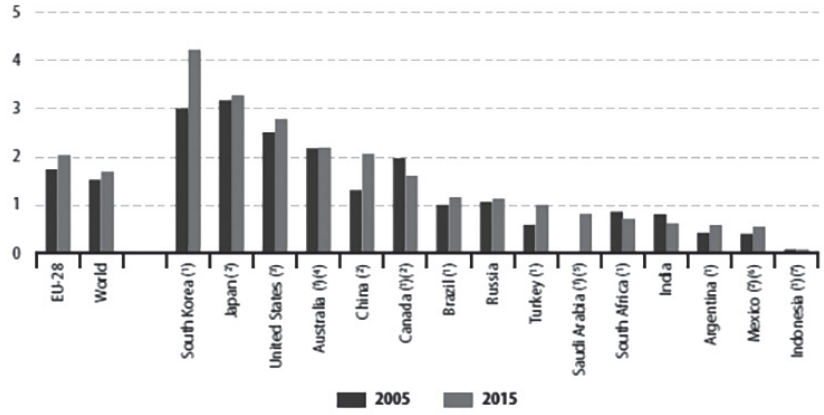

Figure 6. Gross domestic expenditure on R&D in selected actors of world economy (2005 and 2015)

Source: The EU in the world, 2018.

Improvement of research and development is one of main goal which is also integrated in strategy of economic development in the European integration Europe 2020. The main goal in the field of research and development in European integration area is oriented on improving investment to R&D from specific sources of financing on 3% of GDP to 2020. In 2013 R&D expenditure was 2,0% of GDP and since then the level of expenditures to R&D stagnated. Development in expenditure on R&D represents figure 7 (Smarter, greener, more inclusive, 2019).

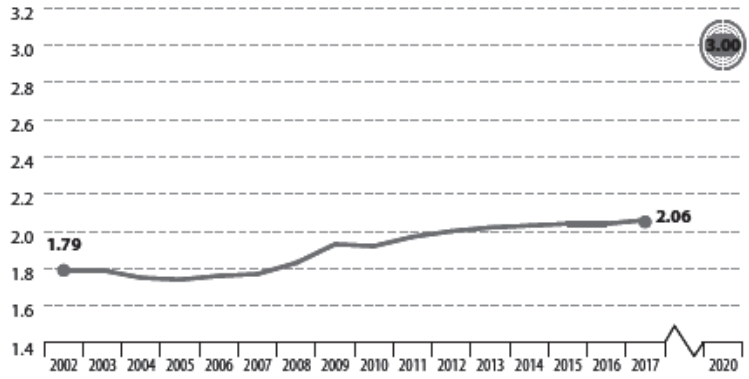

Figure 7. Gross domestic expenditure on R&D EU-28 (2002–2018)
Source: Smarter, greener, more inclusive, 2019.

In the process of implementation of this goal, all member states declared own national targets. On the comparison of R&D intensity in the European Union in 2017 was different and ranging from 0,5% to 3,4%. In 2008–2017 the most of member states of the European Union reached a positive trend in R&D intensity. Especially Slovakia, Greece and Poland reached significant growth. The best performers in R&D intensity from all members' states of the European Union are Finland and Sweden, which shows figure 8.

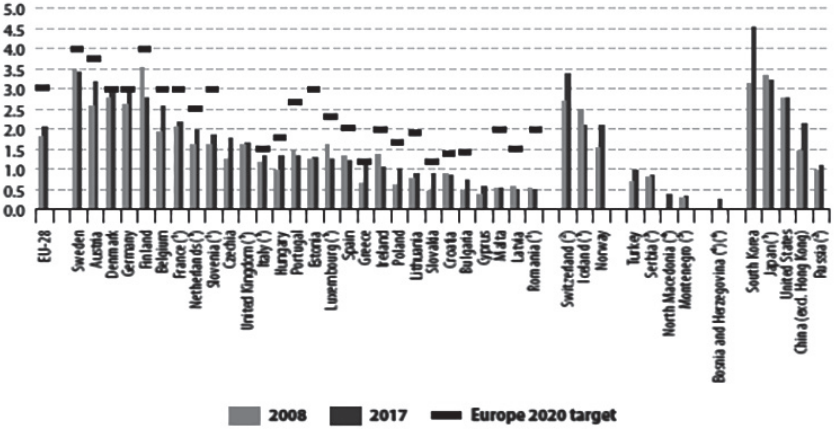

Figure 8. Gross domestic expenditure on R&D in the EU, member states and selected countries (2008 and 2017)
Source: Smarter, greener, more inclusive, 2019.

In the European Union R&D activities are financed by four main sectors: business enterprise, government, higher education and the private non-profit sector. Figure 9 shows the distribution of expenditure on R&D activities between the mentioned sectors, and its changes in 2008 and 2017.

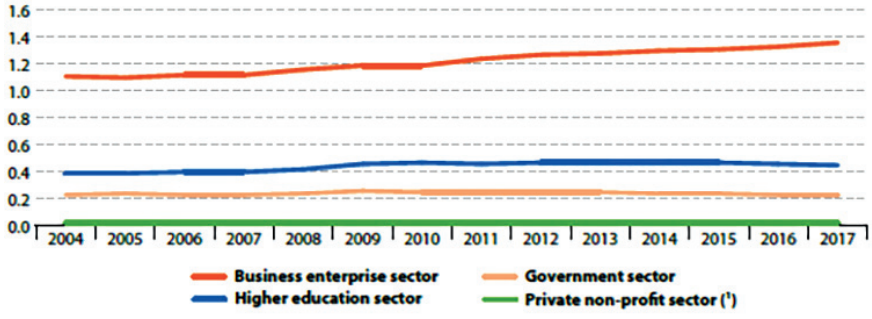

Figure 9. Gross domestic expenditure on R&D in the EU by sectors (2004–2017)

Source: Smarter, greener, more inclusive, 2019.

SCIENCE AND R&D AS A FACTOR OF SOFT POWER

In the field of science, as a soft power factor within the EGPI, the situation in Slovakia is similar to the level of education compared to the V4 countries. Also in this indicator, Slovakia ranked the worst among the V4 countries and its overall position within the EGPI reaches 49 positions (see Table 4). Similarly, as in the case of education, also in the case of science, Slovakia has experienced a significant negative trend in the last three years, with a fall of up to 5 places. The past course from 2010 to 2016 was relatively balanced. A similar situation of the table slump was also recorded in the Czech Republic and Poland, which was not as significant as in the case of Slovakia. Interesting is the common phenomenon for all three countries, with the best ranking in 2016. Another example is the development in Hungary, which since 2010 has been constantly negative.

However, this is in contrast to R&D spending of 1.35% of GDP (see Table 5), which is the second highest overall in the V4 countries. In the period under review, the Czech Republic and Poland were constantly developing in the support of science as a soft power factor. Poland is in the top 20 position, despite the fact that the Czech Republic has the highest R&D expenditure in % of GDP in the long term at 1.79%, while Poland is in third place with 1.03% of GDP. Despite this disproportion, in the case of Poland, science has a priority position in soft power, unlike Hungary and Slovakia.

Table 2. Elcano Global Presence Index – Science

V4		2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
Slovakia	**Science index** / rank	**10,0** / 64	**17,3** / 45	**17,1** / 45	**16,1** / 48	**18,4** / 46	**19,2** / 46	**23,8** / 45	**23,6** / 44	**24,5** / 45	**15,6** / 49
Czech Republic	**Science index** / rank	**31,4** / 29	**58,7** / 25	**58,0** / 25	**57,7** / 26	**59,3** / 26	**61,6** / 26	**70,8** / 25	**74,3** / 24	**72,3** / 25	**53,1** / 28
Poland	**Science index** / rank	**68,1** / 18	**97,1** / 19	**96,0** / 19	**96,5** / 20	**104,2** / 19	**108,4** / 19	**117,1** / 19	**124,8** / 18	**132,2** / 18	**103,4** / 20
Hungary	**Science index** / rank	**25,4** / 32	**28,9** / 38	**28,5** / 38	**28,8** / 38	**30,4** / 41	**31,6** / 41	**34,1** / 41	**33,0** / 43	**32,7** / 43	**27,4** / 43

Source: own processing by Elcano Global Presence Index.

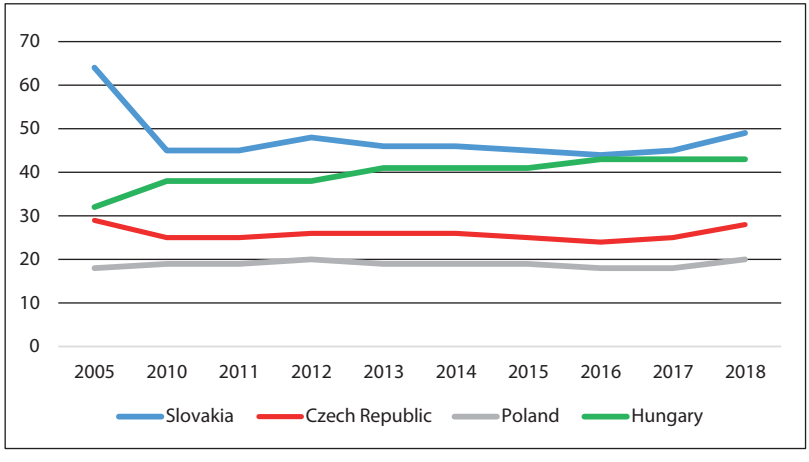

Figure 10. Order of the V4 States within the EGPI – Science
Source: own processing by Elcano Global Presence Index.

In comparison with the V4 countries, the Slovak Republic spends the lowest expenditure on research and development (R&D). Expenditure represents 0.88% of GDP (see Table 3), well above the EU average (2.07% of GDP) and even more than the EU target of 3% of GDP on R&D spending [Eurostat 2019]. While public investment has increased over the last decade, private sector investment is still one of the lowest in the EU.

Slovak investment in science and research has increased almost twice as much in relation to GDP over the last decade. However, the European Commission drew attention to two issues in the country's assessment of the European Semester:

- public investment is too dependent on external resources, in particular the European Structural and Investment Funds (Eurofunds), which calls into question the sustainability of public funding for science and research;
- although private investment has increased more than double (relative to GDP) over the last decade, it is still one of the lowest in the EU and, according to the Commission, too low to significantly boost innovation performance.

As much as 39% of Slovak R&D investment relies on foreign sources of funding, in particular EU funds – accounting for 89% of funding in this area. In both cases, it is one of the highest shares in the EU. According to the European Commission, private investment in science and research appears to be too low to significantly increase innovation performance (Drapáková, Geist 2019).

Table 3. R&D expenditure in% of GDP

R&D intensity (R&D expenditure in% of GDP)	2005	2010	2011	2012	2013	2014	2015	2016	2017
Slovakia	**0.49**	**0.62**	**0.66**	**0.80**	**0.82**	**0.88**	**1.17**	**0.79**	**0.88**
Czech Republic	**1.17**	**1.34**	**1.56**	**1.78**	**1.90**	**1.97**	**1.93**	**1.68**	**1.79**
Poland	**0.56**	**0.72**	**0.75**	**0.88**	**0.87**	**0.94**	**1.00**	**0.96**	**1.03**
Hungary	**0.92**	**1.14**	**1.19**	**1.26**	**1.39**	**1.35**	**1.36**	**1.20**	**1.35**
EU Eurostat	**1.74**	**1.93**	**1.97**	**2.01**	**2.02**	**2.03**	**2.03**	**2.03**	**2.07**
EU OECD	**1.66**	**1.83**	**1.86**	**1.91**	**1.92**	**1.95**	**1.96**	**1.94**	**1.97**

Source: Eurostat: Gross domestic expenditure on Research and Development, 2006-2016. Gross domestic expenditure on Research and Development, 2006–2016;
OECD: Gross domestic spending on R&D. https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm.

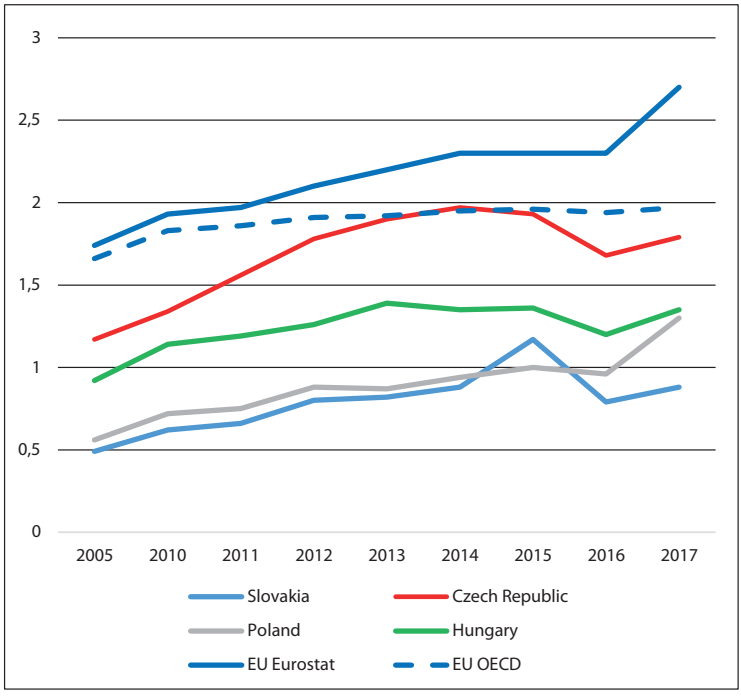

Figure 11. R&D inensity (R&D expenditure in % of GDP)
Source: own processing by Elcano Global Presence Index.

The number of patents also causes a reflection on the level of science. In 2017, 206 patent applications were filed – 183 from domestic entrepreneurs, 23 from foreign entrepreneurs, resulting in a 12% decrease compared to 2016. Of these, only seven were international applications. Most foreign applicants come from the Czech Republic (44%) and Austria (ÚPV SR 2018). Patents granted for the given year are only 82 (59 domestic, 23 foreign). In the statistics of the European Patent Office, Slovakia is ranked 24th (within the EU 28) with 41 patent applications (see Table 4) (EPO, 2017). In comparison with V4 countries, Slovakia is ranked in last place. The best position reached Poland in 14th place with 469 entries, Czech Republic in 15th place with 205 applications and Hungary on 20th place with 94 applications.

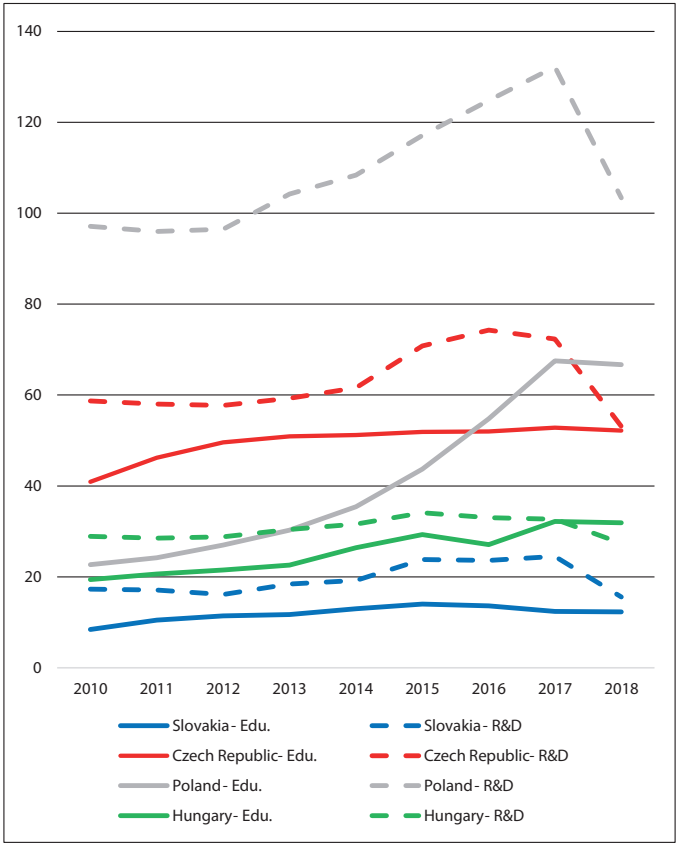

Figure 12. Education Index vs. Indeks of R&D)

Source: own processing by Elcano Global Presence Index.

Table 4. European patent applications include direct European applications and international (PCT) applications

Rank	State	2017	2016	Difference
14.	**Poland**	**469**	**411**	+ 14,1%
15.	**Czech** Republic	**205**	**190**	+ 7,9%
20.	**Hungary**	**94**	**110**	- 14,5%
24.	**Slovakia**	**41**	**42**	- 2,4%

Source: EPO, 2017.

The number of patent applications is also stated in Table 5. The relatively low number of patent applications, as well as patents granted, shows the low creative activity and capacity of the country to benefit from the knowledge gained.

Table 5. Patent applications to the EPO, 2004 and 2014 (per million inhabitants)

	2004	2014
EU-28	113	112
Sweden	250	349
Finland	270	340
Germany	280	256
Denmark	206	244
Austria	178	230
Netherlands	226	205
France	134	138
Belgium	146	137
Luxembourg	252	109
United Kingdom	94	83
Italy	80	70
Slovenia	56	66
Ireland	68	65
Spain	29	33
Latvia (2)	4	32
Czech Republic	11	25
Hungary	15	23
Lithuania	3	17
Poland	3	16
Portugal	6	12
Greece	6	11
Estonia	6	10
Malta	15	10
Slovakia	4	9
Cyprus	8	8
Bulgaria	2	7
Romania	1	5
Croatia	7	3

Note: * 2013 instead of 2014
Source: Eurostat. https://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Patent_statistics, October 2016.

HIGHER EDUCATION AND SCIENCE AS KEY FACTORS OF IMPROVEMENT COMPETITIVENESS POSITION IN GLOBAL AND REGIONAL LEVEL

Quality of higher education plays a key role in the specific processes which are closely connected with enforcement of competitiveness on regional and global level. Competitiveness of the country is connected with some specific factors, for example: qualified of workforce, education system quality, expenditure to R&D, structure of investors (public and private sector) which invest to R&D, innovation potential of the country, innovation performance of the country, quality and function innovation systems which worked on local, regional and national level. All these factors are closely integrated and are parts of national innovation environment. On the global, supranational and national level competitiveness is one of the key factors connected with processes of measuring and comparing the levels of economic growth and development between countries. In the European Union innovation performance is also one of the key factors periodically measured by Summary Innovation Index (SII). It encompasses the whole variety of specific indicators, which are divided into four main groups – framework conditions, investments, innovation activities and impacts (European Innovation Scoreboard, 2019).

In comparison with the level of global innovation performance (2018) we can see, that the European Union lags behind South Korea, Canada, Australia and Japan. Comparing with the previous year (2017) the European Union was overtaken in the level of global innovation performance by thte USA (European Innovation Scoreboard, 2019). Figure 13 shows the comparison of innovation performance on the global level (key economic actors) in 2018.

On the basis of average innovation performance scores member states of the European Union are divided into four groups of countries. The Slovak Republic with other V4 countries, Czech Republic, Poland and Hungary, is a part of third group which a called moderate innovators. Group of moderate innovators includes 14 member states of the European Union. Relative average of innovation performance of these member countries is between 50–90% averages of the European Union (European Innovation Scoreboard, 2019).

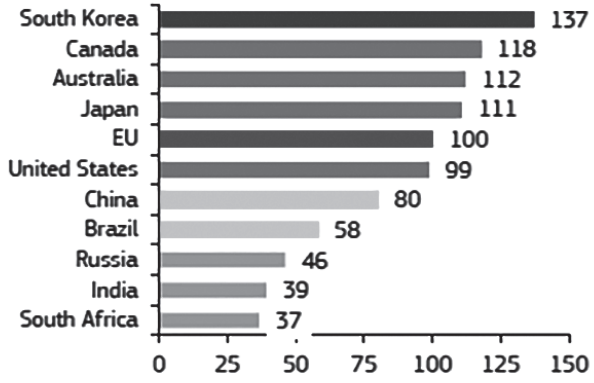

Figure 13. Innovation performance in world economy in 2018
Source: European Innovation Scoreboard, 2019.

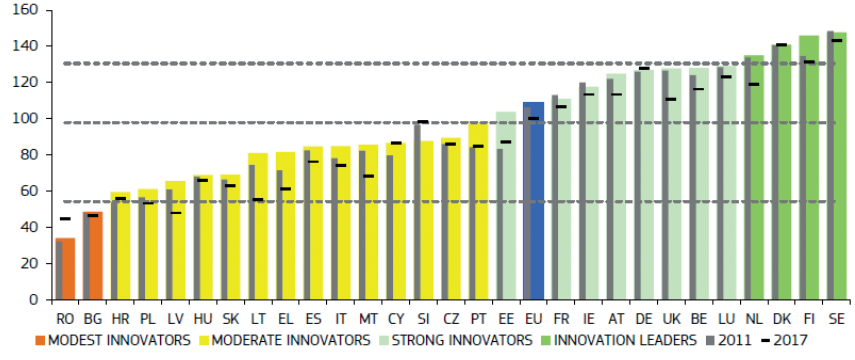

Figure 14. Innovation Performance of the EU member states 2011–2017
Source: European Innovation Scoreboard, 2019.

CONCLUSIONS

The importance of environment conducive to R&D in the current technological period is indeed a prerequisite for the growth of the influence and attractiveness of the image of the state abroad. In comparison with all other V4 countries, the Slovak Republic has very unfavourable conditions for science and research, especially in terms of supporting science and research as a percentage of GDP. Despite the fact that none of the countries is below the EU average in R&D expenditures, the position of the Slovak Republic has been the worst in the long term compared to the V4 countries. Until 2015, there was a relatively positive development in support of R&D in the long term, which was the lowest in comparison with other countries. After 2015, Slovakia recorded a significant decrease in R&D expenditure. Currently, R&D expenditures are well below 1% of GDP. However, the Czech Republic has the largest expenditure, although it has also seen a drop in R&D expenditure after 2015. It is the R&D expenditures in terms of GDP that are in direct correlation with the importance of science and education within the framework of soft power. The only exception to this is Hungary, which spends approximately the same percentage of GDP on science and research, but within its soft power priorities, Poland spends four times the value of the science index.

In Slovakia, science (R&D) has been underfunded for a long time. This affects the stagnation of progress. This is associated with the problem of the departure of Slovak students and graduates abroad, whereby the state is losing its qualified workforce. Support for science and research, together with support for education and higher education, would help to boost innovation and sustainable development, thereby raising the standard of living of the population. With a higher standard of living, the soft power potential as well as the attraction of the country also improves. Similarly, a higher level of science and research in the country would be a better attraction for foreign investors producing products with higher added value, as well as researchers, scientists and experts in various fields.

There is no significant increase in R&D funding. This is due to the slowdown of progress and, in recent years, mainly to the drain of Slovak

intelligence abroad, which does not increase the attractiveness of education and the functioning of science.

Educated people are not able to turn the acquired education together with financial resources into a potential profit - both in the economic area and in the area of increased awareness of the country and its attractiveness. The key to increasing the creative activity of the Slovaks is thus richer support for scientific research – through financial support and through support for the creation of qualified jobs for scientists, researchers and innovators.

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