

WHAT DOES PREVENT SLOVAK ENTERPRISES TO DEVELOP THEIR INNOVATIVENESS?

Ľudmila Fabová

e-mail: ludmila.fabova@stuba.sk

Hana Janáková¹

e-mail: hana.janakova@stuba.sk

Slovak University of Technology in Bratislava, Slovakia

¹ Corresponding author

Abstract. The ability of a company to survive in the current business innovative environment essentially depends on its ability to innovation. Analysis of the behaviour of the most innovative countries in the world and use their experience may bring a lot of benefits to the Slovak companies, contributing thus to their development. There are several examples of successful innovators in the world and their experience could be used by Slovak companies to improve their innovativeness. Therefore the purpose of this paper is to identify the reasons of the poor innovativeness of the Slovak companies and propose some instruments for its improvement.

Key words: innovation, innovation development, Global Innovation Index, Innovation Efficiency Index, innovation policy.

Introduction

Businesses operating in the current advanced economies have completely different conditions than in the past. Developed countries are in the stage of construction and developing knowledge economy and at the same time ongoing globalization processes are affecting all the economies. As a result, the business environment is changing in these economies. Their economic success depends primarily on the ability to use effective intangible assets. These include in particular knowledge, skills and innovation potential which are regarded as the most important source of competitive advantage of individual economies on macroeconomic and microeconomic level (Balog 2013). Businesses must adapt to the changes conditions and methods of competitive struggle. Their ability to survive in the competitive environment depend increasingly on their ability to innovate and appropriate utilisation of innovation.

Majority of Slovak companies, especially small and medium ones, have a lot to do in this regard. Therefore analysis of the behaviour of the most innovative countries in the world and use their experience may bring a lot of benefits to the Slovak companies, contributing thus to their development. That's because there

are several examples of successful innovators in the world and their experience could be used by Slovak companies. Analysis of these examples and synthesis of selected data from the statistical resources allow to identify the basic reasons of poor innovativeness of Slovak companies. Thus the purpose of this paper is to identify the reasons of this situation and propose some instruments for its improvement.

1. Methods and resources

Innovation is the way to increase efficiency and competitiveness of not only individual companies but also all of the economies. The level of innovation can be assessed at the macroeconomic level (i.e. evaluating the innovativeness of particular countries) and at the microeconomic level which evaluates the innovative activity of individual enterprises. Several indexes can be used to evaluate innovativeness at macroeconomic level. Nowadays, innovation and its development can be continuously monitored and observed by all the countries in the world. Investigated data are summarized and published by statistical agencies which consequently prepare central database for different world regions (Drucker 1993). Global inventory system is centralized in the World Trade Organization. This paper examines and analyzes the positive and negative aspects of development in selected areas of the world economy, including trade of goods and services. All tables and figures have been created based on data obtained from publicly available databases. At the global level for the evaluation of innovativeness among every indicators can be used the Global Innovation Index (GII) assessing the innovation capacity of the countries which is based on exploitation of their innovative potential. GI has been published every year since 2007 by the World Intellectual Property Organization together with Cornell University and INSEAD¹. Their report of 2015 evaluates 141 economies in the world using 79 indicators. The Global Innovation Index consists of two sub-indicators evaluation inputs and outputs of innovation processes. The inputs are evaluated by five pillars forming environment in the economy that stimulates the development of innovation. It consists of: institutions, human capital and research, infrastructure, market environment and business environment. Outputs, i.e. results of innovation activities are evaluated by two pillars that represent actual achievements in the sphere of innovation. These include: output in the form of knowledge and technology and creative outputs. The Global Innovation Index is the result of averaging the above two sub-indexes. In addition, the Innovation Efficiency Index (IEI) is calculated as the ratio of sub-index innovative products and sub-index of innovation inputs. The Innovation Efficiency Index allows to evaluate the effectiveness of innovation

¹ Institute "Européen d'Administration des Affaires" is one of the most famous and the biggest economic universities with campuses in Europe (Fontainebleau - France), Asia (Singapore) and the Middle East (Abu Dhabi).

systems in different countries. Database is periodically updated based on the documents of other global databases. They are listed in Table 1.

Table 1. Statistical data sources used in calculations

EUROSTAT, Comtext and on-line databases	SLOVSTAT, Statistical office of the Slovak Republic
Innovation strategy of the SR in 2014-2020	GII, The Global Innovation Index 2015
Country Report Slovakia 2016	Innovation activities of enterprises in the SR 2010-2012
The Global Competitiveness Report 2015-2016, World Economic Forum 2015.	OECD, Main Economic Indicators
World Bank, World Development Indicators	INSEAD

Source: The Global Innovation Index 2015.

2. Discussions and results

2.1. Evaluation of innovativeness in the world

Nowadays innovations are considered to be one of the most important sources of economic growth. Therefore there are efforts to create an environment that would generate innovation and development. In the group of the most innovative countries in the world that are ranked by GII, there are only European countries, except the US and Singapore (Table 1). Also in the first group of 25 countries, there are mainly European countries (only 9 of them are non-European ones) and their positions change only. It is a positive change for Europe because a few years ago the European countries stayed behind their competitors. According to the economic maturity of the country's position, the first 28 countries in the ranking belong to the group of most developed countries. The others belong to less and the least developed countries. Therefore it is possible to conclude that the level of innovativeness of the country is closely related to its economic level. Economically most developed countries have enough resources for innovative development.

Table 2. The top 10 in the GII and IEI in 2015

Global Innovation Index			Innovation Efficiency Index		
Rank	Country	Score (0-100)	Rank	Country	Ratio
1	Switzerland	68,30	1	Angola	1,02
2	United Kingdom	62,42	2	Switzerland	1,01
3	Sweden	62,40	3	Luxembourg	1,00
4	Netherlands	61,58	4	Iceland	0,98
5	USA	60,10	5	Republic of Moldova	0,98
6	Finland	59,97	6	China	0,96
7	Singapore	59,36	7	Malta	0,95
8	Ireland	59,13	8	Netherlands	0,92

9	Luxembourg	59,02	9	Viet Nam	0,92
10	Denmark	57,70	10	Côte d'Ivoire	0,90
36	Slovakia	42,99	48	Slovakia	0,76

Source: The Global Innovation Index 2015.

It is worth mentioning that the high efficiency of innovation can also be achieved by the least developed countries due to the fact that their innovative outcomes outweighs the innovative inputs. Therefore it is necessary to evaluate innovativeness of the countries comprehensively, analysing not only Global Innovation Index or Innovative Efficiency Index but also sub-indices of inputs and outputs, taking into account the stage of development of the economy. Analysis of separate indexes only may bring surprising results. For example, acc. to this index, Angola is ranked 1st and Ivory Coast - 10th.

According to the YII ranking, there are only three countries from the 'top 10' evaluated by GII: Switzerland (2), Luxembourg (3) Netherlands (8). These three mentioned countries have been placed on the sub-index entries at the 2nd, 20th and 11th places and in the sub-index for the first three outputs of the ranking. Switzerland, Luxembourg and the Netherlands therefore can be considered as the most innovative countries in the world as all of them have been placed at the front positions (The Global Innovation Index 2015).

Switzerland requires a special attention as for the fifth time it is ranked on the 1st place in ratings by GII. Switzerland is regarded as the innovation leader due to existence of global research institutions, high level of expenditures on research and development spent by businesses and intensive cooperation between academia and the private sector. Switzerland can be also proud of the highest number of patents per capita in the world and excellent education system that supports talents. Swiss innovation ecosystem creates a favourable environment for creative activity which is supported by public and private sectors and therefore obtains long-term innovative excellence.

2.2. Comparison of innovativeness of the Slovak Republic and Switzerland

According to evaluation made by Global Innovation Index, Slovak Republic is ranked in the group of effective innovators, which cannot be satisfied. In 2015 Slovakia occupied 36th place and among the members of the EU, only few countries were worse: Lithuania (38), Bulgaria (39), Croatia (40), Greece (45), Poland (46) and Romania (54) (The Global Innovation Index 2015).

The analysis of the data presented in Table 3 allows to notice the following facts: in the Global Innovation Index, Slovakia achieved only 63% of the Swiss in 2015, while in the Innovative Efficiency Index it was 75%. When comparing the sub-indices of inputs and outputs, the difference is even greater. In case of

the former – which characterizes the innovative environment - Slovakia reaches 72% of Swiss level. This is probably the result of a relatively high evaluation of two pillars, i.e. institutions and infrastructure that reached 84%. It is necessary to note, however, that these two pillars are the worst in case of Switzerland (10th and 15th place in the ranking).

Much worse is the result of sub-indices comparison of outputs, that evaluates the results of innovation activities. Slovakia achieved only 54% of Swiss level. This is again a consequence of the low evaluation of two pillars affecting outputs: knowledge and technology (47% of Swiss level) and creative output (62%). Among the seven pillars characterizing the inputs and outputs of innovation processes in Slovak republic, the lowest level were achieved by: human resources and research (53rd place), the market environment (53rd place) and business environment (58th place). These three pillars of the five are characterizing the outputs of innovation processes. It means that Slovak Republic doesn't create an environment that would stimulate the development of innovation.

Table 3. Comparison of innovation in Slovakia and Switzerland in 2015

Indicator	Switzerland		Slovakia		
	Rank	Value	Rank	Value	SK/CH (%)
Global Innovation Index	1	68,30	36	42,99	63
Innovation Input Sub-index	2	67,96	37	48,93	72
Institutions	10	89,6	36	75,1	84
Human capital & research	6	59,2	53	33,2	56
Infrastructure	15	58,6	37	49,3	84
Market sophistication	5	72,3	53	50,4	70
Business sophistication	3	60,0	58	36,7	61
Innovation Output Sub-index	1	68,63	38	37,05	54
Knowledge & technology outputs	1	72,4	41	33,7	47
Creative outputs	3	64,8	40	40,4	62
Innovation Efficiency Ratio	2	1,01	48	0,76	75

Source: Based on The Global Innovation Index 2015.

2.3. Evaluation of the pillars of innovativeness of the Slovak Republic

One of the worst evaluated pillars of innovativeness is human resources and research, therefore it will be analysed in more detail. The level of this pillar is influenced by the government expenditure spent on education and research and development (R&D). In case of these indicators the Slovak Republic is lagging not only for the Switzerland but also for the other European countries. The share of public expenditure on education (as a percentage of GDP) amounted to 3.1% in 2012, while in Denmark 8.8%, Switzerland 5.2%, and the EU average 5.3%. In the same year the annual expenditure for one student amounted to

2,810 Euros but in Switzerland 18,493 Euros. Table 4 compares the evolution of the expenditure on R&D as a percentage of GDP in the Slovak Republic and the European Union. The positive fact is that the expenditure on research and development in Slovakia since 2008 have increased but they still constitute less than a half of the EU average. Slovak Republic expenditure on research and development in 2014 constituted only 0.89% of GDP while the EU average was 2.03%. Several EU member states (Finland, Sweden and Denmark) have spent more than 3% of GDP on R&D (Switzerland also spends around 3%). On the other hand, Israel spends 4.2% of GDP on R&D (Eurostat 2016). These countries belong to the innovative leaders.

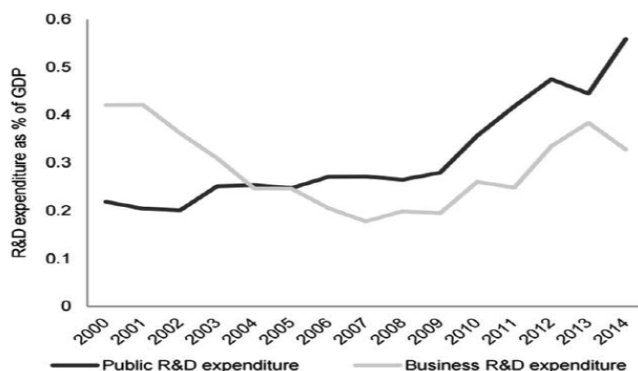
Table 4. Share of expenditures on R&D in relation to GDP in the EU 28 and Slovakia

Region /year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU 28	1,76	1,76	1,78	1,78	1,85	1,94	1,93	1,97	2,01	2,01	2,03
Slovakia	0,50	0,49	0,48	0,45	0,46	0,47	0,62	0,67	0,81	0,83	0,89
SK/EU (%)	28	27	26	25	24	24	32	34	40	41	43

Source: Based on Štatistický úrad Slovenskej republiky.

Beside insufficient level of expenditures on R&D, one can observe inappropriate structure of these expenditures. In contrast to global trend, which promotes especially applied research, in Slovakia still dominates supported basic research (45% of expenditure). Additionally, R&D are financed mainly by business sources in advanced economies (EU – 64%), while in Slovakia R&D are financed mostly by public funds (41%) (Eurostat 2016). Figure 1 presents the development of public and private expenditures spent on research and development in Slovakia in % of GDP. It points one negative aspect: while the public expenditure since 2013 has increased (mainly due to the disbursement of EU funds), the private expenditure is getting down.

Figure 1. Public and private R&D expenditure in Slovakia (% of GDP)



Source: Country Report Slovakia 2016: 41.

2.4. Suggestions and measures

Slovakia has set a target to increase expenditures spent on research and development to 1.2% of GDP by 2020 (Jeck 2014). Research and innovation strategy for smart specialization should start the reform of research and development in the period of 2014-2020. This should include notably increasing resources of business environment so that in 2020 it accounted for 2/3 of the total resources spent on R&D. This implies much greater business involvement in research and also change of the nature of research (higher utilisation of research results in practice). The state should therefore adopt measures that would encourage businesses to a greater extent to engage in research, development and innovation. Some kind of remedy may be a tax relief of companies dealing with research and development. The government has also approved the concept for the development and support of start-up's ecosystem, however in practice the impact of these instruments has not been expressed yet.

Slovak Republic has a lot of qualified and skilled labour power which, however, is not used properly and in the innovation area is not bringing the expected effects. The consequence of this fact is unsatisfactory qualification structure which is a result of improper educational system, i.e. not enough educating graduates orientated technical and natural science. In a companies there is a lack of creative workers – innovators and to solve this problem, it is necessary higher interest of Slovak's high schools and universities in the practical needs and educate absolvents based on demands of their future employers. Every business subject should be involved more actively in the educational processes. For instance, the future employers should be engaged in the creation of educational programs. The mentioned problems could solve "dual education system" which starts to be implemented to the educational system in vocational high school. Companies could also support lifelong learning of its employees aimed at improving their qualifications and skills needed for the implementation of innovative actions.

When comparing Slovakia with developed economies, one can observe that total number of employees working in R&D is relatively low. This is reflected in the poor performance measured by the number of scientific publications and citations. Slovak scientific and research institutions are weakly engaged in international cooperation which is probably a consequence of their low competitiveness. Furthermore, this may be a result of a lack of quality evaluation of young scientists and creative workers.

Development of innovation in a certain economy is providing a particular business sector (community). The level and intensity of innovation activity in individual companies depend not only on the willingness or ability of the company to devote to innovation but it is influenced also by external factors. One of them is appropriate pro-innovative business environment enabling enterprises in a greater extent to participate in the innovation processes.

A poor quality of business environment is one of the factors which characterize the innovation environment in the Slovak republic. It was noticed by the European Commission in its evaluation report for 2015. One emphasizes particularly detrimental bureaucratic and regulatory obstacles of law, inefficient public administration, under-utilizing electronic services, law enforcement and lengthy judicial procedures and even frequent changes in legislation and lack of transparency, as well as corruption (Country Report Slovakia 2016: 31).

Low quality of business environment in Slovakia decreases attractiveness of the country for foreign and domestic investors and hamper innovation development of Slovak companies which are weakly involved in innovation activity. According to the data of Statistical Office of the Slovak Republic for the period of 2010-2012, innovative enterprises constituted 34% of all the enterprises, while the average in the European Union in the same period was 48.9%. Compared to the previous period 2008-2010, in which the share of innovative enterprises in Slovakia was 35.6%, the situation is even worse (Eurostat 2016). The low number of innovative enterprises in the Slovak Republic is the result of innovation barriers that are an obstacle for the successful development of innovation activities in businesses. These include cost, market and knowledge-based factors.

Costs belong to the greatest barriers of innovative activities for Slovak businesses. Specifically is the lack of own resources for the financing of innovation, lack of finance from outside sources and really high costs of innovation that significantly reduces innovation activity of enterprises both in the industry and services. Access of individual enterprises to innovative activity and willingness to invest in the development of innovative processes is important too. To improve the innovation performance of enterprises and the entire economy, it is necessary to identify and eliminate innovation barriers. Some of the barriers can be eliminated at the enterprise level but most of them require solutions at the state level. Therefore the task for the state is to ensure adequate inputs for innovation process and create conditions (i.e. environment that can stimulate development of innovation) for its effective utilization. Innovation policy of each country (regions) has an important role to support innovation. It includes all the instruments and tools which are stimulating innovative development based on support of innovation and the creation of pro-innovation business environment. The result of the effective innovation policy could be sufficient investment in the R&D, high-quality scientific research and educational institutions and cooperation with businesses, intellectual property protection, as well as sophisticated system of support for innovative businesses from the state. In our opinion, however, such policy has not existed in Slovakia yet.

Conclusions

Historically, innovations have had a great impact on the economic growth of the particular countries. A number of leading economists confirmed this thesis. On the basis of the information overview on pro-innovation environment which were obtained from available resources like Global Innovation Index, Regional Innovation Strategy, and statistical databases, it is possible to identify some factors which influence enterprise innovation activity and its development. On the other hand, though Slovakia has adopted a number of strategic documents which should speed up the implementation of innovations into practice, the stated objectives are still impossible to meet and the country lags in the innovation development behind the developed countries.

The basic reason of low innovative performance of the Slovak republic and the factor preventing the development of Slovak enterprises in their innovation is in our opinion the low amount of funds invested in innovation development. Therefore the government of the Slovak republic should finally pass from words to action and long-verbally declared support for research, development and innovation and change it to a gradual increase of the funds invested in this area. Because Slovakia is a small country, it requires prioritizing and investing money in these areas of research and development which bring desired effects and innovation. It means that Slovak scientific and research base should specialize mainly at the areas of science and research which can reach internationally comparable results. It finds also its confirmation in the EU as more established companies that dominate in the European economy focus on improving their products and services rather than on innovation.

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