# EVALUATION OF INNOVATIVE ACTIVITIES OF SMES IN THE SLOVAK REPUBLIC

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**Abstract:** *Innovation is currently an important source of economic growth. They are an integral part of modern economies. They contribute not only to the growth of the country's competitiveness but also the creation of new jobs, the improvement of the quality of life, or the protection of the environment and sustainable development. Therefore, the aim of the paper is through selected indicators, e.g. the share of expenditures on development and research in GDP, expenditures on research and development per capita in the regions, the share of enterprises with innovation activity, the structure of expenditures on innovations, etc. to evaluate the current innovation activity of SMEs in individual regions of the Slovak Republic. Based on the results of the analysis, will also outline further possibilities for increasing and especially support from the state of this innovative potential of SMEs at the national but especially regional level. And because the Slovak Republic has long been one of the below-average countries in the field of innovation within the EU, possible barriers to the development of innovative activities of small and medium-sized enterprises in the Slovak Republic will also be identified.*

**Keywords:** *Expenditure on research and development, Innovation, Innovation potential, Innovation barriers.*

## 1. INTRODUCTION

In recent years, we can say that innovation is a key driver of economic growth and development in all countries, as well as a key element in increasing the competitiveness of businesses, especially small and medium-sized businesses. Small and medium-sized enterprises have several advantages over large enterprises in terms of innovation, which results from their size. Compared to large companies, they are more flexible. They have a closer relationship with customers and are therefore able to respond more quickly to various technological changes as well as to changes in the market. There are stronger links and more flexible information flows between company employees than in large companies. Some SMEs have dynamic leadership and a higher risk aversion associated with entrepreneurship and innovation. Today's small and medium-sized enterprises, if they want to stay on the market and exist for more than just a few years, must constantly improve their internal and external environment. This process of continuous improvement is an innovation. We consider the Austrian economist and professor Josef Alois Schumpeter to be the founder of a direction focused on innovation in the economy, who originally considered every positive change in the production organism to be an innovation. The very word innovation is of Latin origin. Hudec states that the term innovation means the introduction

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of a new or significantly improved product or service on the market, respectively. introduction of a new or significant improvement of the process within the company (HUDEC, 2007). The Organization for Economic Co-operation and Development (OECD) defines innovation as follows: innovation consists of those scientific, technical, commercial or financial steps necessary for the successful development and marketing of a new or improved product, new or improved processes or for a new approach within social services. Research and development are just one of those steps. However, it should be noted here that R&D is not the only source of innovation. It is clear from a business practice that innovations often start with customers, users, suppliers or cooperation partners. Based on a manual issued by the OECD, we can also define innovation as a set of scientific, technological, organizational, financial and commercial practices that have or should result in the realization of new or improved technological products or devices. According to this document, we can classify innovations into four basic types (the same breakdown is also used by the Statistical Office of the Slovak Republic): product, process, organizational and marketing. However, there are several types of innovation. Paul Wright defined three levels of innovation: gradual, substantial and radical. Satell (2017) divides types of innovations according to the applied innovation strategy into breakthrough, maintenance, disruptive and basic research.

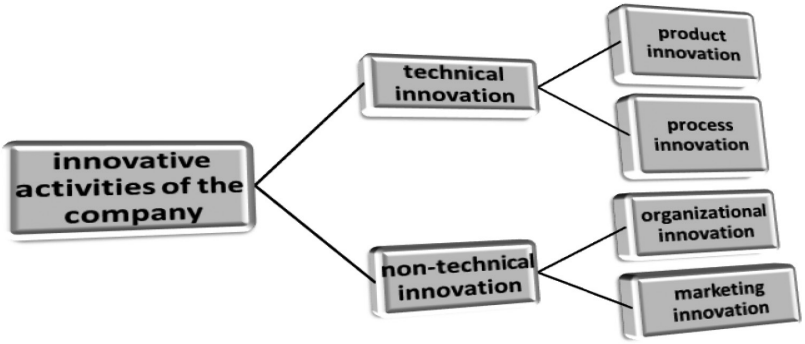


**Figure 1.** Types of innovations according to the Oslo manual
**Source:** Adapted from the Oslo manual

In any case, it is important to be aware of the fact that innovation can also result from the modification of existing ideas. The concepts of idea and creativity are therefore closely linked to innovation. Each innovation begins with an idea, a search for creative and interesting ideas and solutions, which after various stages of development result in the implementation itself and thus leads to the introduction of new products, their improvement and development, increased work efficiency, reduced costs or increased quality. At present, companies cannot focus only on the constant increase of capacity, but mainly on the delivery of a quality product or quality customer service. This means that today the goal of innovation has shifted from quantity to quality.

## 2. INNOVATION PERFORMANCE OF THE SLOVAK REPUBLIC

When evaluating the innovation performance of the Slovak Republic, we must, unfortunately, state that it is low in comparison with other countries of the European Union. Although innovation performance is growing slightly, it is still below the level of most EU countries. In the overall ranking of innovation, which is compiled annually by the European Commission (European Innovation Scoreboard), the Slovak Republic is placed in the last third and thus belongs among the so-called moderate innovators. According to the results of the statistical survey of the Statistical Office of the Slovak Republic, the share of innovative enterprises in Slovakia is 35.6% of the total number of enterprises, while the average in the European Union is up to

51.6%. This unfavorable situation is, among other things, the result of the action of innovation barriers that hinder the development of innovative activities of companies. Science, technology, research, development and innovation currently play a key role in the process of economic and social development to maintain and increase the competitiveness of the economy. The level of expenditure on research and development varies from one EU country to another. Expenditures on research and development in the Slovak Republic amount to 0.83% of GDP (Table 1), which is well below the EU average where expenditures on research and development are at the level of 2.13% of GDP. The Slovak Republic lags behind the EU average in other monitored indicators evaluating the level of research and development in the conditions of the Slovak Republic (number of patents, scientific publications, number of employees in science and research, etc.). All these facts negatively affect the overall innovation performance of our economy.

**Table 1.** Expenditures on research and development in the SR in thousands of euros

| Year | Expenditure on research and development | | | Expenditure on research and development per capita (EUR) | Share of research and development expenditure in GDP (in %) |
|---|---|---|---|---|---|
| | together | capital expenditures | current expenses | | |
| **2010** | 416 369 | 63 073 | 353 296 | 77,2 | 0,62 |
| **2011** | 468 439 | 94 799 | 373 641 | 86,9 | 0,66 |
| **2012** | 585 225 | 109 337 | 475 889 | 108,3 | 0,80 |
| **2013** | 610 876 | 97 300 | 513 576 | 112,9 | 0,82 |
| **2014** | 669 632 | 115 698 | 553 934 | 123,6 | 0,88 |
| **2015** | 927 272 | 374 186 | 553 086 | 171,0 | 1,18 |
| **2016** | 640 835 | 45 814 | 595 021 | 117,9 | 0,79 |
| **2017** | 748 955 | 72 776 | 676 179 | 137,6 | 0,88 |
| **2018** | 750 947 | 53 918 | 697 029 | 138,0 | 0,84 |
| **2019** | 776 590 | 36 117 | 740 472 | 142,50 | 0,83 |
| **index** | 1,87 | 0,57 | 2,10 | 1,85 | - |

**Source:** processed on the basis of data from the Statistical Office of the Slovak Republic

This negative development in the field of innovation is also confirmed by the development of the Global Innovation Index indicator, which has been compiled jointly by Cornell University, the prestigious INSEAD Business Academy and the World Intellectual Property Organization in cooperation with other organizations since 2007. The Global Innovation Index ranks world economies according to their innovative capabilities, from the most innovative economies to the least innovative economies. The index consists of approximately 80 indicators, divided into innovative inputs and outputs. The index is based on the assumption that innovative inputs (highly qualified workforce, educational and research workplaces, services for entrepreneurs, a sufficient number of suppliers, a sophisticated market, infrastructure and access to capital) are very important in creating innovations. Innovation output is a broad concept. If we want to measure it, it means quantifying the extent to which ideas for new products and services from innovative industries represent economic added value and affect the ability to penetrate the market.

In the GII evaluation, the Slovak Republic has long been in the top fifty most innovative countries (Table 2).

Slovakia has currently fallen from 37th to 39th ranks among moderate innovators whose innovation performance is at the level of expectations. The cause of such a development can be e.g. poorly set legislation, whether the lack of support infrastructure, insufficient investment, lack

of skilled labor, etc. This is also proved by the partial results of the GII evaluation, which show that the Slovak Republic achieves better results in innovation outputs than inputs.

**Table 2.** Development of the Global Innovation Index of the Slovak Republic in the years 2011 to 2020

| Year (number of countries) | 2011 (125) | 2012 (141) | 2013 (142) | 2014 (143) | 2015 (141) | 2016 (128) | 2017 (127) | 2018 (126) | 2019 (129) | 2020 (131) |
|---|---|---|---|---|---|---|---|---|---|---|
| Global Innovation Index ranking | 37 | 40 | 36 | 37 | 36 | 37 | 34 | 36 | 37 | 39 |

**Source:** Global Innovation Index, https://www.wipo.int/portal/en

## 3. INNOVATIONS IN SMALL AND MEDIUM ENTERPRISES IN THE SLOVAK REPUBLIC

Small and medium-sized enterprises form the basis of added value creation in the economy, employment and also have a significant impact on the creation of public resources through the tax system. Innovative activities of small and medium-sized enterprises represent one of the main preconditions for their competitiveness in the markets. In the current conditions, only business entities that can constantly innovate their products and services and thus adapt to the new competitive conditions of the business environment can withstand tough competition. Peter F. Drucker also considers innovation to be one of the two basic functions of a business organization. The innovative potential and innovative performance of small and medium-sized enterprises significantly determines the future direction of development of the entire national economy and decides on the orientation of the whole economy.

**Table 3.** Innovation intensity in % (share of innovation expenditure from revenues in innovative enterprises)

| | 2018 | | 2016 | | 2014 | | 2012 | | 2010 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Industry | Services | Industry | Services | Industry | Services | Industry | Services | Industry | Services |
| Businesses together | 2,2 | 2,4 | 1,7 | 1,5 | 1,3 | 1,4 | 2,0 | 1,2 | 1,4 | 0,8 |
| Small businesses | 3,1 | 3,7 | 5,9 | 2,8 | 1,6 | 0,8 | 4,3 | 0,9 | 6,1 | 0,5 |
| Medium-sized enterprises | 2,0 | 2,5 | 2,9 | 0,9 | 4,5 | 1,1 | 2,8 | 0,8 | 2,4 | 1,8 |
| Large companies | 2,2 | 1,8 | 1,3 | 1,4 | 0,9 | 1,9 | 1,8 | 1,6 | 1,1 | 0,6 |

**Source:** processed on the basis of data from the Statistical Office of the Slovak Republic

The intensity of innovation of small and medium-sized enterprises and the involvement of business entities in the process of innovation can be assessed through the volume of funds that SMEs invest in innovation from the total volume of their revenues (Table 3). When analyzing the intensity of SME innovation, we see that the share of funds in the volume of revenues received during the period under review increased the most for small enterprises in the field of services by 3.2 percentage points. Table 4 shows the development of the share of sales in small and medium-sized enterprises with innovative activity in the total sales of all companies, where we can see that this value is close to 50 percent in companies operating in the industry, in service companies this share is relatively low.

In order to develop the innovation potential of SMEs and thus the consequent expected increase in the innovation performance of these business entities, SMEs must make more intensive use of existing domestic innovation capacity, consisting of domestic R&D, skilled workforce, information and communication technologies.

**Table 4.** Share of revenues in enterprises with innovation activity from total revenues of all enterprises in%

| | 2018 | | 2016 | | 2014 | | 2012 | | 2010 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Industry | Services | Industry | Services | Industry | Services | Industry | Services | Industry | Services |
| **Businesses together** | 62,9 | 46,2 | 72,7 | 53,9 | 71,8 | 48,4 | 76,0 | 50,4 | 78,0 | 56,8 |
| **Small businesses** | 45,3 | 26,3 | 25,8 | 29,7 | 33,5 | 44,0 | 33,4 | 36,5 | 27,5 | 37,1 |
| **Medium-sized enterprises** | 45,6 | 38,3 | 53,6 | 57,6 | 47,2 | 30,5 | 52,2 | 47,6 | 59,4 | 35,4 |
| **Large companies** | 68,5 | 72,4 | 82,9 | 72,8 | 82,1 | 66,4 | 85,4 | 66,3 | 86,8 | 85,4 |

**Source:** processed on the basis of data from the Statistical Office of the Slovak Republic

**Table 5.** Expenditures on research and development in individual regions of the Slovak Republic in thousands of EUR

| | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | Index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bratislava region** | 374848 | 360835 | 383071 | 319931 | 384880 | 311168 | 346919 | 317112 | 242739 | 208159 | 1,8 |
| **Trnava region** | 51325 | 43918 | 40098 | 41492 | 97749 | 48742 | 29187 | 25293 | 33565 | 27996 | 1,83 |
| **Trenčín region** | 94105 | 80615 | 95894 | 57001 | 52150 | 55638 | 31337 | 30805 | 26742 | 47520 | 1,98 |
| **Nitra region** | 36578 | 66239 | 37349 | 36876 | 88226 | 52768 | 20186 | 25209 | 21298 | 18776 | 1,95 |
| Žilina region | 77943 | 65422 | 59719 | 59592 | 134196 | 77971 | 61884 | 60787 | 42190 | 31043 | 2,51 |
| **Banská Bystrica region** | 43724 | 41406 | 37334 | 37743 | 44540 | 34814 | 33126 | 29938 | 26320 | 18775 | 2,33 |
| **Prešov region** | 26705 | 26804 | 20202 | 25353 | 23061 | 23744 | 19813 | 17440 | 13344 | 11588 | 2,30 |
| **Košice region** | 71358 | 65704 | 75285 | 62843 | 102467 | 64782 | 68419 | 78637 | 62238 | 52507 | 1,36 |

**Source**: processed on the basis of data from the Statistical Office of the Slovak Republic

Table 5 shows us the development of expenditures on research and development according to individual regions of the Slovak Republic, where we can observe an increase in expenditures on research and development in all regions of the Slovak Republic. The largest increase of more than 100 percent was recorded in the Banská Bystrica region, the Prešov region and the Žilina region. The share of employees in research and development also increased, which is documented in Table 6. However, despite these positive figures, the innovative performance of SMEs is not sufficient. It must be borne in mind that there is a close link between the entrepreneurial activities of small and medium-sized enterprises, economic growth and job creation. Thus, innovative SMEs and startups are a source of economic growth and the growth of the competitiveness of the whole economy.

**Table 6.** Share of employees in research and development

| | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | index |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bratislava region** | 14 291 | 13 892 | 12 983 | 13 671 | 12 538 | 12 925 | 13 402 | 14 357 | 14 494 | 13 839 | 1,03 |
| **Trnava region** | 1 927 | 1 821 | 1 901 | 1 846 | 1 892 | 1 774 | 1 668 | 1 764 | 1 707 | 1 578 | 1,22 |
| **Trenčín region** | 2 385 | 2 347 | 2 396 | 1 471 | 1 217 | 1 489 | 971 | 1 048 | 1 037 | 1 535 | 1,55 |
| **Nitra region** | 2 260 | 2 415 | 2 310 | 2 318 | 2 934 | 2 602 | 2 130 | 1 889 | 1 851 | 1 865 | 1,21 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Žilina region | 3 321 | 3 295 | 2 942 | 3 088 | 2 934 | 2 612 | 2 482 | 2 718 | 2 506 | 2 482 | 1,34 |
| **Banská Bystrica region** | 2 127 | 2 094 | 2 080 | 2 143 | 2 216 | 2 287 | 2 047 | 2 051 | 2 076 | 2 018 | 1,05 |
| **Prešov region** | 1 276 | 1 302 | 1 224 | 1 305 | 1 244 | 1 261 | 1 196 | 1 220 | 1 046 | 1 090 | 1,17 |
| **Košice region** | 4 202 | 4 099 | 3 948 | 3 829 | 3 777 | 3 875 | 3 927 | 3 833 | 3 879 | 3 721 | 1,13 |

**Source:** processed on the basis of data from the Statistical Office of the Slovak Republic

Small and medium-sized enterprises have many advantages that make them successful innovators. However, many small and medium-sized enterprises are not yet ready for such activities for various reasons and, despite their positives, do not participate in innovation activities, which is then reflected in the overall indicators of evaluation of innovation performance of the whole economy.

## 4. CAUSES OF INSUFFICIENT INNOVATION PERFORMANCE IN SMALL AND MEDIUM-SIZED ENTERPRISES IN SLOVAKIA

The Slovak economy has small and medium-sized enterprises that have demonstrable innovation potential. However, its growth needs to be constantly stimulated and supported. There are several small and medium-sized enterprises in which many innovative ideas emerge. On the other hand, we also have companies that are not aware of the need for innovation and, despite their many advantages over large companies, do not innovate at all or very little. There can be many reasons. In essence, we can state that the relatively low level of innovation performance of Slovak SMEs lies in the presence of several problems, but especially structural problems of the Slovak economy, politics or legislation. Among the basic causes from the macroeconomic point of view we can mention the following:

- insufficient support for small and medium-sized enterprises in the Slovak Republic,
- the significant bureaucratic burden on SMEs,
- missing regional innovation centers,
- the lack of a skilled workforce whose education would reflect the needs of the market,
- weak support for applied research and development,
- absent cooperation of SMEs and public research and educational institutions (eg universities, vocational schools, etc.),
- complicated, non-transparent, bureaucratic access to EU funding for science, research and innovation.

From a microeconomic point of view, the causes of insufficient innovation activities in SMEs may be the following:

- lack of financial resources, both investment and current,
- inadequate business management,
- inadequate or non-functional marketing of the company,
- small number of experts among employees,
- inefficient exchange of information with the environment,
- more difficult availability of a sufficient amount of relevant information, etc.

## 5. CONCLUSION

In conclusion, we can state that the Slovak Republic, despite its possibilities, is constantly considered a moderate innovator both globally and in Europe. In order for a business, but also the economy itself, to compete today, it must respond flexibly to the changes that global society brings. And if the economy does not support, initiate and create the right conditions for innovation, other economies will overtake it. Recent activity in some sectors has been slowed and curtailed by the COVID-19 pandemic. At the same time, however, it has created a new space and brought new challenges for the development of innovation. It is essential not to stop in the innovation process and to create, especially on the part of the state, suitable conditions for the use of the innovation potential, which the Slovak Republic undoubtedly has at its disposal.

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