

# INNOVATIVE ACTIVITIES OF SMALL AND MEDIUM-SIZED ENTERPRISES WITH A FOCUS ON THE NEED AND USE OF HUMAN RESOURCES

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## Abstract

In the period of worldwide growing globalization and digitization, innovations are becoming an increasingly important factor determining the success of business activities. They provide enterprises with an increase in efficiency and competitiveness. In the current dynamically developing period, the need to introduce innovations is even greater. This was also pointed out by the current pandemic, during which businesses were forced to respond quickly and flexibly to changes in the market. And innovations would not occur without adequate research and development. Investments in research, development and innovation are essential for the long-term economic development and prosperity of individual enterprises and, consequently, of the country. They strengthen economic growth, efficient use of resources, job creation and labor productivity. An important factor in research and development is human resources, which increase technological progress, scientific knowledge, and improve the quality of life. In the post, we will focus on the field of research and development. We will evaluate the development of research and development expenditures in the Slovak Republic, analyze the structure and use of human resources in research and development, and assess the innovative activities of enterprises.

**Key words:** research, development, innovation, employees, innovation activity

**JEL Code:** O30, M20

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## Introduction

Lately, we have encounter more and more with terms such as turbulent environment, uncertain environment, dynamic environment, unstable environment, which warn us that if we want to have a certain business future, we must be ready to respond to the challenges that arise from such environments. In such conditions, managers don't have an easy task, to provide enterprises with an answer on how to manage instability and how through changes

ensure success and create superior values that will defer them from the competition. (Brkic, Mujic, Brajic, 2017)

In the Slovak Republic, up to 99.9% of the total number of business entities are small and medium-sized enterprises. Their position is important in terms of job creation, creation of added value, they have a positive impact on supporting the local economy and equalizing differences in regional development. An essential part of the successful operation of small and medium-sized enterprises on the market is their innovative activity. Stanislawski states: „it is justified to formulate the thesis that innovative development is one of key conditions ensuring conducting business activity in a competitive market. “(Stanislawski, 2021) Small and medium-sized enterprises represent the dominant form of the business organization in the Slovak Republic. They undertake mainly within the areas of activities and sectors with claims for the workforce. Their competitiveness also depends on the ability of workers to meet the new requirements for skills and qualifications. A key problem for SMEs is a need to improve their innovative capacity. (Glatz, Misota, 2016)

Small and medium-sized enterprises have several advantages over large enterprises in terms of innovation that arise 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 changes in the market. Because of the mobility, adaptedness, the flexibility of the activity, receptivity to the innovations, the small and medium-sized enterprises should become the key ones for the promotion of the innovations' development and implementation. (Kolisnichenko, 2017) Small and medium-sized enterprises and large enterprises are often affected by different internal and external environments because of their different organizational sizes, thus showing different characteristics of innovation and obstacles to innovation. Compared to large enterprises, small and medium-sized enterprises have both advantages and disadvantages in innovation. Understanding the characteristics and obstacles of SMEs in the process of innovation can promote successful innovation activities of SMEs. (Chen, 2017) Since SMEs in modern market economy are the foundation of the national economy of the country, their economic growth and development, competitiveness and adaptation to changes in the environment are crucial for the entire economy. Long-term ability of the enterprise to be competitive is reflected in the fact that if enterprise is efficient, if it offers products/services of high quality at the market, and if it is sensitive to the requirements of customers and if it is capable of introducing or innovating new things into the business. Successful product or process innovations provide to the enterprise with a variety of competitors. This special feature allows

the enterprise to set higher prices or lower costs compared to competitors. (Brkic, Mujic, Brajic, 2017)

Innovations would not occur without adequate research and development. Research and development are the main driver of innovation. The relationship between research, development and innovation is very complex. Edquist (2011) emphasizes that research and development activities bring new knowledge, while development activities bring advanced products and processes. Innovation determines a new way to improve, renew and change something. (Stankovičová 2011) Research and development represent one of the steps towards innovation and the innovative activity of companies.

In the post, we will focus on the area of research and development. We will evaluate the development of expenditure on research in the Slovak Republic, the regional distribution of expenditure on research and development and the share of enterprises with innovative activity. Subsequently, we will evaluate the structure and use of human resources in research and development. The analysed period will be the period of ten years 2011-2020. We will evaluate and analyse the selected indicators based on the data of the Statistical Office of the Slovak Republic.

## **1 Innovative activities of small and medium-sized enterprises**

Enterprises with innovative activity are those that have launched new or significantly improved products on the market or introduced new or significantly improved processes (including organizational or marketing methods) within the enterprise. This also includes those enterprises that had unfinished or suspended innovation activities or carried out or procured research and development.

Slovakia is a country with a competitive technical background and a long tradition of industrial research and development. It has active research and development personnel participating in top domestic and international projects, has an available engineering and scientific base, has a built-up research and development network made up of industrial research and development organizations, scientific and research workplaces at technical and natural sciences universities, research institutes of the Slovak Academy of Sciences and foreign research and development centers. This research and development base is also well connected with other interested institutions such as industrial associations, unions, clusters, research, development and innovation support agencies, business innovation centers and incubators, science and technology parks, but also software development companies.

When evaluating the innovative performance of the Slovak Republic, we unfortunately must state that it is low compared to other countries of the European Union. Although the innovation performance is slightly gradually increasing, it is still below the level of most EU countries. In the overall ranking of innovativeness, compiled annually by the European Commission (European Innovation Scoreboard), the Slovak Republic is placed in the last third and thus belongs to the so-called moderate innovators.

**Tab. 1: Enterprises with innovative activity by size groups of enterprises**

		2010	2012	2014	2016	2018	2020
Enterprises together	Number of enterprises	2306	2496	2632	2488	2794	3204
Enterprises together	Share of the total number of enterprises in %	32.79	31.29	29.17	28.68	27.96	33.96
Small businesses	Number of enterprises	1274	1585	1772	1450	1753	2053
Small businesses	Share of the total number of enterprises in %	26.69	27.23	25.86	22.78	23.29	28.78
Medium enterprises	Number of enterprises	757	657	633	782	754	848
Medium enterprises	Share of the total number of enterprises in %	41.34	37.72	36.21	41.55	37.90	46.11
Large enterprises	Number of enterprises	275	254	227	256	287	303
Large enterprises	Share of the total number of enterprises in %	64.25	61.35	53.92	59.67	60.40	65.49

Source: Processed based on data from the Statistical Office of the Slovak Republic

According to the results of the statistical survey of the Statistical Office of the Slovak Republic, in 2020 the share of enterprises with innovative activity in Slovakia was 33.96% 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, also a consequence of the action of innovation barriers that prevent the development of innovative activities of enterprises.

**Tab. 2: Expenditure on research and development in the Slovak Republic in thousands of Euros**

Year	<i>Expenditure on research and development</i>			<i>R&amp;D expenditure per capita (Euro)</i>	<i>Share of R&amp;D expenditure from GDP (in %)</i>
	Together	Capital	Common		
<b>2010</b>	416 369	63 073	353 296	77.2	0.62
<b>2011</b>	468 439	94 799	373 641	86.9	0.66
<b>2012</b>	585 225	109 337	475 889	108.3	0.80
<b>2013</b>	610 876	97 300	513 576	112.9	0.82
<b>2014</b>	669 632	115 698	553 934	123.6	0.88
<b>2015</b>	927 272	374 186	553 086	171.0	1.18
<b>2016</b>	640 835	45 814	595 021	117.9	0.79
<b>2017</b>	748 955	72 776	676 179	137.6	0.88
<b>2018</b>	750 947	53 918	697 029	138.0	0.84
<b>2019</b>	776 590	36 117	740 472	142.50	0.83
<b>2020</b>	838 927	70 949	767 978	153.65	0.92
<b>2021</b>	918 346	76 786	841 560	168.80	0.95
<b>Index 21/10</b>	2.20	1.21	2.38	2.19	-

Source: Processed based on data from the Statistical Office of the Slovak Republic

When we look at enterprises with innovative activity broken down by size groups, the largest share is held by innovative enterprises in the group of large enterprises, where their share has long been above 60%, in 2020 it was 65% of large enterprises that carry out innovative activities. In 2020, the share of innovating enterprises in the size group of medium-sized enterprises was 46%, and among small enterprises more than 33% of enterprises are engaged in innovative activities.

The basis of innovation is adequate research and development. Spending on research and development in Slovakia is constantly growing from 2010 to 2015, while current spending makes up a significant share during the entire analyzed period. The percentage share of research and development expenditures from GDP reached its maximum in 2015, i.e., 1.18% of GDP. The increase in the percentage of total R&D expenditure for 2015 was entirely due to capital expenditure, drawing heavily on structural funds.

**Tab. 3: Expenditures on research and development by region in millions of Euros**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Index 20/11
Bratislava region	242.7	317.1	346.9	311.2	384.9	319.9	383.1	360.8	374.8	393.9	1.62
Trnava region	33.6	25.3	29.2	48.7	97.7	41.5	40.1	43.9	51.3	51.2	1.52
Trenčín region	26.7	30.8	31.3	55.6	52.2	57.0	95.9	80.6	94.1	88.9	3.33
Nitra region	21.3	25.2	20.2	52.8	88.2	36.9	37.3	66.2	36.5	44.8	2.10
Žilina region	42.2	60.8	61.9	78.0	134.2	59.6	59.7	65.4	77.9	83.9	1.99
Banská Bystrica region	26.3	29.9	33.1	34.8	44.5	37.7	37.3	41.4	43.7	49.5	1.88
Prešov region	13.3	17.4	19.8	23.7	23.1	25.3	20.2	26.8	26.7	26.1	1.96
Košice region	62.2	78.6	68.4	64.8	102.5	62.8	75.3	65.7	71.3	100.7	1.62

Source: Processed based on data from the Statistical Office of the Slovak Republic

In 2016, there was a decline. This year, 0.79% of HPD was spent on research and development. In the following years, R&D spending continued to rise, and in 2021 it more than doubled compared to 2010. The share of R&D spending in GDP has now approached 1% again.

From a regional point of view, research and development expenditures are concentrated in the Bratislava region, which significantly exceeds all other regions. The research and development expenses of companies in the Bratislava region are several times higher than the expenses of companies in other regions, which may be related to the economic maturity of the capital region or the presence of several research institutes. On the contrary, the smallest amount of research and development expenditure is spent in the Prešov Region. The largest increase in research and development expenditures over the last 10 years was

recorded by the Trenčín Region (Table 3). Spending on research and development in this region increased by an index of 3.33 in the analyzed period.

## 2 Research and development personnel

An important factor in research and development is human resources, which increase technological progress, scientific knowledge, improve the quality of life, contribute to European competitiveness and the prosperity of European citizens. For better application of the workers in the labour market there is increasingly required obtaining of the digital skills, because we meet with the lack of skilled workers and there is a rise in the demand for skilled workers with IT skills. (Glatz, Misota, 2016) The field of research and development is largely dependent on human potential, knowledge and insights, more than other fields.

**Tab. 4: Structure of R&D employees (in %)**

Indicator		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
R&D employees by occupation	Researchers	86.41	86.80	87.84	87.01	84.85	83.41	82.79	82.35	81.57	79.07
	Technicians and equivalent staff	9.38	9.53	8.72	8.93	9.89	10.42	11.78	11.87	12.67	15.11
	Supporting staff	4.21	3.66	3.44	4.06	5.26	6.16	5.43	5.78	5.75	5.82
R&D employees by qualification	Graduates from universities and higher qualified people	90.13	90.44	91.86	91.12	89.03	89.65	89.35	88.96	88.97	89.27
	Bachelor's degree	2.15	1.24	0.96	1.29	1.73	1.54	1.36	1.88	2.13	2.07
	Master's degree	40.99	40.82	41.23	39.87	38.82	40.08	39.88	40.72	41.72	43.61
	Doctoral degree (Ph.D., Dr., Professor, Associate prof.)	46.99	48.38	49.67	49.96	48.48	48.02	48.11	46.36	45.12	43.59
	Short-cycle tertiary education	1.27	0.98	0.82	1.25	0.87	1.72	1.38	1.80	1.74	1.49
	Secondary education	8.22	8.22	6.96	7.41	9.63	8.28	8.95	8.97	9.03	8.96
	Basic education	0.37	0.35	0.36	0.22	0.47	0.35	0.32	0.27	0.26	0.28

Source: Processed based on data from the Statistical Office of the Slovak Republic

The number of research and development employees available to the national economy thus becomes the main measure of the country's research and development potential. It is precisely the lack of qualified employees that is a frequent barrier, especially in small, less often in medium-sized enterprises. Not only a lack of qualified or creative employees, but also a problem with their acquisition and subsequent retention. On the one hand, it is related to demographics and the educational structure of graduates, but the lack of qualified employees often also has a regional dependence. Employees who bring innovative ideas to the company are usually concentrated in those locations where there are enough job opportunities.

Small businesses, even if they get such employees, may have problems with the evaluation and career growth of high-quality and innovative employees.

The number of workers in the field of research and development in Slovakia increases slightly during the analyzed period, while it goes without saying that researchers make up the largest share, up to 80%. Researchers are the creators of innovative thoughts, ideas and subsequent innovations. The share at the level of 15% is made up of technicians, and the smallest share (5%) is made up of support staff.

Up to 90% of research and development employees are employees with 2nd and 3rd degree university education. They are the creative employees ensuring the implementation of research and development, researchers and creators of innovations.

**Tab. 5: Research and development employees by region**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Index 20/11
Bratislava region	14494	14357	13402	12925	12538	13671	12983	13892	14291	15127	1.04
Trnava region	1 707	1 764	1 668	1 774	1 892	1 846	1 901	1 821	1 927	2 000	1.17
Trenčín region	1 037	1 048	971	1 489	1 217	1 471	2 396	2 347	2 385	2 350	2.27
Nitra region	1 851	1 889	2 130	2 602	2 934	2 318	2 310	2 415	2 260	2 263	1.22
Žilina region	2 506	2 718	2 482	2 612	2 934	3 088	2 942	3 295	3 321	3 320	1.32
Banská Bystrica region	2 076	2 051	2 047	2 287	2 216	2 143	2 080	2 094	2 127	2 418	1.16
Prešov region	1 046	1 220	1 196	1 261	1 244	1 305	1 224	1 302	1 276	1 328	1.27
Košice region	3 879	3 833	3 927	3 875	3 777	3 829	3 948	4 099	4 202	4 778	1.23

Source: Processed based on data from the Statistical Office of the Slovak Republic

From a regional point of view, the Bratislava region has the largest number of research and development employees, which also reported the highest expenditures on research and development. It can also be caused by the number of public research institutions or other organizations that are mainly based in the capital, i.e., in the Bratislava region. The largest number of research and development employees was added in the Trenčín Region, their number increased by an index of 2.27 in the monitored period. It is related to the already mentioned fact that it is in this region that research and development expenses have increased the most. From the point of view of research and development and innovative activities of companies, the Trenčín region is the second strongest in Slovakia.

### **3 Causes of insufficient innovation performance in SME in Slovakia**

Small and medium-sized enterprises in Slovakia have demonstrable innovation potential. However, its growth must be constantly stimulated and supported. There are several small and medium enterprises where many innovative ideas are generated. On the other hand, we also

have companies that are not aware of the need for innovation and, despite many advantages compared to large companies, do not innovate at all or only very little. There can be several reasons. Among the basic causes from a macroeconomic point of view, we can mention the following:

- insufficient support for small and medium-sized businesses in Slovakia,
- significant bureaucratic burden for SMEs,
- missing regional innovation centers,
- lack of qualified workforce, whose education would reflect the needs of the market,
- weak support for applied research and development,
- lack of cooperation between SMEs and public research and educational institutions (e.g. universities, vocational schools),
- 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 can be the following:

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

The government-approved Economic Policy Strategy with a view to 2030, the goal of which is a gradual approach to knowledge-based economies within the EU, should help to increase spending in the field of research and development and the subsequent increase in innovation activities of SMEs in Slovakia. One of the recommendations talks about the gradual increase of research and development expenditures until 2030 so that the level of the top five EU countries in terms of the share of research and development expenditures in GDP is reached. One of the main tools of support should be various tax breaks. Tax incentives stimulate companies to spend on domestic research and development. Now, companies that hire young research and development workers and companies that increase the funding of their research activities are mainly supported.

## **Conclusion**

In recent years, we can state that innovations are the key driving force of economic growth and development of all countries. At the same time, innovations are also considered to be a fundamental element in the growth of the competitiveness of business entities, especially small and medium-sized business entities. The rate of innovation of Slovak SMEs is relatively low. Businesses suffer from a lack of qualified experts, finances, or support for education in the field of IT. According to the assessment of the European Commission as well as the Slovak Business Agency, Slovakia lags significantly behind other EU member countries in the introduction of innovations.

For the company, as well as the economy itself, to survive in the current competitive struggle, they must respond flexibly to changes brought about by global society. And if the economy does not support, initiate and create suitable conditions for innovation, other economies will overtake it. Recently, the COVID-19 pandemic has slowed down innovation activities in some sectors. However, at the same time, it created a new space and opportunity and brought new challenges for the development of innovations. On the one hand, the pandemic caused economic problems for SMEs and affected their economic performance, but on the other hand, it was the stimulus that accelerated the pace of digitization in them. In the innovation process, it is essential not to slack off, not to stagnate, and to constantly improve the conditions for using the innovation potential, which the Slovak Republic undoubtedly possesses.

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