

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

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### *Abstract*

*Recently, we have been increasingly encountering terms such as turbulent environment, dynamic environment, unstable environment, and businesses must be prepared to respond flexibly to challenges arising from such an environment. The competitiveness of companies depends more and more on the rapid adaptation to ongoing changes. The sources of basic competitive advantages are efficiency, quality, innovation, full understanding, and sensitivity to customer requirements. The main driving force behind innovation is adequate research and development. Research and development represent one of the steps towards innovation and the innovative activity of companies. The aim of the paper is to evaluate the innovative activity of small and medium-sized enterprises in the Slovak Republic as the basis of the company's competitive advantage based on selected indicators. Subsequently, we will analyze and evaluate the use of human resources within the innovative activities of the company and in research and development in individual regions of the Slovak Republic.*

### **Key words:**

*innovation activity, employees, human resources, small and medium-sized enterprises*

**JEL Classification** O30, M20

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### **INTRODUCTION**

In the period of worldwide growing globalization and digitization, innovations are becoming an increasingly important factor determining the success of business activity. They provide companies with higher growth, increase efficiency, competitiveness and enable companies to create new markets. (SBA, 2020) In order for businesses to survive in today's global market economy and achieve long-term success, it is important for businesses to be able to adapt and continuously innovate to overcome intense competition and adapt to changing market demands (Al Ansari, 2014). In the field of innovation, companies encounter a lack of initial ideas important for the creation of innovation or also a lack of financial resources. Some businesses do not realize the importance of innovation. As a result, some companies do not innovate at all. One of the innovation variables is the innovation performance, which is evaluated based on the profit from those products that were innovated. Every business that wants to be competitive in today's globalized market needs to innovate. A suitable means for the support and development of innovations is the creation and introduction of an innovation strategy.

Innovation is a change that brings new value to the customer. This distinguishes the innovated product from the product on which a normal change was implemented. The new value for the customer consists, for example, in ease of use or handling of the product, in reduced risk, increased comfort, convenience. An upgraded product means more fun, fashion, image, more emotions, a better price, or friendliness to the environment. (Kislingerová, 2008) Stanislawski notes that "innovative development is one of the key conditions ensuring the implementation of entrepreneurial activity in a competitive market." (Stanislawski, 2021) In modern economic conditions, one of the important factors of ensuring the enterprises effective functioning in various sectors of the economy is the successful implementation of innovative activities. These are innovative activities that allow to ensure sustainable economic development, which requires the innovative activities intensification, increasing the innovation potential, introducing the targeted strategic planning and practical use of innovations. Until now, research in the field of innovation management has mainly focused on advanced market economies and large enterprises, but small and medium-sized enterprises, which in the Slovak Republic make

up 99% of the total number of business entities, contribute significantly to innovation and economic growth.

## LITERATURE OVERVIEW

In recent years, we can state that innovation is a key driving force of economic growth and development in all countries, as well as a key element in increasing the competitiveness of enterprises, especially small and medium-sized ones. A feature of the development of enterprises in modern conditions is the transition to innovative economic systems. Global trends in innovative development are characterized by structural restructuring of the economy based on the penetration of information and communication technologies into all spheres of economic activity. (Volkova, 2020) Innovation became the symbol of the modern society, a panacea for solving numerous problems of the contemporary enterprise. Enterprises enter the innovation activities in order to achieve competitive advantages. (Szmaj, 2015)

The word innovation itself is of Latin origin. Hudec states that the term innovation means the introduction of a new or significantly improved product or service to the market or introducing a new or significant process improvement within the company. (Hudec, 2007) According to the Collins Dictionary (2019), the term innovation is generally defined as the introduction of new ideas or methods. The Oslo Manual (2018) defines an innovation as a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process). (Oslo manual, 2018)

Innovation is a highly diverse activity. Enterprises can innovate through product or business process innovation, with the latter including process, marketing and organisational innovation. Enterprises can adopt new technologies developed by other enterprises or they engage in intensive in-house research and innovation activities. (European Innovation Scoreboard, 2022) Due to this, we distinguish several types of innovation. Satell (2017) divides the types of innovation according to the applied innovation strategy into breakthrough, maintenance, disruptive and basic research.

Innovation can create opportunities in all types of regions, regardless of their level of development. Policies fostering regional innovation, however, need to adapt to the nature of local innovation activities, which can vary substantially according to regional characteristics. (OECD, 2020)

Innovation is key for growth in all types of regions, but many regions are struggling to transition towards new growth opportunities and to reap the benefits that a constantly expanding global pool of knowledge offers. Regional productivity and innovation gaps highlight that knowledge diffusion is by no means automatic. What helps regions to innovate depends on the capacity of their regional innovation system. Research highlights the role of "absorptive capacity" of regional innovation systems. For instance, larger investments in research and development have different growth impacts in regions depending on the degree of "absorptive capacity". (Ahlin, Drnovšek and Hisrich, 2014) Countries are seeking strategies to promote innovation activities that are effective for all types of regions. In some cases, they do so by adapting rules to enable all regions to participate in research activities, e.g. through modified co-financing and eligibility criteria for grants for different regions to overcome a lack of public funds. Small businesses that successfully innovate increase their chances of growth and survival. Businesses that do not incorporate innovation into their core business strategy may become uncompetitive due to outdated products and processes. Product innovation is important to maintain market share, process innovation is important to maintain competitive pricing, and management innovation is important to maintain a flexible and sustainable business. Small and medium-sized enterprises need to better understand how to overcome obstacles and effectively implement innovation processes. Aligning an innovative corporate culture with a company's business strategies can lead to greater efficiency and organizational success. (Madrid-Guijarro, Garcia, Van Auken, 2009). The identification of barriers to innovation activities is of significant importance in the proper climate development for innovation. In the course of this process, it should be remembered that the perception of factors hampering or preventing the implementation of innovation activities depends on the characteristics of enterprises. The

heterogeneity of perception is influenced by, e.g., enterprise size, the history of its operations, development strategy, the entrepreneur's country of origin, the degree of innovation as well as the division into innovative and non-innovative entities. The latter should remain the subject of special interest, because the identified barriers determine their resignation from innovation activities. (Sobczak, Gluszczyk, 2020)

In the management of innovations in small and medium-sized enterprises, innovation barriers arise, which were divided into the following categories. (D'Este a kol., 2012)

1. Cost barriers - high economic risk, high cost of innovation, lack of internal funding sources and lack of external funding sources,
2. Knowledge barriers - lack of suitable professionals, lack of information about technology and lack of information about markets,
3. Market barriers - market with dominant companies and uncertain demand for innovative products and services,
4. Regulatory barriers - legislation and legal regulations.

Internal barriers originate within the enterprise and are closely related to its management and organization and include issues related to, for example, financial resources and competences. External barriers come from the external environment of the enterprise and arise when the enterprise must react to the behaviour of competitors, customers, partners, and the government. (Sandberg, Aarikka-Stenroos, 2014) Internal barriers are related to certain problems based on the company's resources. These obstacles, associated with a lack of financial resources, weak financial position, insufficiently qualified human resources, low quality of work, low commitment of human resources and high risk, are perceived by some enterprises as too big to overcome, thus limiting the innovative activities of the enterprise and reducing the innovativeness of the enterprise in the field processes and management. (Madrid-Guijarro, Garcia, Van Auken, 2009)

Innovation is central to improvements in living standards and can affect individuals, institutions, entire economic sectors, and countries in multiple ways. Sound measurement of innovation and the use of innovation data in research can help policy makers better understand economic and social changes, assess

the contribution of innovation to social and economic goals, and monitor and evaluate the effectiveness and efficiency of their policies. (Oslo manual, 2018) Innovations derive from knowledge-based activities that involve the practical application of existing or newly developed information and knowledge. Knowledge is one of the most strategically significant resources for firms. How it is accessed and deployed is particularly important for firms engaged in innovation activities. 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. (Stankovicová 2011)

## GOAL AND METHODOLOGY

Recently, we have been increasingly encountering terms such as turbulent environment, dynamic environment, unstable environment, and businesses must be prepared to respond flexibly to challenges arising from such an environment. The competitiveness of companies depends more and more on the rapid adaptation to ongoing changes. The sources of basic competitive advantages are efficiency, quality, innovation, full understanding, and sensitivity to customer requirements. The main driving force behind innovation is adequate research and development. Research and development represent one of the steps towards innovation and the innovative activity of companies.

The aim of the contribution is to evaluate the Global Innovation Index in the Slovak Republic and the innovative activity of small and medium-sized enterprises in the Slovak Republic as the basis of the company's competitive advantage based on selected indicators. Subsequently, we will analyse and evaluate the use of human resources within the innovative activities of the company and in research and development in individual regions of the Slovak Republic. The article was prepared based on the following general scientific methods - generalization,

comparison, analysis, and synthesis. We will evaluate and analyse the selected indicators based on the data of the Statistical Office of the Slovak Republic and data from The World Intellectual Property Organization.

## FINDINGS AND DISCUSSION

### Innovation performance of the Slovakia

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 innovation performance is gradually increasing, it is still below the level of most EU countries, and Slovakia is among the so-called moderate innovators. This negative development in the field of innovation is also confirmed by the

development of the Global Innovation Index indicator. GII data is processed annually by the World Intellectual Property Organization - WIPO and considers approximately 80 indicators, which are divided into two categories - innovation inputs and innovation outputs. Innovation inputs include, for example: legislative environment, stable business environment, infrastructure, education, higher education, research and development, ecological sustainability, investments, availability of financing, market competition, highly qualified workforce, and others. Innovation outputs include, for example: the creation of innovations, the impact of created innovations, intangible assets, creative industry, creativity in the online space and others. The GII aims to capture the multidimensional aspects of innovation.

Tab. 1: Global innovation index - ranking for Slovakia.

	2015	2016	2017	2018	2019	2020	2021	2022
Global innovation index	36	37	34	36	37	39	37	46
Innovation inputs	37	42	39	39	42	43	42	54
Innovation outputs	38	38	35	36	33	34	35	45

Source: Processed based on data from <https://www.wipo.int/portal/en/index.html>

Slovakia ranks 46th among the 132 economies featured in the GII 2022. Compared to 2021, it fell by 9 rungs. 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. The partial results of the GII evaluation point to the fact that

SR achieves better results in innovation outputs than inputs. Slovakia produces more innovation outputs relative to its level of innovation investments. Despite the slight improvement, Slovakia's performance in relation to GDP per capita is below expectations, given the level of our economic development.

Tab. 2: The seven GII pillar ranks for Slovakia

	2020	2021	2022
Knowledge and technology outputs	30	30	28
Infrastructure	33	39	41
Business sophistication	46	43	45
Human capital and research	62	58	46
Institutions	41	39	59
Creative outputs	39	43	68
Market sophistication	82	73	70

Source: Processed based on data from <https://www.wipo.int/portal/en/index.html>

Note: The highest possible ranking in each pillar is 1.

Our country achieves lower results than the European regional average in all investigated

areas of the Global Innovation Index, which is probably a reflection of the current low funding

of the innovation ecosystem. In table 2 we can see an overview of the rankings in the seven areas of GII for the last three years. Slovakia performs best in Knowledge and technology outputs and its weakest performance is in Market sophistication and Creative outputs.

**Innovative activities of small and medium-sized enterprises in Slovakia**

Small and medium-sized businesses form the basis of the creation of added value in the economy, employment, and 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 prerequisites 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 survive in the fierce competition. The innovation potential and innovation performance of small and medium-sized enterprises determines to a significant extent the future direction of the development of the entire national economy and decides on the orientation of the entire economy. The innovative activity of SMEs lags significantly

behind the innovative activity of large - often multinational companies. At the same time, in many EU countries, SMEs have an irreplaceable place, both from the point of view of employment and the creation of added value. Innovations in small and medium-sized businesses are the driving force of economic growth. According to the results of the statistical survey of the Slovak Ministry of Economy, 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 unfavourable situation is, among other things, also a consequence of the action of innovation barriers that prevent the development of innovative activities of enterprises. When we look at enterprises with innovative activity broken down by size groups, innovative enterprises in the group of large enterprises dominate for a long time. Their share has long been above 60%. In 2020, it was 65% of large enterprises that engaged in innovative activities as part of their 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.

Tab. 3: 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

The intensity of innovation of small and medium-sized enterprises and the involvement of business entities in the process of innovation can be evaluated through the volume of funds that SMEs invest in innovation from the total volume of their sales (table 4). When analysing the innovation intensity of SMEs, we can see that

the share of innovation expenditure from the volume of received sales during the monitored period is the highest among small enterprises in the industry, even though this share has decreased by 3 percentage points over the last 10 years.

Tab. 4: Innovation intensity in % (share of innovation expenditures as a percentage of sales in innovating enterprises)

	2010		2012		2014		2016		2018		2020	
	I	S	I	S	I	S	I	S	I	S	I	S
Enterprises together	1.4	0.8	2.0	1.2	1.3	1.4	1.7	1.5	2.2	2.4	1.9	2.0
Small businesses	6.1	0.5	4.3	0.9	1.6	0.8	5.9	2.8	3.1	3.7	3.0	1.8
Medium enterprises	2.4	1.8	2.8	0.8	4.5	1.1	2.9	0.9	2.0	2.5	1.7	2.4
Large enterprises	1.1	0.6	1.8	1.6	0.9	1.9	1.3	1.4	2.2	1.8	1.9	1.8

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

Note: I – industry, S – services

### Use of human resources in research and development

Human capital has a significant impact on reducing innovation barriers such as lack of knowledge and market uncertainty. Investments in innovation and in increasing the qualifications of employees complement each other and positively affect the innovative performance of enterprises. The level and breadth of qualifications of a company's employees is important for innovation, especially in SMEs and start-ups, which can carry out very little

research, and whose workforce may include only a small number of scientists and technicians. Enterprises with a higher proportion of highly qualified employees are better able to overcome obstacles to innovation. Innovations would not occur without adequate research and development. Research and development are the main driver of innovation. An important factor in research and development and thus also in the innovative activities of companies are human resources, which increase technological progress, scientific knowledge and improve the quality of life.

Tab. 5: Research and development employees broken down by region and gender.

	2017				2018				2019			
	Men	Women	Together	% share in SR	Men	Women	Together	% share in SR	Men	Women	Together	% share in SR
BA	8196	6732	14928	44.6	9254	7089	16343	45.7	9467	7335	16802	46.3
TT	1210	718	1928	5.8	1139	739	1878	5.3	1259	727	1986	5.5
TN	1822	623	2445	7.3	1817	578	2395	6.7	1844	593	2437	6.7
NR	1293	1316	2609	7.8	1401	1326	2727	7.6	1309	1226	2535	7.0
ZA	2328	1309	3637	10.9	2640	1355	3995	11.2	2719	1295	4014	11.1
BB	1349	901	2250	6.7	1396	887	2283	6.4	1437	919	2356	6.5
PO	789	591	1380	4.1	852	609	1461	4.1	830	609	1439	4.0
KE	2494	1796	4290	12.8	2688	2000	4688	13.1	2770	1970	4740	13.1
SR	19481	13986	33467	100	21187	14583	35770	100	21635	14674	36309	100
	2020				2021				2022			
	Men	Women	Together	% share in SR	Men	Women	Together	% share in SR	Men	Women	Together	% share in SR
BA	9666	7551	17217	46.3	10301	7745	18046	47.2	10808	7975	18783	47.4
TT	1292	777	2069	5.6	1628	913	2541	6.6	1751	924	2675	6.8
TN	1810	584	2394	6.4	1968	620	2588	6.8	2017	621	2638	6.7
NR	1364	1167	2531	6.8	1412	1177	2589	6.8	1438	1162	2600	6.6
ZA	2535	1099	3634	9.8	2237	1006	3243	8.5	2380	1036	3416	8.6
BB	1652	987	2639	7.1	1778	1018	2796	7.3	1809	1007	2816	7.1
PO	892	600	1492	4.0	939	623	1562	4.1	956	590	1546	3.9
KE	3209	2004	5213	14.0	2872	1981	4853	12.7	3033	2107	5140	13.0
SR	22420	14769	37189	100	23135	15083	38218	100	24192	15422	39614	100

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

Legend: NR - Nitra region, KE - Košice region, PO - Prešov region, BB – Banská Bystrica region, ZA – Žilina region, TN – Trenčín region, TT – Trnava region, BA – Bratislava region, SR - Slovak Republic

The field of research and development is largely dependent on human potential, knowledge and insights, more than other fields. In the field of research and development, it is necessary to support the development of intangible capital - people and their ideas, knowledge, and link it to real material outputs and research results. 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. Bratislava region has the largest number of research and development workers, which makes up more than 40% of research workers in the Slovak Republic during the entire observed period. This may also be due to the number of public research institutes and other organizations that are mainly located in the capital, i.e. in the Bratislava region. The Košice region is

second in order - but significantly weaker in terms of the number of researchers. The Žilina Region is in third place throughout the analysed period. The Prešovský region has long had the smallest share in the number of research and development workers. Although based on the development index (tab. 6), we can see that the largest increase in the number of research and development employees was recorded in the Trnava Region, where their number increased by 39%. On the contrary, the Žilina Region recorded a slight decrease. When we look at the breakdown of workers by gender, men dominate in every region. In Table 6, we can see the breakdown of research and development employees by job classification. It is logical that in each region researchers significantly predominate over technical and support staff.

Tab. 6: Research and development employees broken down by region and job classification.

		2017	2018	2019	2020	2021	2022	Index 2022/2017
BA	researchers	12390	13594	13562	13858	14519	15030	1,21
	technical and equivalent personnel	1792	2003	2348	2486	2617	2801	1,56
	support staff	746	746	892	873	910	952	1,28
	together	14928	16343	16802	1217	18046	18783	1,26
TT	researchers	1484	1496	1533	1614	1769	1813	1,22
	technical and equivalent personnel	274	267	273	291	595	672	2,45
	support staff	170	115	180	164	177	190	1,12
	together	1928	1878	1986	2069	2541	2675	1,39
TN	researchers	1385	1338	1448	1405	1634	1665	1,20
	technical and equivalent personnel	723	648	707	695	705	668	0,92
	support staff	337	409	282	294	249	305	0,91
	together	2445	2395	2437	2394	2588	2638	1,08
NR	researchers	1942	2224	2075	2027	2083	1940	0,99
	technical and equivalent personnel	362	289	231	228	285	507	1,40
	support staff	305	214	229	276	221	153	0,50
	together	2609	2727	2535	2531	2589	2600	0,99
ZA	researchers	2916	3044	2856	2522	2525	2667	0,91
	technical and equivalent personnel	506	615	856	810	440	567	1,12
	support staff	215	336	302	302	278	182	0,85
	together	3637	3995	4014	3634	3243	3416	0,94
BB	researchers	1885	1857	1916	2028	2175	2043	1,08
	technical and equivalent personnel	249	274	305	322	303	372	1,49
	support staff	116	152	135	289	318	401	3,46
	together	2250	2283	2356	2639	2796	2816	1,25
PO	researchers	1142	1217	1233	1237	1264	1192	1,04
	technical and equivalent personnel	171	154	141	169	196	256	1,50
	support staff	67	90	65	86	102	98	1,46
	together	1380	1461	1439	1492	1562	1546	1,12
KE	researchers	3717	3985	4228	4005	4071	4566	1,23
	technical and equivalent personnel	369	549	338	1060	561	388	1,05
	support staff	204	154	174	148	221	186	0,91
	together	4290	4688	4740	5213	4853	5140	1,20
SR	researchers	26861	28755	28851	28696	30040	30916	1,15
	technical and equivalent personnel	4446	4799	5199	6061	5702	6231	1,40
	support staff	2160	2216	2259	2432	2476	2467	1,14
	together	33467	35770	36309	37189	38218	39614	1,18

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

Legend: NR - Nitra region, KE - Košice region, PO - Prešov region, BB – Banská Bystrica region, ZA – Žilina region, TN – Trenčín region, TT – Trnava region, BA – Bratislava region, SR - Slovak Republic

It is precisely the lack of qualified employees that is a frequent barrier, especially in small, less often in medium-sized enterprises, not only the lack of qualified or creative employees, but also the problem of obtaining and subsequently maintaining them. The lack of qualified employees often also has 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.

## CONCLUSION

In the period of worldwide growing globalization and digitization, innovations are becoming an increasingly important factor determining the success of business activity. They provide companies with higher growth, increase efficiency, competitiveness and enable companies to create new markets. In conclusion, we can state that, despite the possibilities, the Slovak Republic is still considered a moderate innovator both in the global and European space. In order for the company, as well as the economy itself, to survive in the current competitive struggle, they must respond flexibly to the changes that global society brings. 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 and limited innovative activities in some industries. But at the same time, it created a new space and brought new challenges for the development of innovations. The identification of obstacles to innovative activities is of great importance for the proper development of the innovation environment. The identification of obstacles to innovation activities is of great importance for the proper development of the innovation environment. During this process, it is necessary to keep in mind that the factors that prevent the implementation of innovative activities depend on the characteristics of the company, such as the size of the company, the history of its operation, the development strategy, the country of origin of the entrepreneur, the degree of innovation, etc. Most often, the lack of own financial resources and personnel issues related to the acquisition and retention of qualified employees are considered barriers to innovation. It is essential to not stop in the innovation process and to create suitable conditions, especially from the state, for the use of the innovation potential, which the Slovak Republic undoubtedly possesses.

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