

## INNOVATIVE ACTIVITY OF SLOVAKIA IN COMPARISON WITH EU COUNTRIES

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**Abstract:** Innovations are the main drive mechanism of competition growth. This growth capability is directly dependent on an acceptable concentration on knowledge, which is based especially on education, resourcefulness, creativity, experimenting and ability to be innovative. The main objective of the survey is to examine and assess the proportion of the corporate innovation activity, to analyze the causes of the phenomenon and its correlation in the analyzed company. On this basis, we proposed assumptions, conclusions and recommendations, which should contribute to an improvement in the development of innovative potential of enterprises in the Slovak Republic.

**Keywords:** *intangible capital, innovation, innovation potential*

### 1 Introduction

New trends of business are created, such as business outside of business. Currently people do not always require particular space provided by an employer to perform their work, but the new information techniques and technologies enable performing the work outside the company. Here, we can point out, that in comparison of tangible and intangible sources, the importance of intangible sources is still rising. In the past man had to travel for work, however, currently there is a trend that man create work himself, with his own creative activities and ideas. This is what vision of modern businesses is built upon.

In order to succeed in an environment of market economy, business must seek new opportunities offered by market and thus increase its innovation activity that leads to development of innovation potential. In fact, it is innovation potential that describes innovation environment of a company in which innovations are created, implemented and improved. Innovations are the main moving mechanism of economy development and its implementation is a necessity that guarantees business to survive in ever changing business environment. Innovation and innovation potential of businesses contribute to growth of work productivity, growth of product quality, development of innovating activities and qualification of working labour. Innovation process contributes to growth and development of product quality in every phase of production process and thus increases economic prosperity of business, satisfaction of consumers and is one of the most significant means in competition.

### 2 Literature review

The core of innovation is in creating new knowledge, as a result of scientific, experimental and developmental activities and ability of workers to apply this knowledge in business environment, in an area of product manufacturing, creation of service as well as process creation. Turbulent technological progress impacted definition of innovation also from author perception of the world. The term innovation has its origin in Latin innovare which means create something new. In its previous meaning innovation was understood as a change in behaviour. An attempt for closer specification resulted in a vast amount of definitions.

According to J. Tidd, J. Bessant, K. Pavitt innovation refers to something introduced for the first time, something new. He puts forward that change and novelty are important, where the

perceived degrees of change and novelty are in the eye of the beholder.<sup>1</sup>

The authors S. Myers and D. G. Marquis point out that innovation is no to be confused with invention. Innovation is not a single action but a total process of interrelated sub processes. It is not just the conception of a new idea, nor the invention of a new device, nor the development of a new market. The process is all these things acting in an integrated fashion.<sup>2</sup>

J. A. Schumpeter is considered the founder of economic discipline dealing with research of innovations and their processes. His understanding became a fundamental base for further studies. However, at first he does not define innovations as we know them, but only as new combinations of development changes especially in a market production. Modern definitions of innovations are discussed by G. Mulgan and D. Albury according to whom we can define innovations as implementation of a new or significantly improved product, process or service, new marketing or new organisational method which brings vital improvement in effectiveness, efficiency and quality.<sup>3</sup>

K. Atuahene-Gima researched innovations in China and came to conclusion that innovations of product must support innovations in areas of marketing, branding, distributions, delivery and production in order for product to be successfully established on the market.<sup>4</sup>

Innovation is a new, commercially useful way of doing things. The result of innovation by A. Afuah is new product in the sense that it has reduced costs, its features are improved and also has characteristics that had never previously or that on the market did not exist before.<sup>5</sup>

According to E. B. Bayercelik, F. Tasel, S. Apak the most significant factors influencing the development of innovation activities involve financial factors, size of a company, institutional factors, technological capabilities, customer preferences, economy factors, cultural factors, managerial skills, ability to learn, orientation on market and competition advantages.<sup>6</sup>

J. R. Cooper provides an alternative view. The emphasise is given on the fact that innovations are realised in different ways and he takes into account demands on structural changes in organisations and divides innovations as follows: revolution and value added innovations, technological and administrative innovations, regarding processes and product innovations.<sup>7</sup>

J. DeGraff states that it is crucial to know the definition of innovation, because if there is not a collective definition to explain innovation there is a small chance to reach the same aim together with your co-workers. This is especially important for entrepreneurial businesses which mark fast increase to something better and bigger.<sup>8</sup>

Innovation is not a single process; it is a long and cumulative process of number of organisational decisions, starting from the

<sup>1</sup> Tidd, J., Bessant, J., Pavitt, K., *Managing Innovation: Integrating Technological, Market and Organizational Change*. 3rd edition. Chichester: John Wiley & Sons Inc., 2005. pp. 5-6.

<sup>2</sup> Myers, S., Marquis, D. G., *Successful Industrial Innovations: A Study of Social Factors Underlying Innovation in Selected Firms*. Washington: Report for the National Science Foundation, 1969. NSF 69-17.

<sup>3</sup> Mulgan, G., Albury, D., *Innovation In The Public Sector*. London: Prime Minister's Strategy Unit/Cabinet Office, 2003. pp. 3-4.

<sup>4</sup> Atuahene-Gima, K., *What Is Innovation?*, New African, London, October, 2012, Available at: <http://newafricanmagazine.com/what-is-innovation/>.

<sup>5</sup> Afuah, A., *Innovation Management: Strategies, Implementation, and Profits*. 2nd edition. New York: Oxford University Press, 2002. pp. 1-4.

<sup>6</sup> Bayercelik, B. E., Tasel, F., Apak, S., *A Research on Determining Innovation Factors for SMEs*, 10th International Strategic Management Conference, pp. 203-206, Elsevier, September, 2014.

<sup>7</sup> Cooper, J. R., A multidimensional approach to the adoption of innovation, In *Management Decision*, Vol. 36, No. 8, pp. 493-502, 1998.

<sup>8</sup> DeGraff, J., *What Is Innovation?*, The Huffington Post, New York, June, 2014, Available at: [http://www.huffingtonpost.com/jeff-degraff/what-is-innovation\\_b\\_5939508.html](http://www.huffingtonpost.com/jeff-degraff/what-is-innovation_b_5939508.html).

creation of a new idea until its realisation phase. New thought regards perception of new needs of customers or new way how to produce. Thus perceive innovation K. Urabe, J. Child, and T. Kagono.<sup>9</sup>

Analysis of all above mentioned definitions led us to abstract definition involving characteristic treats of innovation. Innovation is a qualitative and quantitative change of product or process; it comes from intelligence of human mind that leads to improvement of uniqueness of a product or process by increasing its qualitative function ensuring the growth of management and efficiency of the subject in time. It creates monetary and added value for consumer depending on the essence of given innovation.

### 3 Methodology and data

The aim of the research was based on the data collected on innovation activities for Slovakia to analyse the innovation potential of manufacturing companies. The variables in the statistical verification were slightly research and development in companies. Of the 80 respondents manufacturing companies in the survey 31 companies, representing a 38.75% response rate. The survey was conducted using a combination of random companies.

Critical area:  $\chi^2_P > \chi^2_{1-\alpha} [(r-1).(s-1)]$  when  $\alpha$  is level of importance, or  $(1-\alpha)$  is credibility.  $\chi^2_{1-\alpha} [(r-1).(s-1)]$

At level of importance 0,05:

$$\chi^2_{21-\alpha} [(r-1).(s-1)] = \chi^2_{20,95} [(2-1).(2-1)] = 3,841$$

With credibility 0,95 or at the level of importance 0,05 we accept the hypothesis that there is statistically important dependency between coefficients.

Calculation for chi-quadrat:  $\chi^2 = \sum \frac{(O - E)^2}{E}$

Chi-quadrat = 14,39

$$14,39 > 3,841$$

The reliability of 0,95, respectively. at the significance level of 0,05 we accept the hypothesis that the variables are statistically significant dependence.

If we discovered, there is an association between statistical elements we can precede to the next analysis which is characterization of intensity of association based on relation.

At level of importance 0,1:

$$\chi^2_{21-\alpha} [(r-1).(s-1)] = \chi^2_{20,90} [(2-1).(2-1)] = 2,706$$

$$14,39 > 2,706$$

The reliability of 0,90, respectively. at the significance level of 0,1 we accept the hypothesis that the variables are statistically significant dependence.

$$Q = \frac{(ab).(a\beta) - (a\beta).(ab)}{(ab).(a\beta) + (a\beta).(ab)}^{10}$$

where,  $a$  = statistical variation and  $b$  = statistical variation;

$$Q = 0,9568$$

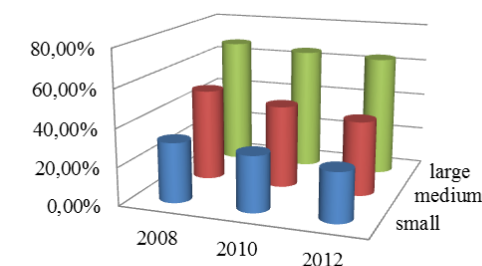
### 4 Data analysis

Research and development activities in Slovakia are relatively underdeveloped, with the total gross expenditure on R & D are the second lowest in the OECD (Organisation for Economic Co-operation and Development) and the efficiency of public

spending on research and development in order to improve the performance of private R & D is low.

From the graph 1 it shows that in the period between 2008-2012 the innovative capacity of firms in each category dropped. This is a significant drop in innovation activity medium-sized businesses where, in 2010 to 48.70% decreased innovation activity compared with 2008 to 43.60% by 5.1%. Small businesses in the Slovak Republic spent the lowest innovation activity among the three categories of enterprises. Their innovation activity in 2010 is 29.30%. Large enterprises were characterized in 2010, the strongest innovation activity in the Slovak Republic e.g. 65.10%. In the next reporting year 2012 innovation activity decreases in each sector enterprises as well.

Chart 1. The percentage of companies in each category of enterprises with innovation activity in the years 2008-2012 in Slovakia



	2008	2010	2012
■ small	31,50%	29,30%	25,90%
■ medium	48,70%	43,60%	39,30%
■ large	67,60%	65,10%	63,80%

Source: Statistical Office of the Slovak Republic, processed by SBA, Slovakia 2014, p.213

According to the average performance in innovation, Member States are classified into four different performance groups:

- Denmark, Finland, Germany and Sweden are "innovation leaders" s performance in innovation significantly above the EU average.
- Belgium, France, Ireland, Luxembourg, Austria, Slovenia and the UK are "successful innovators", with performance above average or near average.
- Performance of Cyprus, the Czech Republic, Estonia, Greece, Croatia, Lithuania, Hungary, Malta, Poland, Portugal, Slovakia, Spain and Italy are below the EU average. These countries are "moderate innovators".
- Bulgaria, Latvia and Romania are "weaker innovators" s performance in innovation significantly below the EU average.

The most innovative countries have achieved the best results in all dimensions: from research and innovation inputs through innovative activities in business to innovative outputs and economic effects, reflecting the balance of a national system of research and innovation. Group of innovative leaders showed the smallest variance in performance across all eight dimensions of innovation. This means that the performance of the innovation leaders (Sweden, Denmark, Germany and Finland) in all dimensions is almost the same. These countries are mostly located in the top partition and above the EU average. Only in the second dimension open, excellent and attractive research systems, Germany is ranked slightly below the EU average and the eighth dimension of the economic effects are Finland and Sweden just below the EU average.

Among the European countries outside the EU confirmed its overall leadership in innovation and Switzerland this year with a performance higher than in the EU Member States and with the highest position in six performance indicators. But Switzerland's

<sup>9</sup> Urabe, K., Child, J., Kagono, T., *Innovation and management: International Comparisons*, Berlin: Walter De Gruyter&Co, 1988, pp. 3-4.

<sup>10</sup> Pacáková, V. et al., *Štatistická indukcia pre ekonómov a manažérov*. 1. vyd. Bratislava: Wolters Kluwer, 2015. pp. 67-90.

innovation performance is improving much slower pace than in the EU. Iceland is a successful innovator with results above the EU average, Norway and Serbia are the moderate innovators and the former Yugoslav Republic of Macedonia and Turkey are among the weaker innovators. In the case of Serbia and Turkey, there was a significant improvement in innovation with an average annual growth rate of over 6%.

Through statistical analysis, the proportion of public and private expenditure on science and research, we concluded that the Slovak Republic in comparison with EU countries most investment stems from public resources. In the Member States of the European Union is the opposite condition. We found that the low proportion of innovation in the business sector requires increased support innovations as a scientific research area of the private sector, encouraging the private sector to increase spending on research and development. As the main incentives could improve the unfavorable situation in the expenditure share of private and public sector legislative measures. As mentioned earlier, most innovation in Slovakia is ensured by a transfer of technology, the entry of foreign investors into the market, creating strategic alliances and purchase of know-how. It is this situation encourages companies to pay greater attention in its operations with the creation of innovations in-house.

Specific attention was paid in addition to spending on science and research and its impact on the type of industry technology development and intangible assets input into the transformation process. The sectors with the lowest innovation development include light industry (food) and to sectors with higher share of innovative development include electronics, automotive and information technology industry. On innovative development it is also affected by the size of the company. SMEs have less potential for innovation than large enterprises. The automotive industry in Slovakia is a strong sector for the development of the country's economy and record it in most jobs. Significant influence on the country's macroeconomic indicators, including GDP, from which the area of science and research depend.

## 5 Results and discussion

The share of innovative products in the Slovak manufacturing companies in comparison with EU countries very low. The proportion of innovative products is between 0% - 20%. The least innovative activities are enterprises of the food industry 0% - 10%. The largest share of innovative products we have seen in information technology, electrical engineering industry 80% - 100%. It is closely linked with the highest share of exports to foreign countries and business agility. Information technology and electronics industries are forced to react flexibly to market requirements in order to remain competitive in domestic and foreign markets.

Low share of innovative products in companies and causes low share of government expenditure on innovation. In comparison with the countries of the European Union Slovak companies are subsidized by the State minimum. Companies are forced to draw from its own funds derived from the parent company. Each new release of the product extended the existing functionality and adds new area of functionality. On the share of innovative products it is also affected by the size enterprises. SMEs are, paradoxically, more innovation potential than large companies. This is because SMEs are forced to devote to innovation, improvements to remain competitive, while big corporations to build a strong position in the market, tradition, and the massiveness.

The share of enterprises with independent department of innovative development represents 38% of the respondents of the survey respondents. Innovation processes in companies with innovative departments led to the successful production, implementation and exploitation of novelty in the economic and environmental areas. Those companies carry out innovative work in-house. The remaining 62% of companies have separate departments innovation development has partly respectively. It does not at all. Innovative activity is provided by external

suppliers in the form of outsourcing. The aim of the innovative outsourcing business is cost savings, increased service quality using suppliers who are professionals in their field, access to cutting-edge technologies without having to invest in their purchases, increasing flexibility and performance. The second case, the undertakings which did not address innovation development. The most frequently occurring reason is that innovation activity is paid to the parent company that operates innovative development department.

Completed survey, we found that the proportion of the total cycle development phase is less than 50%. Development is typically in a range of 0% - 5%. This demonstrates the fact that research and development companies in Slovakia dealing minimum. Businesses that reported the proportion of development in the range of 21% - 40% to 41-60% includes the development and activities of such modifications, alterations, innovation first order, construction and testing of prototypes and models, construction tools, jigs, molds and smart use of new technologies, construction and operation of the chosen alternative for new or improved materials, devices, products, processes, systems, etc. But development does not take place completely new product. Survey means survey conducted in order to gain new scientific knowledge or technical knowledge, activities aimed at obtaining new knowledge, search for alternatives for materials, devices, products and design. These activities are undertakings, taken from an accounting perspective. Companies can ensure the development of part-time basis on their own, passive licensed, often from the production and operational know-how. Making in-house development includes activities such as the drafting of the product; The structural design of the product; preparation of design prototyping; Technological production prototype; manufacture, testing and approval of the prototype.

## 6 Conclusions

Intense competition are a reality. The market has changed, new players were added, and the competition sharpens. Slovak production companies have a close eye on market changes and respond to the needs of the domestic and foreign markets. Particularly the need to address compliance with the conditions of foreign trade, as Slovakia is heavily dependent on exports. At present, the rapid development of material resources no connection with intangible assets as a basis for successful existence of enterprises. To achieve the desired effect, it is necessary to minimize material resources and pay more attention to intangible assets. Increase public awareness of the existence and use of intangible resources also it contributes to the improvement of other areas such as business, environmental, ethical business conduct. Companies should be open and adaptable to new market opportunities, global production trends, advanced technology, innovation, research and development, modernization of the production schedule, ensure quality products, high-quality workforce and the creation of new organizational forms (strategic alliances).

Enterprises are forced to research and development to compensate for other activities, such as alternatives, the creation of start-ups, start-up offices. This form of alternative research and development companies also require substantial capital. The most commonly beginning of start-ups interested large corporations, which have a fixed market background and profitable. Start-up businesses to create workplaces of the problem, and quickly when needed alternative solutions tasks. A good initial idea or ideas that the firm may obtain participation of workers in decision-making respectively, rationalization proposals.

Another proposal is to acquire know-how and new technologies to improve the image of your own company, penetrate new markets, strengthen competitiveness and reduce business risk. Compared to the old-upmi are more convenient form strategic alliances mainly because spreading the risks inherent in the start-up epoch borne by the company itself. The main disadvantage of strategic alliances in comparison with start-upmi the unwanted

outflow of know-how, which is caused by working together and deciding on strategic enterprise.

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