

INNOVATIONS AND THE SIGNIFICANCE OF INNOVATION ACTIVITIES IN BUSINESS

SIKOROVÁ Andrea¹, LAMPA Martin¹, SAMOLEJOVÁ Andrea¹, BESTA Petr¹

¹VŠB - Technical University of Ostrava, Ostrava, Czech Republic, EU

andrea.sikorova@vsb.cz, martin.lampa@vsb.cz, andrea.samolejova@vsb.cz, petr.best@vsb.cz

Abstract

This article deals with innovation performance of the individual countries of the European Union. It describes the current trends of innovation activities in the Czech Republic and the innovation potential of the Moravian-Silesian Region. The data was drawn from the European Information Bulletin which is a specialized publication of the Agency for Support of Business and Investments and from the innovation activities of industrial firms as well as other firms. The reason for these innovation activities is to obtain competitive advantage and to strengthen the position on the market. In the global environment, the continuous innovation is a necessity whether it is innovation of the product, the processes or the business strategy.

Keywords: Innovation, competitiveness, innovation performance, trends

1. INTRODUCTION

The basis for innovations in a company is careful listening to the employees, to the customers and the consumers because each person inside and outside the company has an opinion, a reason or an idea how to improve things, processes or an overall functioning of the company as such and these may lead to strengthening of the position on the market.

Application of these innovative ideas which are sufficiently creative and able to help companies to achieve a long-term sustainability of the business and thus competitiveness on the market is very important not only for the company but also for the end users or the environment. Thanks to innovations a company may gain an advantage against other competitors and this way the competitiveness of this company is strengthened.

A frequent mistake of companies is to think of innovations only in terms of products or technology. Innovation is much more than a product or technological platform. Many companies make serious mistakes when looking for innovations. It is necessary to distinguish innovations from mere inventions which are two completely different things.

2. INNOVATIONS

Innovations as a set of perspective thoughts and ideas that are implemented ensure better functioning of the organization and they also have a constant added value for the customer or for the lives of the customers and subsequently the shareholders and they are closely related to competitiveness. Innovation is a very broad term and it is difficult to specify it clearly because it may be related to a broad range of areas. It may represent for example innovations of products, production technology or processes related to production directly or indirectly, such as logistics, sales, procurement, etc.

Innovations represent culmination of an entire series of scientific, technical, organizational, financial and commercial activities and in the summary they make an innovation process consisting of the invention and the innovation phases. Innovations are preceded with certain activities, e.g., in the form of an inventions,

improvement ideas, projects or utility patterns. These activities leading to changes in the structure of knowing are called **inventions**. Not all of these activities will be implemented. Some will remain unfinished, other will be used only for the development of science and knowing. Only the results of scientific, research and development activities that are implemented are considered innovations. [1]

3. MEASURING OF INNOVATIONS

Innovations may be measured e.g., on two levels: on the business level and on the political level. On the business level the innovations may be measured by research which deals with the financial resources of the company, the efficiency of the processes, motivation of the employees or satisfaction of the customers. The most frequently used metrics include percentage of the annual income from new products launched on the market in the last x years, costs of R&D, creation of patents (trademarks, copyrights, publications).

On the political level, measuring deals with competitive advantages of the regions or countries in which the innovations play their role. In this case, innovations may be measured by various frameworks dealing with technology, processes or marketing. Another method is monitoring of expenses for research and development as a percentage of the GDP. In the Lisbon Strategy the European Union specified that average of expenses for research and development should be 3% of the GDP.

3.1. European Innovation Scoreboard

Competitiveness is covered in the European Information Bulletin (European Innovation Scoreboard - EIS). The EIS was established in the year 2000. It is a static tool which on the basis of collective data for indicators representing significant aspects of the innovations process enables to measure, compare and subsequently to evaluate the innovation capacity of the European Union in terms of the capacity of the innovation systems of the member countries (later also the individual candidate countries and the associated countries) of the European Union and the capacity of the Pan-European innovation system.

The European Innovation Scoreboard is one of the methodological procedures that describe and analyze socioeconomic phenomena and processes with the help of quantitative indicators. Since its introduction it seeks to find the most suitable way for measuring the innovation performance of the European Union and its evaluation. Thus it seeks to select the most suitable quantitative indicators based on which it would be possible to describe, compare and evaluate individual national innovation systems, their current condition and development tendencies. [2]

3.2. Innovation performance of the Czech Republic within the member countries of the EU

The Czech Republic occupies the 16th place in terms of innovations in the European Union. This is based on the conclusions of the Union-wide comparison of the innovation performance published by the European Commission. With respect to the leading position in innovations, the leader of the EU is again Sweden followed by Denmark, Finland, Germany, and Netherlands; see **Figure 1**.

In the selected areas of innovations the leaders in the EU are as follows: Sweden - human resources and quality of academic research, Finland - financial framework conditions, Germany - private investments to innovations, Belgium - networks and cooperation in the area of innovations, and Ireland - innovations in small and medium size businesses. **The fastest growing innovators** are Latvia, Malta, Lithuania, Netherlands, and the United Kingdom.

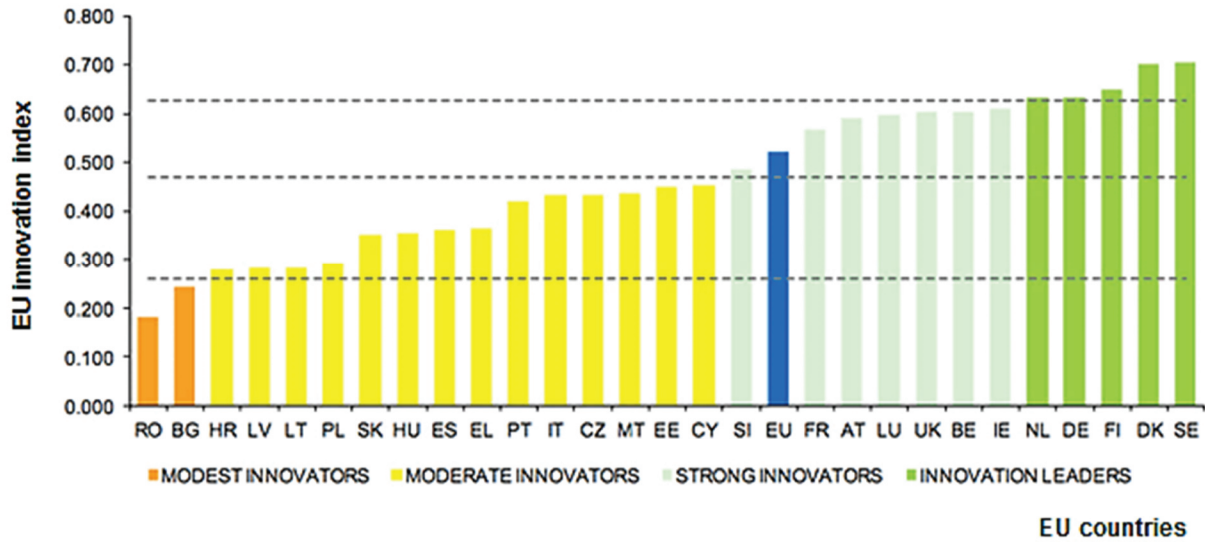


Figure 1 Innovation performance of the member countries of the EU [3]

In the Czech Republic, the innovation performance was growing until 2012, in 2013 it dropped down and in the recent years it was growing again. Compared with the Union-wide average, the Czech Republic is quite strong in the area of human resources, finance and support and private investments. On the other hand it shows weaknesses in the area of intellectual property and in the area of openness and attractiveness of research systems, see **Figure 2** (Note: Performance relative to the EU where the EU = 100). [3]

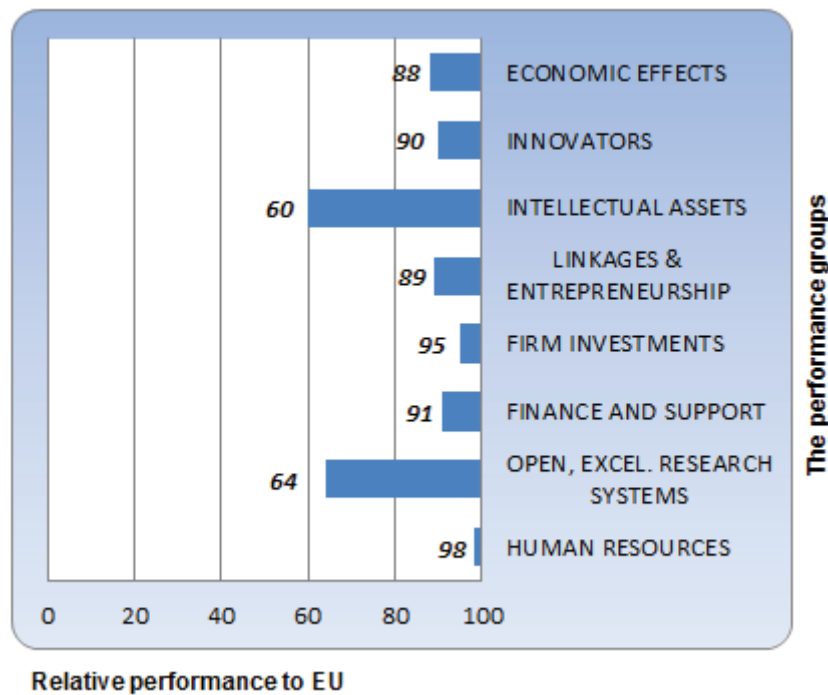


Figure 2 Relative performance to EU [3]

The main driving force for success in innovations is a balanced system for support of innovations which combines a suitable level of public and private investments, an efficient innovation partnerships of companies and the academic world and also a high-quality educational base and top-quality research. Specialization in

the key basic technology increases the regional innovation performance mainly in the area of advanced materials, industrial biotechnology, photonics and advanced production technology.

4. TRENDS IN INNOVATION ACTIVITIES

The basic indicator of innovation capability is the execution of innovation activities, i.e., activities that are related to searching for innovation ideas and introduction of innovations. [4] An innovation activity is successful only when there is an adequate response of the market, e.g., in form of enhanced sales, in form of more satisfied customers, reinforcing the image, creating better relationships with the stakeholders of the company. However, at the same time it must respect the resource possibilities of the company and the financial requirements of the owners and creditors and the innovation activities must not lead to jeopardizing the stability of the organization.

The current trends in innovation activities of companies are listed in the following areas.

Production automation can focus on technological units, production lines, camera quality inspections, products handling, assembly and testing stations. Each company should be focusing on automation because automation brings several advantages at once. First of all it brings improvement of production quality by eliminating the human factor errors affecting production. At the same time people are freed both from physical but mainly from mental labor which increases the stability of the production process as such. It also eliminates the risk of health damage of the operators and thus it brings higher work safety at the worksite. Automation increases efficiency of production by avoiding inefficient idle time connected with increased production costs. Conveyor systems, as one of the sub-systems of automation of production, are focusing on improving the ergonomics of work in logistics. They ensure transport of the finished products as well as the semi-finished products between individual production technological processes inside the company and also outside the company. These systems are very frequently used mainly in the area of logistics, shipment, food-processing and other companies active in production or storing of inventory. Utilization of these systems leads to savings of costs for in-process transport, better sorting, warehousing and storing of products in the most efficient way. At the same time this will lead to saving of space. Logistics is an integral part of every production company and so even here it is necessary to make efforts aimed at improving the processes in order to gain competitive advantage on the market, and thus to innovate.

Robotized worksites are the future of industry. This does not apply to industry only, but it can be used for domestic applications, military applications and also for medical applications. In the new industrial revolution (Industry 4.0) we are talking about Collaborative Robots (Open Safety) that can mutually cooperate. Their advantage is in support of the activities of the personnel, they enable work in collaboration and they can also be easily controlled by people throughout the entire performance of the activity. Collaborative robots are complementary to traditional industrial robots, they do not compete with them, and they enter into direct barrier-free cooperation with people. They increase work productivity and flexibility in the production processes and other processes of the company. The main requirement for new robots is reliability, communication, and safety. [5]

Internet of Things is a relatively new technology of wireless interconnection of built-in equipment with internet which brings new possibilities for remote control and monitoring of this equipment online. This technology will be used mainly in logistics and transport. It may accelerate the journey of the product to the customer and practically it may change the entire sectors as we know them today and bring profits to logistics in a range of billions. One of the areas where Internet of Things is used already is safety on roads and forecasting of road traffic situations. This way it increases safety, information sharing, and comfort of drivers. If there is an obstacle on the road, automobiles will share this information and will inform the driver with a sufficient lead time. The driver can then be better prepared for the unexpected obstacle on the road.

Cloud computing is an internet-based model of development and utilization of computer technology. We could call this model as providing of services or programs that are available on the internet and users access them remotely using a web browser. The advantage is in efficient control and work thanks to availability of the data anywhere and also higher security of the data or the possibility of an immediate increase of performance of the data center. A big disadvantage is reliance on high-quality internet connection.

Laser engraving of material is a modern technology based on evaporation of material or color in a depth of several micrometers. Laser engraving can be used for creation of a plastic ornament, inscription or logo in the surface of the material. It can be used for engraving of plastics, wood, leather, glass, paper, and of course metals. The advantage is in durability, precision, and resilience. It is a contact-less method. [6;7]

Laser cutting of material is a high-performance technology of precision cutting. It can be used for cutting of plates with a thickness of up to 25mm.

Cutting of material using water jet does not result in thermal impact on the material in the place of cutting. The material surrounding the cutting area is not quenched and it has the same homogeneous structure as the cut semi-finished product. [8]

The largest facility for recycling of electronic waste in the world which is built in Sweden will be used for recycling of precious metals from electronic waste, most frequently copper and it will use only a fracture of energy which is usually consumed when extracting metals from ores.

Exploration of the Earth using drones and satellites while the information obtained will be used in agriculture to determine the yields of agricultural crops. Remote exploration of the Earth is a method for obtaining information on objects, phenomena, and areas without direct contact with them from a distance using satellites. It can also be used for identification of meteorology and climatology of the Earth, direction of the Golf stream, and also for identification of deposits of raw materials (geology).

Businesses unable to keep pace with these growing demands are slowly but surely becoming uncompetitive. [9]

4.1. Innovation potential of the Moravian-Silesian Region

The current trends in innovation activities of the Moravian-Silesian Region are listed in the following areas.

Plastic surgery - Innovations and cross-discipline cooperation in orthotics and prosthetics. An international conference focusing on cross-discipline cooperation, technical and clinical innovations in orthotics and prosthetics. The aim is to introduce advanced digital technology into plastic surgery (virtual planning, virtual modelling, 3 D scanning, and 3 D printing). The aim is innovation of products, processes and business models in orthotics and prosthetics.

Methods and tools for stereotactic radio surgery - help for patients suffering from intra-ocular melanoma. The University Hospital in Ostrava can treat this oncological disease with high accuracy using ionizing radiation. The hospital is a co-owner of this invention registered with the United States Patent and Trademark Office. It is one of many research projects on which the University Hospital in Ostrava is working - only in oncology there are eleven such projects. All results of the research which the hospital publishes in specialized periodicals will contribute to improved care for the patients in the future.

Outdoor projector - for outdoor projection on buildings and other structures without damaging them. The projector is remote-controlled and it can locate the structure for the projection by itself. This is called Videomapping. It can be used for increasing the attractiveness of cultural events, festivals or for advertising.

The Borcad seats - with a unique styling and design thanks to which the company is one of the most innovative companies in this field.

Optimization of piercing of semi-finished products for production of seamless pipes - savings in the area of electric power and especially savings in the area of defective products. A company named MATERIÁLOVÝ A METALURGICKÝ VÝZKUM s.r.o. owned by TRINECKÉ ŽELEZÁRNY, a.s. and VŠB - Technical university of Ostrava.

The Moravian-Silesian Region supports development of innovative business for example through the Operational Program named Business and Innovations for Competitiveness.

5. CONCLUSION

One of the basic conditions for maintaining competitiveness of a company on the current market is the need to innovate. Innovate not only own products or services provided but also all processes and practically all activities performed in the company. However, an innovation is at the very end of the innovation process - it is the output of the innovation process. The higher the level of innovation capability the company achieves the higher the probability that it will capture the innovation ideas and will be able to implement the innovation. In order to be able to evaluate the level of its innovation capability the company must have some developed metrics for measuring of this innovation capability. Innovation capability is currently considered a necessary precondition of competitiveness of all types of businesses. In general, it represents a set of preconditions for creation of innovations.

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