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Innovative Business and the Czech Republic

Abstract

Innovative activities should generally be regarded as the key area of economic development. Innovations can bring a company competitive advantage and can help to improve competitive position in the market. The paper points out the contribution of innovation and innovative business, which have a significant impact on the competitiveness of companies, or region. From the survey which was carried out in the Department of Management and Business Administration of School of Business Administration in Karvina in the Czech Republic in the year 2011 under the title "Adaptability of SMEs in the current economic conditions in the crisis years 2007 – 2010" one of the objectives of the research was to analyze and evaluate whether firms innovated in the crisis years and what types of innovations were the most frequently in the period. In order to evaluate the survey there was used program SPSS 11.5. The paper deals with innovative business and innovation performance of the Czech Republic. The aim of the paper is to evaluate innovative business in the Czech Republic and the innovation performance of the Czech Republic on the basis of primary and secondary research. Businesses have to monitor and evaluate innovation activities in order to maintain their competitiveness, therefore the paper indicates areas which are important to monitor, measure and evaluate in the context of the current time in the area of innovative inputs and innovative performance. The paper is supported by the Student Grant System of Silesian University in Opava, School of Business Administration in Karvina under number SGS/9/2012.

Key Words

innovation, performance, measurement, innovative business

JEL Classification: L20, L26, R11

Introduction

Innovation is a deliberate and beneficial change in the status quo, which has to find a practical application, and has to be at least new for a company. Objects of changes are products, services, staff, manufacturing, technical and technological procedures, organizational processes, including changes in the economic processes of qualification, but also changes of the market. The result of implemented changes should bring a benefit, whether economic, technical or societal.

Already from defined definition innovation would not be an everyday event, but such an event or fact, which has the ability to redefine the scope and boundaries – opening up new opportunities and it is also a challenge for existing players, in order to change

something in part of the new conditions. Innovation can be understood as a general activity necessary for the survival and growth of the organization.

According to Švejda [10] innovative business is then understood as a set of business activities specializing in the continuous realization of innovative activities. In relation to research and development object of business should be commercialization of results of research and development on the market. The transfer of technology is an important tool. The process of innovation begins with an innovative business plan, it ends not only by the application of new products in the market and by evaluating the parameters of products, but there is also important thoughtful way of their disposal (recycling) after the end of their life cycle. The beginning and end of the innovation process is influenced by innovation (technology) marketing.

1. Statistics of Innovative Companies in the Czech Republic

According to the Eurostat methodology, updated for the year 2010, innovation (innovative) firms are those firms which in the period 2008 – 2010 either introduced product innovation or process innovation or they had ongoing or abandoned activities (technical innovation), or implemented marketing or organizational innovations (non-technological innovation). Starting from the year 2008 the CIS survey the non-technical innovation has been equated with technical innovations.

In the Czech Republic in the period 2008 – 2010 there innovated 49.9 % of economically active enterprises. The share of non-innovative enterprises reached 50.1 %. The highest proportion of innovative enterprises was in the group of large enterprises with more than 250 employees (75.5 %), the smallest share of innovative enterprises was found in small enterprises (46.3 %). In the group of medium-sized enterprises innovated 59.7 % of enterprises. In terms of ownership of enterprises there innovated more foreign-controlled enterprises (63.0 %) than domestic firms (47.2 %).

By comparison with the previous period 2006 – 2008 there occurred in the period 2008 – 2010 the increase of the share of innovative enterprises from 42.0 % to 49.9 %. There was most the share of innovative enterprises of small businesses, from 37.2 % in 2006 – 2008 to 46.3 % in the period 2008 – 2010. For medium sized businesses the increase between the periods was 2.6 percentage points. For large companies the situation was reversed, there was a slight decrease in the share of innovative enterprises from 76.0 % in the period 2006 – 2008 to 75.5 % in the period 2008 – 2010. In the case of foreign affiliates the increase in the share of innovative enterprises was greater than that of domestic firms.

In the period 2008 – 2010 the largest share of innovative enterprises was recorded in the area 'Information and communication' (70.2 %). It was followed by the area "Financial and insurance activities" with a share of 66.1 % of innovative enterprises. The third most important sector in terms of the share of innovative enterprises was the sector "Manufacturing" (56.4 %). The least innovate enterprises were in the area

"Administrative and support services" (the share of innovative enterprises 37.0 %) and the area "Accommodation and food service activities (37.1 %).

According to the broader concept of innovation in the revised Oslo Manual 2005 there were identified four main types of innovation: product innovation, process innovation, marketing innovation and organizational innovation. This classification maintains the highest possible degree of continuity (to ensure comparability of data) with the previous definition of technical product and process innovation used in the previous second edition of the Oslo Manual 1997. Product innovation and process innovation are closely related to the concept of technical product innovation and technical innovation process. Marketing and organizational innovations in comparison with the previous definition extend a number of innovations covered by the Manual and is one of the non-technological innovation.

In the Czech Republic, the share of technical innovation (product or process) in the period 2008 – 2010 which is considered in innovation as key innovators there was 31.6 % of the total number of economically active enterprises. The highest proportion of enterprises with technological innovation was in the group of large enterprises with more than 250 employees (62.9 %). In the group of medium-sized enterprises there technically innovated 42.2 % of enterprises. The smallest proportion of enterprises with technological innovation was in case of small firms (27.5 %). In terms of business ownership there technically innovated more companies under foreign control (46 %) than domestic firms (28.6 %).

In comparison with the previous period 2006 – 2008 there was in the period 2008 – 2010 the increase of the share of enterprises with technological innovation (from 28 % to 31.6 %). Most increased the proportion of enterprises which innovated technically in the group of small enterprises from 23.3 % in the period 2006 – 2008 to 27.5 % in the period 2008 – 2010. For medium sized businesses there occurred between to a slight decline of 0.2 percentage points between the periods. For large companies, there was also a slight decrease in the proportion of enterprises with technological innovation from 63.3 % in 2006 – 2008 to 62.9 % in the period 2008 – 2010. The share of enterprises with technological innovation in area of domestic companies increased between the periods by 1.6 percentage points. For foreign affiliates, the increase of innovative activities related to products and processes was more pronounced. The share increased from 33.4 % in the period 2006 – 2008 to 46 % in the period 2008 – 2010.

The highest proportion of enterprises with technological innovation by CZ-NACE r2 was registered in the area 'Information and communication' (54.1 %), followed by the area "Financial and insurance activities" with a share of 49.6 % of enterprises with technological innovation. Third most important area in the industry key sector as for the share of innovative enterprises there was the sector "Manufacturing" (43.3 %). The least technically innovate enterprises were in the area 'Administrative and support services "(the share of innovative enterprises was 14.3 %) and the area "Construction "(17.4 %).

In the period 2008 – 2010 from the total number of technically innovative enterprises only 34.2 % enterprises cooperated on the introduction of technical innovations with an

external partner. Large technically innovative enterprises cooperated more (62.1 %) than medium (45.9 %) and small enterprises (25.1 %).

For the technically innovative firms there were the most common co-operating partners in innovation suppliers of equipment, materials, components or software (mentioned by 23.9 % of firms). Important role as a cooperating partner played clients or customers (19.2 %). The least frequent trade partner for technical innovation there were government and public R & D institutions (6.9 %). Top ranking partners with whom technically innovative enterprises cooperated is the same in size groups of enterprises. For all size groups of enterprises there prevails the product innovation over process innovation.

From the research of Rylkova [8] there was found that only 13 % of selected sample (300 organizations) from the Czech Republic consider cooperation of small and medium sized companies as the main factor of innovation background in the company. As for SME's cooperation with other firms, only 34 % asked cooperate on new product or proces development. Table 1 evaluates the development of innovative enterprises in the Czech Republic.

Tab. 1 Innovative Enterprises in the Czech Republic

Development of innovative enterprises	Share grows
Enterprises with technical innovation (product or process innovation)	Share decreases
Enterprises with non-technical innovation (organizational or marketing innovation)	Share grows
Manufacturing sector	Higher innovation performance
Service sector	Lower innovation performance
Large enterprises	Most innovatively active
Midle-sized enterprises	Less innovatively active
Small enterprises	Least innovatively active
Cooperation	Low level
Innovation performance	Moderate Innovator

Source: own

According to the SII (Summary Innovation Index) the Czech Republic ranks third position in the group of countries known as moderates innovators with SII value slightly below the EU-27 in recent years. Moderate innovators are countries reaching 50 to 90 % of the EU-27. The average innovation performance is measured using a composite indicator that takes into account the "innovative results" of countries based on 24 indicators, zero is the worst possible result, maximal possible result is assigned by value 1. In the year 2011 the average innovation performance reflects the real innovation performance in 2009/2010 – the reason is the time delay in disclosure of relevant statistical data.

Countries belonging to the innovative leaders (innovation leaders) are reaching at least 20 % higher innovation performance than the average for the EU-27, the so-called followers of innovation (innovation followers) are those whose innovation performance is within 10 % below average to 20 % above the EU-27 average. Performance of Moderate Innovators group of countries is lower than in the EU-27, but reaches higher

valuest than corresponds to 50 % of the EU-27. Countries with lower innovation performance belong to the group Moderate Innovators.

Czech Republic belonged according to rating dynamics of innovation performance (calculated on the basis of the development of the indicators making up the SII in the previous five years) with an average annual growth of 4.8 % among well above average among countries (average annual growth rate of the EU-27 amounted to 1.8 %) in the year 2009. In the year 2010, the average annual growth in innovation performance of Czech Republic was lower – only 2.6 %, while the average annual growth rate of EU countries amounted only 0.85 %. Thanks to economic growth in the year 2010 (mainly due to positive developments in the manufacturing and service industries), the current average annual growth rate of the innovation performance of the Czech Republic rose to 3.2 %. While in the year 2010 the value for the EU-27 was 0.85 % in the year 2011 average growth rate dropped to 0.33 % due to the impact of the economic crisis. In both years, the resulting growth rate is positively influenced by the development of indicators in open, excellent and attractive research systems, the negative impact was observed in indicators of corporate investment, in usage of venture capital (there decreased indicator – amount of funds designated as venture capital to HDP3) and in innovators group (decrease of innovative small and medium sized enterprises).

2. Own Research

Department of Management and Business of School of Business Administration in Karvina, Silesian University in Opava conducted survey under the title "Adaptability of SMEs in the current economic conditions in the crisis years 2007 – 2010. The research took place in the summer semester of the year 2011 with the help of full-time and distance students. Interpreted sample characterizes the state in 207 companies in the Czech Republic. The questionnaire was completed by the student on a personal meeting with a manager of company. The questionnaire survey included the following categories: A. Identification of the company (11 questions), B. Strategic and project management (9 questions), C. Risk and crisis management (11 questions), D. Personnel policy (7 questions), E. Production, services and innovative activities (9 questions), F. Use of grants and subsidies (8 questions), G. Energy savings and renewable energy (6 questions), H. Identification and intermediate student opinion survey (6 questions). [9]

In order to evaluate the survey there was used SPSS 11.5 program. Outputs were achieved with using several methods, for the purposes of this study there were selected three methods: Rotated Component Matrix (factor loadings after rotation, arranged by size), Communalities (part of variability explained by variables common factors) Correlation Matrix (mutual dependence of two questions).

One of the objectives of the research carried out by the department was to analyze and evaluate whether firms innovated in the years 2007 – 2010, and what types of innovations where the most frequently. As for the questionnaire survey conducted by the Department management and Business one of the hypothesis was (*H*): *Innovation activities in this period are concentrated primarily on product – goods or services.*

The results showed that 65.7 % of enterprises didn't innovate, 34.3 % of firms innovated. Only 12 companies innovated something different and the rest innovated the product. The hypothesis was confirmed and is supported by the following table 2.

Tab. 2 Types of Innovation

Valid	Without innovation	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Without innovation	136	65.7	72.7	72.7
	Goods	13	6.3	7.0	79.7
	Goods, services	3	1.4	1.6	81.3
	Goods, technology	1	0.5	0.5	81.8
	Services	20	9.7	10.7	92.5
	Services, quality	2	1.0	1.1	93.6
	Services, technology	1	0.5	0.5	94.1
	Quality	4	1.9	2.1	96.3
	Quality, technology	1	0.5	0.5	96.8
	Design	2	1.0	1.1	97.9
	Technology	4	1.9	2.1	100.0
	Total	187	90.3	100.0	
Missing	System	20	9.7		
Total		207	100.0		

Source: [9, own evaluation by SPSS]

From the questionnaire survey conducted by the Department of Management and Business there was possible to point out areas that can have a high impact on the success of the organization.

Using SPSS program 11.5 there was found this structure of questions which attract the links with other questions and are most responsible for the results that came out after the evaluation of specified number (sample) of questionnaires. Questions correlation coefficient higher than 0.5 was found 36 times, but in order to remained the contribution clear and concise, there are only 3 of the most important issues with a correlation coefficient higher than 0.8 – Product and service innovation with correlation coefficient 0.809, Written strategy with correlation coefficient 0.805 and Measurement of performance with correlation coefficient 0.804.

According to Jiménez, Sanz-Valle [4] most of the broad empirical studies on the relation between innovation and performance provide evidence that this relation is positive ([Bierly and Chakrabarti, 1996], [Brown and Eisenhard, 1995 and [Caves and Ghemawat, 1992]; e.g. Damanpour, 1991; e.g. [Damanpour and Evan, 1984], [Damanpour et al., 1989], [Hansen et al., 1999], [Roberts, 1999], [Schulz and Jobe, 2001], [Thornhill, 2006], [Weerawardena et al., 2006] and [Wheelwright and Clark, 1992]). However, as Simpson et al. (2006) point out, innovation is an expensive and risky activity, with positive outcomes on firm performances but also with negative outcomes, such as increased exposure to market risk, increased costs, employee dissatisfaction or unwarranted changes. In addition, some studies arrive at conflicting conclusions. For instance, Wright et al. (2005), using a sample of small businesses, find that product innovation does not affect performance in benign environments, but has a positive effect on performance in hostile environments.

3. Measurement of Innovation Performance in Companies

According to Rejeb, Morel-Guimaes [7] literature attests of researches in the field of innovation capacity evaluation for a company or a country (Furman, 2003). These approaches are generally based on the evaluation of the innovation process outcomes and of the resources devoted to it. All these statements may be considered through three analytical levels setting aside the individual and collective cognitive level (Boly, 2004):

- Level A: The permanent and global innovation management of the company. This level integrates all the strategic tasks, the organization of new projects launching and the improvement of innovation management practices.
- Level B: The outcomes or inputs of a particular project. This level is characterized by a limited period and is concerned with the transformation of an idea up until an innovative product.
- Level C: The material characteristics of the innovative product resulting from the new product development process. This level represents the artefact of Level B. This approach suits our special interest in establishing links between evaluation and operational management tasks. The evaluation of Level C is very common in engineering through the definition of the future specifications of the innovative product and its relating performances.

According to Rejeb, Morel-Guimaes [7] literature is mostly concerned with Level B evaluation. Many authors propose approaches to determine the balance between the outcomes and inputs of innovation. Generally, financial and commercial variables are taken into account (Griffin and Page, 1996; Huang et al., 2004; Kangmao et al., 2005). Financial evaluations are based on classical ratio including financial margins and returns on investment (Crepon et al., 2000). Moreover, specific financial criteria dedicated to innovation resources are suggested: they generally measure time and cost development (Grant and Pennypacker, 2006). Marketing variables include qualitative and quantitative aspects, such as new market shares and customer satisfaction (this last example is dedicated more to product's Level C than to the project's Level B). Strategic considerations, such as competitive advantage, are integrated to evaluate the balance between outcomes and inputs. Several authors (Archibugi and Pianta, 1996; Abraham and Moitra, 2001) add technological criteria, such as the number of patents, to conduct this evaluation.

According to Rylková [8] innovative capabilities are a kind of background for the emergence of innovations. Measuring innovation capacity can then be done by measuring the assumptions, that means inputs (factors of production) in the innovation process (associated with finding and collecting innovative ideas and ending with investment in staff training and in research and development). It is obvious that some conditions are relatively easily measurable (quantity), others very heavily (quality).

For measuring inputs there are most frequently used according to the experience of enterprises surveyed in Rylkova [8] operating costs, capital expenditures, number of employees allocated to specific activities related to innovation. The most common individual indicators measuring innovation capabilities are the research and

development expenditures for a given period, investment in new equipment and employee training, percentage of employees trained in the area of innovation, capital invested into the innovation, percentage of staff time devoted to innovation and number of innovative ideas. For measuring process there can be used metrics of the duration of the change the idea in the idea realization that means the movement within innovation process from one stage to the next one and the costs connected with the stages.

Innovation performance follows the innovative activities of the company but innovation activity it is not the property of the company. It is again the result of the innovation process and arises from interactions among competing firms in a given market situation. Innovation performance is generally considered as a crucial component of long-term competitiveness of countries and regions.

Innovation performance (evaluation of innovation implementation) stands up to the very end of the innovation process. For measurement it is necessary to understand and describe the whole innovation process and to identify factors that may affect the ultimate realization of innovation. Measuring output includes for example number of newly listed products, changes in market share, growth in sales and profit growth from sales of innovative products.

According to Košturiak, Chal' [5], it is useful to use the following indicators of innovation performance:

- Success of innovations: the number of successful projects to the total number of initiated innovative projects.
- Effectiveness of innovations: the real contribution of projects to the total cost of the project.
- Time of innovation: the average time implementation of innovative projects.
- Return on Innovation: the period during which benefits from an innovative project reach the project costs.
- Return on Innovation: return on investment in innovation.
- Total expenditure on innovation as a percentage of sales.

According to Rylková [8] measurement of innovation performance in a company should be connected with evaluation of these categories – realised innovation (number of implemented innovations during a period), success of innovation (number of successful projects to the total number of initiated innovative projects), time of innovation (average time implementation of innovative projects), acquired patents (number of patents for a certain period), economic indicators (return of innovation, total expenditure on innovation as a % of sales, real contribution of the project to the overall cost of the project).

Conclusion

According to Vacek, Egerová, Plevný [11, p. 538] innovations today determinate the competitiveness of any organization; often they are pre-conditions of its survival. The

paper introduced innovative business of the Czech Republic on the basis of secondary research. From the primary research it may be inferred that the areas product and service innovation, written strategy and measurement of performance can have the greatest impact on the speed of adaptability of companies to changes and development.

Enterprises have to realize that they are surrounded with an external environment that supports or does not support development. The company itself uses inputs that transforms into outputs, provides products or services and solve problems such as where to obtain information, resources, customers, qualified staff, how to develop. The behavior of company influences the market. Influence of the market is becoming difficult, so it is necessary for company to seek new forms of development and to establish new forms of cooperation. The innovation process is nowadays without intensive cooperation with R&D organizations, universities and other innovative parts of the region (also known as an innovative process of „higher rank“). This cooperation, which is still not so used in the Czech Republic, is one of the characteristics of the knowledge economy and is a source of competitiveness of firms and regions. Most of today's successful innovations are a combination of innovations, where combined products are the outputs of joint innovation activities carried out by individual members of networks. The linear model of innovation is being replaced with an interactive model. All of these areas should be included in the development strategy, which will also include prerequisites for innovation and lead to innovation effect. The innovation effect should include measurable results, balanced cost of capital, it should include both qualitative and quantitative criteria, it is necessary to monitor the market position and create and develop a corporate culture which is opened to innovation.

According to Pitra [6] innovation measurement can be assessed in two basic levels. Company's level uses to the measure research that deals with the economical results and financing, motivation of employees, or there is applied customer satisfaction. It can include revenue from the sale of a new product, the cost of research and development, the length of the life cycle of the product or how the product is perceived by consumers. The second level is the political – and deals with the competitive advantages of regions or countries in which innovation plays its unique role. In this case, the innovation can be evaluated by using the areas dealing with technology, processes, or marketing.

According to Hadraba [3] measuring innovation should be carried out effectively, efficiently (must bring relevant information to the corporate management) and economically (must be done at a reasonable cost). Individual indicators generally meet the requirement of economy, but rarely effectiveness, as they focus on innovation from a too narrow view.

Evaluation of companies (either internal or external) should mainly serve the company management, which should be reflected in the results of the evaluation of its other activities and possibly the best practices should be used elsewhere. In the case of an enterprise or small group of companies it is possible to implement and measure a set of quantitative criteria. In the case of a large group of companies in different industries with very different objectives it is necessary to take a broad approach to the assessment.

The metrics for measurement of innovation performance of companies should be based on innovation strategy and planning, management, marketing, production, products, organization, quality and environment, logistics, organization and human resources because an important role plays promotion of innovation by management, the climate in the company, management systems, employee motivation etc. The question for discussion and future research is: What measures are the most important to evaluate within the product or process innovation?

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