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Innovation as a determinant of the competitiveness of Polish enterprises

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Abstract

Research background: Global competition, fast and dynamic technological change and increasingly shorter product life cycles have changed the current environment of enterprises' functioning. In order to compete, firms are obliged to introduce new technologies, products, services or organizational systems and are forced to seek competitive advantages in innovativeness. Technology transfer becomes a major opportunity to enhance competitiveness and innovativeness of enterprises. The use of technology transfer and implementation of innovations allows companies to meet the requirements of the market and international competition. This paper discusses innovation activity occurring in industrial enterprises in Poland at present.

Purpose of the article: The aim of the article is to determine the level of innovativeness in gaining the competitive position of surveyed Polish enterprises. The purpose of the article is to determine the occurring innovation activity and the novelty level of innovations implemented in the group of surveyed firms.

Methods: The study is based on a survey on industrial firms (n=100) located in Poland. Data was collected during 100 individual interviews with high- and medium-level managers of randomly selected companies.

Findings & Value added: The research has determined the level of innovativeness in gaining the competitive position of the surveyed firms. As the survey showed, enterprises pre-

vailed the range of implementation of material innovation - product and process. Rarely firms implement non-material innovations. The study pointed to low activity in the field of patenting and implementing innovations with a high level of novelty. According to the obtained results, there is a dominant introducing new form the companies side innovations, which causes low competitiveness of surveyed enterprises. These findings suggest that measurement of innovativeness in gaining the competitiveness should be developed. The findings support the need for Polish enterprises to participate in advanced forms of technology and knowledge procurement.

Introduction

Modern economy is characterized by increasing importance of knowledge related to the quality of human capital and knowledge embedded in the products (Balcerzak, 2010, p. 91). Development of successful technological innovations is essential for creating and sustaining on firm competitive advantage. Gaining competitive advantage is critical for enterprises. Through innovations companies are able to meet the demands of the market and client needs. Technology development is a part of a complex process of innovativeness, and is implemented via various channels that allow the flows of scientific and technological knowledge between science and industry, and between businesses themselves.

Innovation is one of the key source of achieving competitive advantage. Enterprises, in order to compete, must introduce new technologies, products, services or organizational systems, which are prerequisites for higher innovativeness. Enterprises are looking for competitive advantages in different areas of business, marketing, production, research and development or business management. It becomes essential for the efficient management of processes to implement new solutions for product, process, organizational and marketing methods. The pace of creating and implementing innovations to a large extent determines the firms' competitive advantage.

Intense global competition and rapid technological change have transformed the current competitive environment (Prahalad, 1998, pp. 14–22). There is increased pressure on enterprises to continually advance knowledge and new technologies in order to ensure long-term prosperity and survival (Steele, 1989). Innovation is a necessary condition to obtain a favorable position, not only on the local or national level, but also in the global economy. The economy based on knowledge, time and territory has become a secondary concept, whereas competitiveness is the common requirement for companies that want to develop.

Firms play a key role in creating and disseminating innovation. Especially small and medium sized (SMEs) companies constitute a majority of the operating organizations. Their market position and growth prospects to

the greatest extent that reflect the entrepreneurial potential of the entire economy. However, SMEs often have a weaker economic and financial situation than large enterprises. Every day they face many difficulties in terms of finance or human capital. Barriers faced by SMEs often prevent them from free development. On the other hand, firms and especially SMEs, in order to survive, have to increase the innovativeness level, which is a way to gain competitive advantage.

According to research conducted both at the national and international level, the innovativeness of Polish firms is significantly different from the situation in most European Union countries, in both product and process innovations, but also organizational and marketing (see. Innovation Union Scoreboard 2013, 2014, 2015). Polish companies occupy one of the last places in terms of: average expenditure on innovation activities, the percentage of companies implementing innovation, and the average value of sales of new or significantly improved products.

The premise to undertake the survey is the issue of low innovativeness and weak competitive position of industrial enterprises in Poland, and the extent of the use of new products and processes as a source of competitiveness. In this connection, the aim of the survey is to determine the degree of real innovativeness of Polish industrial companies and to assess its impact on their competitiveness.

Theoretical background

The term innovation was used for the first time by Schumpeter (1934), for whom the innovation was the engine of the market economy. According to Schumpeter, entrepreneurs are willing to bear the risk of their introduction. Those who decide to undertake such a task have a chance to obtain very high profits. Innovation is the destructive force of creativity. In this process, firms play a key role, as they are the missionaries of progress (Schumpeter, 1934, p. 104–137).

According to P. Drucker, innovation is a specific tool of entrepreneurs, for whom the change makes the opportunity to take up a new business or to provide a new range of services. Innovation can be considered as a discipline, it can also involve learning and practice. Entrepreneurs should look for changes and symptoms suggestive of opportunity for effective innovation. Innovation process is a structured, systematic and purposeful procedure, based on transparent principles of action, which allow firms to convert an idea into a concrete innovation (Drucker, 2001, p. 25, 192).

From the point of view of firms, innovation is an important factor in their competitiveness. Remaining with existing solutions and production of constantly the same products, using the same methods, can in the long term lead to loss the current competitive position. The lack of adaptation to surrounding competitive conditions can completely restrict the activities of the company.

Ch. Freeman wrote that not to innovate means to die. According to him, innovation is any change, which is the first time the subject of trade what means simply is being sold (Freeman, 1973, p. 21). In turn, for Kuznets (1959, p. 30) innovation is the first or re-use of old or new knowledge in the production process, system, or the first use of the device.

The only constant in modern economy is change and related to it innovation, which is a guarantee for a firm of its success and survival, regardless of its size and area of industry in which it operates. Innovations are essential in the maintenance and growth of existing enterprises, as well as emerging entities (Chesbrough, 2003, p. 17).

According to Kotler (1976, pp. 198–199), a company must develop a lot of ideas for new products to successfully implement only a few of them. Product innovations are focused primarily on the needs of the market and process innovations are primarily aimed to improve the efficiency of the production process (Utterback & Abernathy, 1975, pp. 639–656). In turn, organizational innovations in the general sense relate to the creation, introduction or adaptation of new ideas or behavior in the organization (Lam, 2004, p. 3).

Martín-de Castro *et al.* (2013, pp. 351–36) say that developing successful technological innovations is the most important factor for creating and sustaining an organization competitive advantage. Innovation contributes to achieving a competitive advantage in several aspects (Tidd *et al.*, 1998). The most important characteristics of innovations include: a strong relationship between market performance and new products, new products help maintain market shares and improve profitability, growth also by means of non-price factors, ability to substitute outdated products, innovation of processes that lead to production time shortening and speed up new product development in comparison to competitors.

Developing successful technological innovations is essential for creating and sustaining a company competitive advantage (Urbancová, 2013). Analysis of the sources of competitive advantages points to several possible sources of reaching competitiveness. The question is, to what extent the innovation and technology influences received by the company competitive advantage is by default based on analysis of existing resources and the possibility of their use by the firm (Lin, 2003, pp. 327–341). Companies that

rely on imitation of technological resources are able to achieve a sustainable competitive advantage (Bettis & Hitt, 1995, pp. 7–19; Teece, 1977, pp. 830–837). One of the key success factor of the organization becomes the use of transferred knowledge in raising the competitive ability of the company (Gilbert & Cordey-Hayes, 1996, pp. 301–312). Companies that acquire and use innovation effectively compete in the domestic and international market (Lynn *et al.*, 1999, pp. 439–454). The possibility of the use of technology can improve the average performance of the company, which in turn leads to maximize its competitive advantage (Gilbert & Hayes, 1996, pp. 301–312). Innovation transfer can contribute significantly to obtain a competitive advantage (Sazali *et al.*, 2009, pp. 408–422).

Firms can gain competitive advantage by effectively managing creation of innovations for tomorrow (Tushman & Nadler, 1986, pp. 74–92).

Research Methodology

Data collecting

This study conducted an industrial firm survey to collect data from industrial companies from Poland. The study conducted 100 face-to-face questionnaires. According to Churchill (1999, pp. 2–3), face-to-face questionnaire collection is the most used sampling method in large-scale surveys. The study collected a total of 123 questionnaires, but excluded 23. The study obtained a total of 100 usable, completed questionnaires. Individual interviews were collected among a research sample consisting of high and medium level managers of randomly selected industrial companies from the territory of Poland.

Survey instrument

The study got all measurement items for the questionnaire from the literature of innovation, and was based especially on OECD methodology. The study measured all responses according to innovation type (process, product, organization, marketing), level of innovation novelty (highest rate — new and patented innovation, medium rate — new for the market, lowest rate — new from the point of view of company introducing innovation), material on material innovation, and the number of entered innovation during the last three years of company activity. When the surveyed firm confirmed implementation of patent innovation it meant the possibility of reaching the highest competitiveness level. On the other hand, only innova-

tions new to the company meant low ability to compete. As well, it was important what kind of innovation the company introduced and how many of different innovations was being implemented during the surveyed time.

Following assumption was adopted in the research — innovation occurred when the surveyed company in the last three years of its activity has implemented a product, a process, an organizational or marketing innovation.

Innovation are new or significantly improved products and services that have been commercialized or a new or significantly revised process used for the commercial production of goods and services. New means also new for the company (Rogers, 1998, p. 8). In the case of product innovation, implementation means putting on the market in the last three years of the company activity new products or significantly improved products in terms of changes in the components, and other features for better performance of these products. Process innovations means to use in the last three years of the company's activity new or significantly improved processes through the introduction of new or significantly improved methods of production or supply, significant changes in technology, equipment and software. Marketing innovations, in turn, is implementation over the period of three years marketing methods not previously used by the surveyed company, which represents a significant departure from the marketing methods used before. Implementation of marketing is associated with changes in production technology or production of new or significantly improved products. Organizational innovations in the survey are new organizational methods in the firm's business practices, workplace organization or external relations that has not been used in a company before.

Data analysis and results

The percentage of surveyed companies that have implemented innovations in products and processes greatly exceeded the percentage of implementation in the field of marketing and organizational innovations. Firms that have declared the implementation of innovations in products accounted for 66% of surveyed population, and 58% implemented process innovations. In terms of non-material innovation, the index was much lower and stood for innovation in marketing about 10%, and 17% in organizational innovation (Figure 1).

Analysis of enterprises in terms of the number of employees in the company showed significant differences between the enterprises that employ 10 to 49 people and companies employing 50 to 249 employees in the field of

implemented innovations. Small companies implement far less innovation than medium-sized companies, also in terms of product, process and organization innovation. Only in the case of marketing innovations do small companies implement a greater number than an average medium firm.

The share of small firms in the population that have implemented product innovations was only 29% and the diffusion of innovations in the process 24%. Most implementations in technological innovation took place in the medium-sized companies, of which 37% have introduced product innovations and 34% have introduced process innovations. Taking into account the organization innovation part, deployments for small and medium-sized enterprises was low and amounted for total about 17%, of which 7% of organizational innovations introduced small companies and 10% medium-sized companies.

In the analysis of surveyed enterprises it was also important to determine the nature of the introduced innovations — whether they were entirely new innovations, and therefore have not yet occurred in the company, or whether they were significant improvements of existing products or technology of production. In the group of surveyed companies implementation of entirely new products declared 31% of enterprises. Fewer, about 31% of companies, have introduced to the market improved products in terms of changes in materials, components and other features for better effect. Almost half of the surveyed industrial enterprises (44%) declared the introduction of significantly improved methods of manufacture, delivery or significant changes in terms of technology, equipment or software. As regards the implementation of completely new technology of production, it was much lower than the implementation of new processes. Only 14% of the surveyed firms indicated that in the last three years had introduced a completely new processes.

The low rate in this area suggests that the innovations implemented in the Polish industrial enterprises are more in the nature of improvements and significant changes to the process than a completely new processes.

An important characteristic of innovation is the degree of novelty that represents a particular innovation. The highest rate of novelty have the solutions that are new at the international level or have been patented internationally. Lower level of innovativeness have innovations that are new from the point of view of the market on which the company operates. The lowest level of novelty is shown by those innovations that are new only from the point of view of the implementing it company. According to that, distribution of novelty in the study, surveyed companies most often declared the introduction of innovation in product or process, which were new at the company level. Among the surveyed companies, up to 43% of them

have implemented process innovations and 38% new product innovations new for the firm. Another declared group of implemented innovation in companies were new innovations from the market scale at which firm have been operating. And so, 14% of companies have introduced process innovations and 25% new product innovations in the market scale, on which the company have been operating during the last three years. The least likely, firms implemented innovations in product and process which have been patented. Among all surveyed companies, only one has introduced process innovation which had been patented, and only three companies have patented product innovation.

Due to the size of the firm, the group of small and medium-sized companies have usually implemented product innovations new from the point of view of the company.

From the population of small companies, 21% of them have introduced a product and 21% a process innovations which were new from the firm's point of view. None of the small firms have implemented product or process innovation which has been patented, only 8% of small companies have implemented product innovations and 3% process innovations new for the market. This demonstrates low innovative solutions that are implemented by small firms, which mostly implement material innovations, new only for the firms. Among medium-sized firms novelty level of implemented innovations was higher than in small enterprises. In the surveyed population of medium sized firms, there were companies which have patented process and product innovations. The percentage of firms which have patented product innovation was about 3% and process 1%. Percent seems negligible, but taking into account the size of the surveyed population of medium sized enterprises and the requirements of the patent procedure, it means occurrence of significant innovative solutions on a global scale in the surveyed population.

The share of medium sized firms that have introduced new product innovations in the market scale, on which the company operated, was 17% and 11% for the process innovation. In the group of medium-sized companies, as in the case of small, the most frequent implementation of innovations were on the scale of novelty level of the firm. The share of medium-sized enterprises that have implemented innovations new to the company was 17% in terms of product and 23% in the process innovation.

From the point of view of competitiveness of enterprise, it is also important how many innovations company implements. The surveyed firms indicated how many material and non-material innovations they have introduced over the last three years of its activity (Figure 2).

The surveyed companies most often declared the introduction of two, three or four innovations during the surveyed period (Figure 2).

In the product innovation category 4% of firms declared implementation of one innovation, 15% two, 18% three, 16% four to five and 6% from six to ten. Only 3% of surveyed companies declared implementation more than eleven innovations, and 4% enterprises introduced more than twenty product innovations in the last three years. Distribution of firms that have implemented process innovation was similar. In terms of the process, 14% of surveyed companies introduced one innovation, 18% two, 10% three, 10% from four to five, 1% more than eleven, and 1% above twenty innovations over the last three years (Figure 2).

The analysis of responses in terms of the number of implementation of marketing and organization innovations showed much lower implementation of intangible innovation than tangible one. Most firms declared implementation of one organization innovation — 10% surveyed firms. Only 5% of enterprises population have implemented two, and 3% three organization innovations. Concerning marketing innovations, 3% of firms declared implementation of one innovation, 5% two, 2% three and 1% four innovations during the last three years.

The analysis of examined indicates a significant difference between small and medium-sized enterprises. In the group of medium-sized enterprises there was a higher overall innovativeness than in the group of small firms. Also, bigger companies implemented greater number of innovations in product and process than small enterprises.

There was a significant advantage of implementation of material than non-material innovations. More than a half of surveyed firms have declared implementation of product (66%) and process (58%) innovations during the last three years.

The frequency of innovation intangible assets was six times lower than the material. In the case of marketing, only 10%, and organizational 17% of the surveyed companies declared implementation of innovation. There significant differences in the amount and type of innovation implemented due to the size of the company. Small companies introduced innovations much less frequently than the average implementation of innovations in the surveyed population.

Taking into account the market of the company activity of the surveyed enterprises, the most parts of innovations have been implemented by small firms operating on the local market and medium-sized firms operating on domestic and international market.

Among the surveyed companies there is a domination of innovation concerning products and production methods. The implementation of com-

pletely new products occurred in the case of 31% firms and entirely new processes introduced only 14% of them.

Conclusions

As the survey showed, the level of innovativeness in Polish industrial firms is rather low. This directly affects the level of competitiveness of surveyed companies which are rather competitive in the regional level and, in general, are not able to compete on the international level, among firms introducing new products and using new processes that are often patented or are completely new for international market. This kind of new, radical innovations gives that kind of companies a competitive advantage and a possibility to be a creator of new products and processes.

Implemented innovation in surveyed Polish industrial enterprises showed that the implemented innovations are rather improvements and significant changes to the product and process, than completely new products or processes. This was especially visible for small firms, whose activity is mainly based on actual production and implementation of improvements and rarely implementation of entirely new innovations. For all types of innovation, small companies have achieved significantly lower rates of innovation. Due to the level of innovations novelty, there is domination of implementation of new products and solutions new from the point of view of the implementing company. Less likely ones are innovations new to the market, and only one of surveyed enterprise has introduced this type of innovation. New patented innovation in the group of surveyed firms are particularly rare. Only three of surveyed firms have been able to introduce these type of innovations, and all of them were medium-sized firms. It can be observed that bigger size companies are more innovative than small firms in the terms of innovations novelty. Also, they introduce more innovations new to the market, and they are more innovative from the point of quantity of implemented innovations.

Based on the survey the recommendations can be formulated, according to increasing the innovativeness level as well as competitiveness position of industrial firms. From the central point of view, increasing the availability of support mechanisms at national and regional dimensions — customized according to the enterprises size and needs in the field of innovation, should be a priority. The inclusion of the innovative policies should recognize the specific conditions of Polish industrial enterprises. Taking into account by the authorities in the funding of innovation funding opportunities for various forms of technology transfer is also important.

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Annex

Figure 1. Type of implemented innovation in polish industrial enterprises (share of expenditures in %)

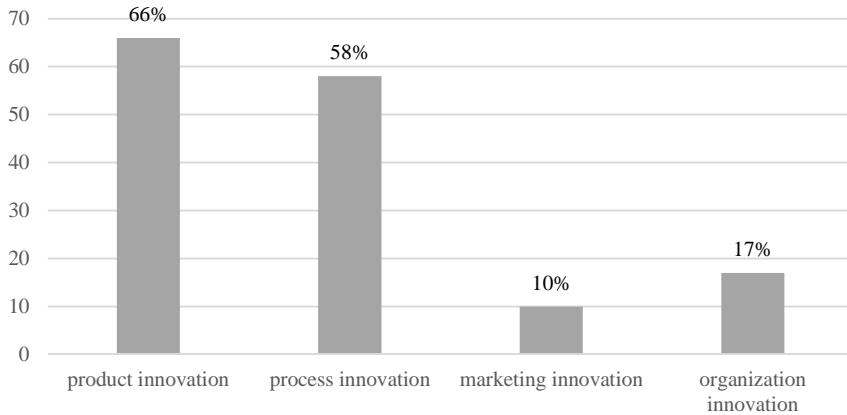


Figure 2. Percentage of companies that have implemented material innovations (product, process) due to the number of implemented innovations (%)

