

INNOVATION ACTIVITIES OF INDUSTRIAL ENTERPRISES IN POLAND IN THE LIGHT OF PUBLIC STATISTICS

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ABSTRACT

Intensive promotion of innovative activities, especially in companies, has forced the creation of international monitoring systems. In Poland, the Central Statistical Office [GUS] and the Statistical Office [US] in Szczecin are currently investigating statistical innovations. The article attempts to evaluate the innovative activity of industrial enterprises in Poland in 2005–2015. Attempts were made to answer the following questions: have the innovative activity of industrial enterprises increased in the period of Poland's full membership in the EU structures, what are the effects of this activity, or are there visible trends in growth? The results of the research on the innovative activity of industrial enterprises in Poland, implemented in accordance with the Oslo methodology under the Community Innovation Survey (CIS), were used to achieve this objective. The level of enterprise innovation in Poland is lower than in most EU countries. Improving the performance of innovation requires, on the one hand, greater involvement of enterprises and, on the other hand, public sector support, which plays a key role in creating the right knowledge and skills.

Key words: innovative activity of industrial enterprises, Oslo methodology, Community Innovation Research (CIS), innovation inputs and outputs

INTRODUCTION

In recent years, science, technology and innovation have been considered as the main factors determining the improvement of competitiveness of economies. This leads to a systematic increase in the interest in scientific and technical indicators describing this aspect of the economy.

In Poland, the first statistical research on science and technology, including innovation activity, was conducted as early as in the 1950s. At the time, however, in the studies of the Central Statistical Office of Poland (CSO – GUS), the term “production renewal” was used. The concept of innovation activity appeared in the CSO terminology in the 1990s in connection with the processes of adjustment of Polish statistics to the methodological recommendations of the OECD and the European Union. Intense promotion of innovation activity, especially in enterprises, resulted in the emergence of international monitoring systems. The first attempts to develop the international methodology of researching innovativeness of enterprises date back to the 1960s. The Organisation for Economic Cooperation and Development (OECD) has made the greatest contribution to the development of this methodology and the development of research on innovativeness [Kozioł 2009, p. 130]. In 1963, in the Italian town of Frascati, the first version of the *Proposed Standard Practice for Surveys of Research and Development*, known as the *Frascati Manual*, was created. To date many editions

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of this manual have been published. The cooperation of the OECD with other international and regional organisations and groups, including the EU, has caused the methodology of *Frascati Manual* to become the worldwide standard [*Frascati Manual* 2002]. The effect of cooperation is, first and foremost, the development of a comprehensive research methodology which is described in a series of methodological manuals called colloquially the Frascati Family.

The most important manual of the Frascati Family concerning statistical research of innovation activity is the *Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*. The first edition of this manual was released in 1992 and was developed by the OECD and the Nordic Industrial Fund. The manual concerned innovations introduced in the industry. The second edition was published in 1997 as a result of cooperation between the OECD and Eurostat. That edition contained the definitions and methodology updated on the basis of the conducted research, which was supposed to facilitate better understanding of the innovation process and incorporating a broader spectrum of types of activity, including in particular the study of innovation activities in the services sector. The third edition of the *Oslo Manual – 2005* – is currently in use. The Polish version of this manual was published by the Ministry of Science and Higher Education in 2008.

The methodology of research on innovativeness is constantly being developed and improved, but it is still far from expectations.

Studies on innovativeness in the countries of the European Union are based on recommendations arising from the Frascati Family manuals, above all the *Oslo Manual*. The European Statistical Office (Eurostat) is responsible for collecting, analysing and publishing statistical information on science, technology and innovation.

Two basic studies of innovativeness are conducted in the European Union [*Nauka i technika w 2009 r.*, p. 123]:

- *CIS (Community Innovation Survey)*;
- *EIS – European Innovation Scoreboard*.

National statistical offices or relevant ministries conduct statistical research in the individual countries participating in the *CIS*. In Poland, within the framework of official statistics, the CSO and the Statistical Office of Szczecin conduct statistical research on innovation. The research on innovativeness conducted by the CSO include industrial enterprises and companies in the sector of services which are included in the Statistical Survey Programme of Official Statistics under 1.43.02 – *Innovation in the industry (PNT-02)* and 1.43.13 – *Innovation in the sector of services (PNT-02/u)*.

The European Innovation Scoreboard (EIS) is the other, apart from the *CIS*, source of information on the level of innovativeness of countries, including innovation activities of European enterprises. The EIS uses a large part of the data derived from the *CIS*. In 2010, the EIS was replaced by the new *Innovation Union Scoreboard 2010, IUS-2010* [Innovation Union Scoreboard 2010. The Innovation Union's ... 2011, p. 3]. Methodological differences as well as the division and comparison of indices contained in the EIS and the IUS reports can be found in the works of: Roszko-Wójtowicz and Białek [2016], Innovation Union Scoreboard [2015], Hollanders and Tarantola [2011].

The main aim of the authors of the paper is an attempt to assess innovation activities of industrial enterprises in Poland in the years 2005–2015, in particular the effects of these activities. To achieve this objective, the results of research on innovation activities of industrial enterprises provided by public¹ statistics, including the results of the latest research carried out in 2016 by the CSO and Szczecin SO for the years 2013–2015, are used.

¹ In the paper the term “public” statistics is used interchangeably with the term “official” statistics.

INNOVATION ACTIVITIES OF INDUSTRIAL ENTERPRISES

Constantly changing market conditions, strong competition, and ever increasing requirements of customers who expect products of specified quality force enterprises to conduct innovation activities. In accordance with the Oslo methodology used by the CSO: “innovation activities consist in engaging in various scientific, technological, organisational, financial and commercial activities which actually, or are intended to, lead to the implementation of innovations.

Innovation activities of enterprises can be [*Działalność innowacyjna przedsiębiorstw w latach 2013–2015, 2016*, p. 17]:

- successful, resulting in the implementation of an innovation (although it does not necessarily have to be associated with commercial success);
- ongoing – when the process of implementation has not yet been completed;
- discontinued prior to the deployment of an innovation.

The above-presented situation means that enterprises conducting innovation activities can be:

- innovative;
- innovatively active.

An innovative enterprise is an enterprise which in the period of analysis (usually three years) introduced into the market at least one innovation which was new at least for the said company. The term “innovatively active enterprise” is a broader category. It encompasses enterprises that in the analysed period introduced at least one innovation or implemented at least one innovative project which was interrupted or abandoned during the period of analysis or was not completed (i.e. it is still ongoing) [*Działalność innowacyjna przedsiębiorstw w latach 2013–2015, 2016*, p. 41].

In both cases, we are dealing with enterprises conducting innovation activities, that is, enterprises which have incurred expenditure on this type of activity, though not all of their endeavours have been successful. Therefore there may be differences in terms of effectiveness of innovation activities between an innovatively active enterprise and an innovative enterprise.

These methodological notes indicate the need to take into account in the evaluation of innovation activities of enterprises indicators that describe both the expenditure on and the effects of the said activities [Witkowski and Weresa 2006].

EXPENDITURE ON INNOVATION ACTIVITIES

Expenditure on innovation activities is one of the main indicators in the assessment of innovativeness. The funds expended for this purpose by enterprises are diverse in terms of types of innovation activities financed and sources of financing.

The data presented in Table 1 indicate that in the years 2005–2015 the share of enterprises conducting innovation activities did not exceed 40%. The highest percentage (38.2%) was recorded in 2005, a slightly lower level of 37.3% was observed in the following year. The record low share, only 16.9%, was observed in 2008. In the remaining years of the analysed period, the share of enterprises incurring expenditure on innovation activities fluctuated around 30%.

In the years 2005–2015, expenditure on innovation activities in industrial enterprises employing more than 49 persons increased in nominal terms by 101.8% (from PLN 14,329.1 million in 2005 to PLN 28,920.7 million in 2015), while actual growth was at 87% (Fig. 1). The record level of expenditure on innovation activities in the industry of PLN 28,920.7 million (actual expenditure: PLN 26,928.0 million) was observed in 2015, which meant, compared with the previous year, the increase of more than 27%. Regrettably, that was a unique situation. It is difficult to say whether this is the beginning of a new upward trend. In previous years, the expenditure

Table 1. The share of industrial enterprises incurring expenditure on innovation activities in the years 2005–2015

Years	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
The share of enterprises ^a incurring expenditure on innovation activities (%)											
	38.2	37.3	31.8	16.9	29.6	29.6	29.8	28.8	29.6	29.5	30.0

^a Employing more than 49 persons.

Source: *Nauka i technika w 2007 r., Informacje i opracowania statystyczne*, GUS, Warszawa 2009; *Nauka i technika w 2010 r., Informacje i opracowania statystyczne*, GUS i US – Szczecin, Warszawa 2012; *Nauka i technika w 2015 r., Informacje i opracowania statystyczne*, GUS i US – Szczecin, Warszawa 2016.

level was definitely lower, and the most difficult situation, i.e. expenditure reductions, was observed in the year 2009, 2011 and 2013. The largest decline of up to 14.4% (compared to the preceding year) occurred in 2011. In 2009 the decline of 11.1% was recorded, while in 2013 the decline amounted to 2.6%. Analysing the amount of expenditure on innovation activities of industrial enterprises, the lack of a clear upward or downward trend can be seen. Therefore, to better illustrate the dynamics of the expenditure, the geometric mean has been calculated and it turns out that during the period 2005–2015 expenditure on innovation activities grew annually on average by 6.5%. Unfortunately this is not growth that allows Poland to close the gap separating it from European leaders of innovation.

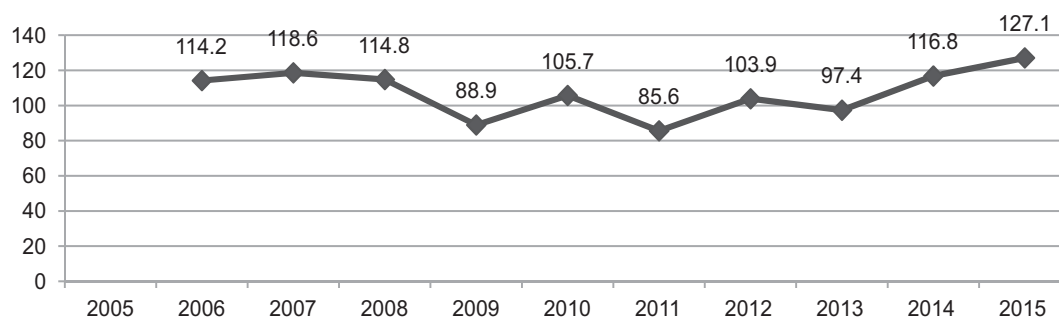


Fig. 1. The dynamics of expenditure on innovation activities in industrial enterprises employing more than 49 persons in the years 2005–2015 (fixed prices)

Source: Own elaboration based on the CSO *Statistical Yearbooks of Industry 2006–2016*.

Among industrial enterprises, enterprises employing 250 persons and more incurred the largest expenditure on innovation activities. Their share in total expenditure on innovation incurred by industrial enterprises was not only very high (75% in 2015), but increased in relation to 2014 (70.1%) [*Działalność innowacyjna przedsiębiorstw w latach 2013–2015, 2016*, p. 79].

The level of expenditure on innovation activities should be considered in conjunction with their intended purpose (Table 2). During the entire analysed period, investment expenditures on the purchase of machinery, technical equipment and means of transport dominated in the structure of expenditure on innovation activities. The share of this kind of expenditure ranged from 51.4% in 2015 to 62.2% in 2009. Investment expenditure on buildings, structures and land ranked second (15.1–27.7%).

Table 2. The structure of expenditure on innovation activities in industrial enterprises in Poland in the years 2005–2015 (%)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	Expenditure on R&D activity										
	9.6	9.2	8.1	8.1	10.2	14.6	13.5	17.4	19.9	19.6	16.7
	Expenditure on the purchase of knowledge from external sources and software										
	2.4	2.0	1.7	1.1	2.9	6.1	3.5	5.1	2.8	2.7	2.0
	Investment expenditure on machinery, technical equipment, tools and means of transport										
	58.6	58.8	58.8	57.0	62.2	52.3	58.5	58.5	54.5	57.3	51.4
Items	Investment expenditure on buildings, structures and land										
	24.1	22.8	24.2	27.7	21.8	22.5	18.9	15.1	19.9	16.7	25.7
	Expenditure on staff training and marketing new or significantly improved products										
	2.3	3.1	3.5	3.3	1.8	2.4	2.6	2.5	2.6	2.5	1.6
	Other expenditure										
	3.0	4.0	3.8	2.7	1.1	2.1	2.9	1.4	0.3	1.2	2.5
	Total expenditure on innovation activities										
	100	100	100	100	100	100	100	100	100	100	100

Source: Own elaboration based on the CSO *Statistical Yearbooks of Industry 2005–2016*.

In the structure of expenditure on innovation activities, the dominance of investment expenditure (on machines and equipment, buildings, structures and land) is maintained, their total share in the analysed period amounted to on average 79%.

R&D expenditure, important for innovation activities, in the years 2005–2015 ranged from 8.1 to 19.9% of the total expenditure. A relatively small share of expenditure on R&D and a high percentage of investment expenditure (on machinery and equipment as well as buildings and structures) in the total expenditure on innovation activities are characteristic traits of innovation activities conducted in enterprises in underdeveloped, the so-called catching-up, countries. Such enterprises seek to reduce the technological gap as soon as possible through the absorption of external tangible technology. Analysing the data in Table 2, positive changes in this area can be observed. At the beginning of the analysed period, i.e. in the years 2005–2008, expenditure on R&D activity did not exceed 10%, and since 2010 the share of expenditure on this kind of innovation activities clearly increased, reaching approx. 20% in 2013 and 2014.

The lack of significant interest in the implementation of innovation processes within the surveyed enterprises is also indicated by a small share of expenditure on staff training and marketing new and improved products. During the analysed period, the share of the expenditure ranged from 1.6% (2015) to 3.5% (2007). The significance of the other types of expenditure is smaller.

In an attempt to assess innovation activities of industrial enterprises in Poland, one cannot forget about sources of funds for financing the said activities.

Enterprises' own funds were the main source of financing of expenditure on innovation activities. During the analysed period 2005–2015, those funds accounted for on average 73.5% of all the incurred expenditure for this purpose in industrial enterprises. The largest share of expenditure on innovation activities (79.7%) financed from enterprises' own resources was recorded in 2006, while the lowest (63.6%) in 2015. Since 2011 a decline in the share of enterprises' own funds in the total expenditure can be observed.

Table 3. The structure of expenditure on innovation activities in industrial enterprises in Poland according to the sources of funding in the years 2005–2015

Years	Total	Funds:					
		own	received from the state budget	obtained from abroad (non-refundable)	bank loans	obtained from venture capital funds	others
2005	100.0	76.3	1.7	1.0	13.6	0.0	7.5
2006	100.0	79.7	1.6	1.5	14.0	0.0	3.2
2007	100.0	74.8	1.1	1.1	14.3	0.0	8.7
2008	100.0	72.1	1.2	1.6	20.5	0.2	4.5
2009	100.0	69.7	0.8	2.7	25.4	0.0	1.4
2010	100.0	77.3	1.0	7.2	7.3	0.0	7.1
2011	100.0	76.2	1.2	6.9	9.0	0.0	6.7
2012	100.0	75.0	1.9	6.6	5.9	0.0	10.5
2013	100.0	72.2	1.5	6.9	6.8	0.0	12.7
2014	100.0	72.2	1.6	6.0	8.6	0.0	11.7
2015	100.0	63.6	1.8	4.6	10.9	0.0	19.1

Source: Own elaboration based on the CSO *Statistical Yearbooks of Industry 2005–2006*.

Other sources of funding of innovative activity were used by industrial enterprises to a significantly lesser degree. The financial resources obtained from venture capital funds were the least-used source of innovative activity financing. The share of funds obtained from the state budget ranged from 0.8 to 1.9%. In the case of this source, no clear upward or downward trends can be observed.

The use of bank loans to finance innovative activities fluctuated significantly in the period of analysis. Entrepreneurs most frequently made use of bank loans in 2009, when their share in the financing of innovative activity was more than 25%, but in 2012 this source accounted for only 5.9% of the total expenditure. The annual average share of bank loans in the financing of innovative activities of industrial enterprises amounted to 12.4%. Since 2010 the significance of this source was clearly reduced.

The analysis concerning sources of funding of innovative activity conducted by enterprises very often points to funds obtained from abroad. In the first four years of the analysed period, this source was of minor importance, as its share did not exceed 1.6%. In the subsequent years, the share of funds obtained from abroad significantly increased, reaching a maximum of 7.2% in 2010.

Summarising the analysis of the structure of expenditure on innovation activities in industrial enterprises by funding sources, first of all the high autonomy of enterprises in financing these activities with their own funds and the relatively low use of resources from external sources should be noted. The likely cause of insufficient use of external resources is the lack of knowledge about their existence and complicated procedures of obtaining such funds. The reduction, in recent years, of the share of bank loans in financing innovative activities of industrial enterprises is compensated by an increase in the share of non-repayable financial resources obtained from abroad, which is probably related to an increase in the availability of such resources.

Using public statistics, one should note the limitations arising from the lack of important statistical data which prevent the in-depth analysis regarding changes in the structure of expenditure on innovation activities. The CSO also distinguishes (apart from: enterprises' own funds, funds received from the state budget, funds

obtained from abroad, funds obtained from venture capital funds, and bank loans) the so-called other funds. The share of those funds significantly increased in recent years (Table 3), and in 2015 it amounted to 19.1%. In the years 2011–2015, the other funds constituted a by far more important source of innovative activity funding than bank loans. The other funds are a broad category with such a level of aggregation that does not allow one to draw far-reaching conclusions.

EFFECTS OF INNOVATION ACTIVITIES CONDUCTED BY INDUSTRIAL ENTERPRISES

When deciding on financing innovation activities, entrepreneurs are governed by their expected profitability, i.e. the widely understood profit motive.

The incurred expenditure on innovation activities should result in the implementation of new or significantly improved products and processes, and these products and processes should be new at least from the point of view of the enterprise introducing these innovations [*Nauka i technika w 2009 r.*, p. 119]. The introduced innovations allow one to include enterprises into the groups of innovative enterprises or innovatively active ones. The share of innovative enterprises in the industry according to the number of persons employed presents Table 4.

Table 4. Innovatively active and innovative enterprises in the industry in Poland according to the number of persons employed

Items	2004–2006	2006–2008	2008–2010	2010–2012	2012–2014	2013–2015
	% of analysed companies					
Total number of innovatively active enterprises ^a	–	22.0	18.1	17.7	18.6	18.9
Total number of innovative enterprises ^a	23.2	21.4	17.1	16.5	17.5	17.6
Innovative enterprises according to the number of persons employed						
10–49	13.9	14.5	9.6	9.6	10.7	10.6
50–249	37.4	33.3	30.2	29.4	31.3	31.3
250 and more	65.5	60.9	55.8	56.2	57.8	57.9

^a Employing more than 9 persons.

Source: *Działalność innowacyjna przedsiębiorstw w latach 2006–2015*. GUS, Warszawa.

As shown in Table 4, in the years 2004–2006, innovative enterprises in Poland accounted for only 23.2%, which was the highest share. In the subsequent periods of analysis, this share was even lower, and 2010–2012 it amounted to only 16.5%. In industrial enterprises, not all implemented innovative projects were successful, i.e. resulting in the introduction of a new product or process, and therefore the share of innovatively active enterprises is higher than the proportion of innovative enterprises. Fortunately, this difference is not large, as it ranges from 0.6 p.p. in 2006–2008 to 1.3 p.p. in 2013–2015. Analysing the data in Table 4, we reach a sad conclusion. During the period of Poland’s full membership in the EU structures, the lack of a clear increase in the number of companies that meet the criteria of an innovative company is evident, as more than 80% of enterprises were not innovatively active enterprises. Thus, in terms of innovativeness measured by the share of innovatively active and innovative enterprises no significant progress was made. These indicators were higher in the run-up to integration, which probably was closely associated with the processes of adjustment to the EU standards implemented by companies in Poland.

To better illustrate innovation activities of enterprises, it is worth comparing the results achieved by industrial enterprises in Poland with the results achieved by enterprises in other countries. In the assessment of Poland's position in the international arena, data on innovativeness published by Eurostat can be used. The share of innovatively active industrial enterprises in Poland in the years 2010–2012 was 17.7%, while among the countries of Europe in which the study was conducted the highest share of innovatively active industrial enterprises was recorded in Germany (61.5%) and the lowest in Romania (7.5%) [*Działalność innowacyjna przedsiębiorstw w latach 2009–2011*, p. 25]. Previously, the situation also looked similarly. In the years 2008–2010, the number of innovatively active enterprises in Poland amounted to 18.1%. The number of such enterprises at the time was the highest in Germany – 69.8%, and the lowest in Romania – 16.2%.

The level of innovativeness of enterprises in the industry in Poland was lower than in most EU countries.

The data contained in Table 4 clearly indicate that innovation activity is associated with the size of the enterprise, measured in terms of the number of employees. Process and product innovations were most often introduced by entities employing 250 and more persons.

In the years 2013–2015, the share of small innovative enterprises (10–49 employees) was more than 5 times smaller than the share of large companies and nearly 3 times smaller in comparison with the share of medium-sized ones.

In accordance with the international methodology used by the CSO, the share of the revenue from the sale of new or significantly improved products launched onto the market in the last three years in the total sales revenue is treated as an indicator of the assessment of the effects of innovation activity of an enterprise. This points to changes with regard to modernisation of the range of products and their competitiveness [*Działalność innowacyjna przedsiębiorstw w latach 2013–2015*, p. 71]. The evolution of this indicator in Poland in the years 2008–2015 is presented in Figure 3. In this case, due to the lack of comparable data, the period of 2005–2007 is not included.

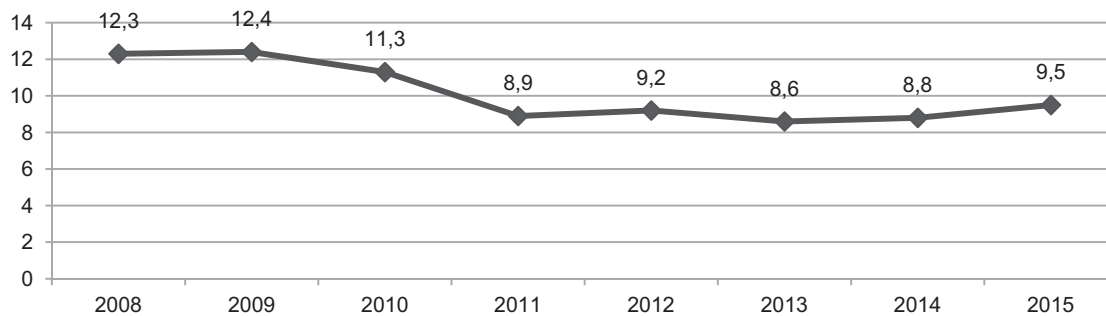


Fig. 2. The share of net revenue from the sale of new or significantly improved products launched onto the market in the last three years

Source: *Działalność innowacyjna przedsiębiorstw w latach 2008–2015*. GUS, Warszawa.

During the analysed period, the net revenues of industrial enterprises in Poland from the sale of new or significantly improved products accounted for, at most, 12.3% of total sales revenue. The maximum level of this indicator was recorded in the year 2008, that is, at the beginning of the period of analysis. Unfortunately, in the next three years a decline was recorded, and then in the years 2011–2015 stabilisation at a level not exceeding 10% was observed.

In the context of the analysed effectiveness of innovation activity in the industry, the presented data do not provide grounds for optimism.

CONCLUSIONS

The paper is an attempt to assess innovation activities of industrial enterprises in Poland in the years 2005–2015. The answers to the following questions have been sought: did the level of innovation activities conducted by industrial enterprises rise in the period of Poland's full membership in the EU structures, what are the effects of these activities, and can the upward trend be seen? The evolution of selected indicators considered in public statistics, in accordance with the standard Oslo methodology, as important indices of innovation activities of enterprises in the industrial sector was analysed.

During the analysed period, expenditure on innovation activities (fixed prices) in industrial enterprises grew on average by 6.5% on an annual basis. Entrepreneurs see therefore innovation as a factor conducive to business growth and increased competitiveness. However, interest of enterprises in innovation activities was limited, as only 38.2% of companies employing more than 49 people conducted such activities incurring certain related expenditure.

In the structure of expenditure on innovation activities, the dominance of expenditure on the purchase of material technologies in the form of innovative machines and equipment needed for manufacturing new products and implementing new processes is visible. Entrepreneurs were reluctant to use the intangible technology in the form of purchase of ready knowledge from external sources, but their interest in the creation of knowledge in the context of R&D grew. Since 2010 the share of expenditure on research and development activities clearly increased.

Enterprises' own funds, which in the years 2005–2015 constituted on average up to 73.5% of the total expenditure on innovation activities, were the main source of innovation financing. The share of loans in the financing of expenditure on innovation activities was diverse and ranged from 5.9 to 25%. This means that entrepreneurs rarely used modern forms of financing innovation. Small positive changes in this area are evidenced by a decreasing share of enterprises' own resources and bank loans in the financing of innovation activities. However, the lack of appropriate statistical data does not allow to specify the share of which financial resources is increasing, apart from non-refundable funds obtained from abroad.

It is difficult to positively assess the effects of innovation activity conducted by industrial enterprises in Poland. Both the share of innovatively active enterprises and innovative enterprises was higher immediately after Poland's accession to the EU than in the following years. The level of innovativeness of enterprises in Poland was lower than in most EU countries. More than 80% of enterprises employing more than 9 persons are not innovatively active enterprises, while in the countries that are innovation leaders the share of such companies amounts to approx. 30%. No upward trend is also noticeable in terms of the share of net revenue from the sale of innovative products in the total sales revenue.

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DZIAŁALNOŚĆ INNOWACYJNA PRZEDSIĘBIORSTW PRZEMYSŁOWYCH W POLSCE W ŚWIETLE BADAŃ STATYSTYKI PUBLICZNEJ

STRESZCZENIE

Intensywne promowanie działalności innowacyjnej, zwłaszcza w przedsiębiorstwach, wymusiło powstanie międzynarodowych systemów jej monitorowania. W Polsce, w ramach statystyki publicznej, badaniami statystycznymi innowacji zajmuje się obecnie GUS i US w Szczecinie. W artykule podjęto próbę oceny działalności innowacyjnej przedsiębiorstw przemysłowych w Polsce w latach 2005–2015. Starano się odpowiedzieć na pytania: czy w okresie pełnego członkostwa Polski w strukturach UE aktywność innowacyjna przedsiębiorstw przemysłowych wzrosła, jakie są efekty tej działalności, czy są widoczne tendencje wzrostowe. Do realizacji powyższego celu wykorzystano publikowane przez GUS wyniki badania działalności innowacyjnej przedsiębiorstw przemysłowych w Polsce, które są realizowane zgodnie z metodologią Oslo w ramach wspólnotowego badania innowacji (CIS – ang. *Community Innovation Survey*). Poziom innowacyjności przedsiębiorstw w Polsce jest niższy niż w większości krajów UE. Poprawa wyników działalności innowacyjnej wymaga z jednej strony większego zaangażowania przedsiębiorstw, z drugiej zaś – wsparcia sektora publicznego, odgrywającego kluczową rolę w tworzeniu odpowiednich zasobów wiedzy i umiejętności.

Słowa kluczowe: działalność innowacyjna przedsiębiorstw, metodologia Oslo, wspólnotowe badania innowacji (CIS), nakłady i efekty działalności innowacyjnej