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THE IMPACT OF EUROPEAN INTEGRATION ON INNOVATIVENESS OF THE POLISH ECONOMY

Introduction

In the contemporary world, innovations are widely considered to be a driving force for economic growth, regional development, as well as the necessary condition for enterprises to survive in a highly competitive environment. There is no wonder that the issue of innovation has also become one of the key priorities of the European Union, occupying an important place in almost all EU programming documents [1, p. 192–216].

Polish accession to the European Union was associated with a long and difficult process of adjustment, which covered a number of legal, political and socio-economic changes. It also opened an opportunity to raise the level of innovativeness of the Polish economy and reduce the gap separating Poland from the highly developed countries.

After 10 years of Polish presence in the European structures, the overall balance of benefits and costs of integration should be evaluated positively. Thanks to the extensive modernization efforts and significant funds from the EU budget, Poland has recorded a tremendous civilization progress. It is also estimated that since May 2004, Poland has become one of the biggest beneficiaries of the EU budget, with the balance of around 80 billion EUR gained [2, p. 120–122].

However, it is worth to consider whether all the opportunities resulting from the EU accession have been fully exploited. A number of questions arises also with respect to changes in innovativeness of the Polish economy. Many scholars, policy makers, as well as business practitioners claim that the progress which has been made in this area during the post-accession period is insufficient.

The aim of this paper is to present and to evaluate changes in the innovativeness of the Polish economy during the post-accession period. The considerations contained in the article were illustrated by relevant statistical data from the Central Statistical Office of Poland, Eurostat, as well as the European Patent Office. Additionally, the main directions of innovation policy in Poland were also analyzed.

1. Innovations in Poland: selected indicators and their changes

There is no doubt that the innovativeness of the Polish economy not only deviates significantly from the leading European countries, but also lags behind most of the new EU member states. The 2015 Innovation Union Scoreboard report gave Poland a very poor ranking, ahead only of the least

innovative countries, i.e. Lithuania, Latvia, Bulgaria and Romania [3, p. 5]. The only positive change is the fact that in the recent years Poland has moved from the group of countries classified as «modest innovators» to the group of «moderate innovators».

The main reason for this situation is undoubtedly very low level of expenditure on R&D activities in Poland. Although a significant improvement of this indicator was recorded in the period 2004-2014 (table 1), however, the overall level of R&D intensity of the Polish economy is still very distant from EU average (2.03% of GDP). As a result, Poland is placed among 10 EU member states with the lowest level of expenditure on R&D activities (less than 1% of GDP) [4, p. 57].

Table 1

Gross domestic expenditures on R&D activity in Poland in 2004-2014

Specification	Gross domestic expenditures on R&D activity					
	2004	2006	2008	2010	2012	2014
Total (mln PLN)	5155	5893	7706	10416	14353	16168
Per capita (PLN)	135	155	202	270	372	420
Ratio to GDP (%)	0.56	0.56	0.60	0.72	0.88	0.94

Source: [4, p. 55; 7, p. 32; 8, p. 32].

A serious weakness is also the unfavourable structure of the sources of expenditure on R&D activities: nearly 60% of the total funds came from the state budget, whereas only one quarter – from the business sector (table 2). The experiences of highly developed countries demonstrate that this relationship should be shaped quite the opposite, and the dominant source of funding for R&D activities should be business entities.

Table 2

Source of expenditure on R&D activity in Poland in 2004-2014

Specification	Percentage of total expenditure on R&D activity					
	2004	2006	2008	2010	2012	2014
Government	61.7	57.5	56.1	60.9	51.4	45.2
Business sektor	22.6	25.1	26.6	24.4	32.3	39.0
From abroad	5.2	7.0	5.4	11.8	13.3	13.4
Others	10.5	10.4	11.9	2.9	3.0	2.4

Source: [4, p. 66; 5, p. 64; 6, p. 56; 7, p. 49; 8, p. 48].

The consequence of the high proportion of budget expenditure on R & D is also a high share of expenditure on basic research. Due to their nature, basic research may contribute to increasing the general knowledge resources, however, their applicability to business practice is very low [9, p. 87]. This

disadvantageous situation can be also observed in Poland (table 3).

Table 3

The structure of current expenditures on R&D activity by type of activities in 2004-2014

Specification	Percentage of total expenditure on R&D activity					
	2004	2006	2008	2010	2012	2014
Basic research	39.5	36.5	38.2	39.7	36.7	32.3
Applied research	25.2	24.6	22.4	20.5	21.0	20.7
Experimental development	35.3	38.8	39.4	39.8	42.3	47.0

Source: [4, p. 60; 8, p. 33].

Since 2010, it can be observed inversion of this negative trend. Unfortunately, there are also serious doubts whether this tendency will be continued in the following years. The obstacle to this may be unfavorable structure of the Polish economy, dominated by small and medium-sized enterprises, which have neither sufficient resources nor the motivation to take the risk of investing in R&D. These concerns are confirmed by the ranking of 1000 top R&D investors in EU, which takes into account only two Polish firms: Asseco Poland (software company – 627th position) and Netia (telecom operator – 876th position) [10].

Another problem may also be marginal importance of high technology industries, whose share of the sold production of industry constantly fluctuates around 5% (table 4). Despite the long-term structural reforms (changes) in Poland, the industry is still dominated by traditional business sectors (low and medium-low technology), usually representing a very low level of innovativeness.

Table 4

Structure of sold production in manufacturing section by level of technology – the sectoral approach in 2004-2014 (%)

Specification	2004	2006	2008	2010	2012	2014
High-tech	4.5	4.9	5.2	6.9	5.3	5.3
Medium high-tech	25.6	26.7	25.9	27.7	27.0	27.3
Medium low-tech	31.3	32.5	33.8	33.5	35.5	34.8
Low-tech	38.6	35.9	35.1	32.0	32.2	32.5

Source: [4, p. 117; 5, p. 127; 6, p. 113; 7, p. 266].

A very positive symptom is, however, a noticeable improvement of patent statistics (cf. table 5), which are widely considered to be an important source information about the inventive activity. Particularly impressive progress has

been made in respect to Polish patent applications to the European Patent Office. Their number increased from 93 in 2004, up to 475 in 2014. The number of patent applications per 1 million inhabitants in Poland has reached the level (12.4) similar to the results of such countries as Czech Republic (15.7), Hungary (11.1) and Portugal (10.4), but still very distant from the leading EU countries [11].

Table 5

Patent applications to the Patent Office of the Republic of Poland and patents granted in 2004-2014 (domestic entities)

Specification	2004	2006	2008	2010	2012	2014
Patent applications	2381	2157	2488	3202	4410	3941
Patents granted	778	1122	1451	1385	1848	2490

Source: [4, p. 139–141].

Analyzing the indicators describing the innovativeness at the macro level it should also be remembered the role played by the companies in this process. Innovations can be implemented into business practice only through enterprises. Therefore, a prerequisite for the high innovativeness of national economy is the existence of a substantial group of firms, willing to built their competitive advantage through innovation.

A number of studies showed, however, that the share of innovative companies in Poland remained very low, especially among SMEs (table 6). Sadly to say, these results are very distant from the leading EU countries. For comparison, the highest percentage of innovation active enterprises was recorded in Germany: 61.5% in industrial sector and 48.3% in service sector, respectively [12, p. 35]. Moreover, the majority of innovation active enterprises in Poland implement products and processes, which are characterized by relatively low level of originality (new-to-firm innovations only).

Table 6

Innovation active enterprises in Poland in 2012-2014 (%)

Specification	Total	By number of employees		
		10-49	50-249	250 or more
Industrial sector	18.6	11.4	33.4	59.8
Service sector	12.3	9.6	21.9	46.1

Source: [12, p. 31].

Another major problem is also the lack of sufficient inter-organizational cooperation in the field of innovation. Cooperation with external entities

enables to acquire scarce resources, promotes the sharing of knowledge and reduces cost and risk of innovation. Meanwhile, taking into account exclusively innovation-active companies from the industrial sector, only 30.1% of the firms were involved in any form of innovation-related cooperation during the period 2012-2014 [12, p. 97–98]. Most commonly such relationships were maintained with suppliers of equipment, materials or components (24.3% firms), other enterprises in the same enterprise group (21.0%), higher education institutions (16.8%), research institutes (14.3%), clients (9.8%), consultants (5.4%), as well as competitors or other enterprises in the same sector (5.1%) [12, p. 104]. It seems that relatively weak linkages between enterprises and research institutions constitute a serious obstacle to the effective transfer of scientific achievements to the business practice.

2. Innovation policy in Poland: main trends and support instruments

The greatest weakness of the innovation policy during the transition period in Poland was undoubtedly inconsistency and shortsightedness of the actions taken, resulting from economic and political situation of the country. Another negative phenomenon was also a multitude of different strategic documents, which, however, were only to a small extent implemented into practice [13, p. 207].

Accession to the EU has forced to establish the strategic priorities of the national development and to design of appropriate innovation policy frameworks. For instance, Regional Innovation Strategies have been developed and implemented at the local level. The next step will be to identify new priorities for regional development in form of smart specializations, taking into account the specificity of particular regions [14, p. 48–51].

Deep transformations have also been made in the public R&D sector to make it more responsive to the needs of the contemporary economy. Fundamental changes can be observed among specialized industry research institutes overseen by the Ministry of Economy (or other ministries). A great number of them have been restructured and consolidated. As a result, a total number of institutes has been reduced from approximately 200 in 2004 to a mere 100.

In October 2010 a reform of the science and higher education sector has been launched, aiming primarily to improve the quality and practical applicability of the scientific research. The tightening of linkages between science and business has also been recognized as a priority challenge in Poland's current National Development Strategy 2020 [15, p. 2].

Innovation policy in Poland is, however, dominated by two main trends. The first one involves the support of innovative enterprises in the form of grants from EU funds, while the second one – the development of business environment institutions (eg. technology parks, business incubators, technology transfer centers, etc.) and promotion of cooperation in the framework of networks and clusters.

In 2007-2013 enterprises implementing innovative projects could obtain grants within the following frameworks: Operational Programme Innovative Economy (OP IE), Operational Programme Development of Eastern Poland (OP DEP) and Regional Operational Programmes (ROP). The most important of them was undoubtedly the OP Innovative Economy, which provided aid to projects covering innovations at the national or international level. The innovation projects at the regional or local level could receive support within one of the sixteen Regional Operational Programmes. In turn, the OP Development of Eastern Poland was focused on project contributing to the economic growth in accordance with the principle of sustainable development [16, p. 66–68].

However, many authors highlighted the low efficiency of existing support innovation programs. Financing of innovative projects with the EU funds could also lead to many adverse effects, such as addiction from external support or substitution of private investment in R&D by aid funds. Moreover, existing evidence suggests that the aid from the structural funds only marginally improved the innovation capacity of SMEs in Poland and did not affect their cooperation with research units [17, p. 189–198].

It is assumed that in 2014-2020 EU Programming Period a number of changes will be introduced. For example, non-repayable grants will be mainly awarded for projects with high risk of failure. Other innovative projects to a greater extent will be supported through preferential credits and loans [18, p. 37–46].

As mentioned earlier, an important component of innovation policy in Poland are numerous business environment institutions (BEIs). It should be emphasized that their activities are also predominantly financed from the EU funds. In 2014, a total number of 681 BEIs was identified in Poland. Most of them were: training centres and non-banking financial institutions (eg. regional loan and credit guarantee funds). Institutions directly linked with innovation support were represented by: 47 innovation centers, 42 science and technology parks, 42 technology transfer centers and 24 technology incubators [19, p. 10–11].

Those institutions constitute a very heterogeneous group. Besides dynamically operating units there are also quite numerous examples of centers created in peripheral regions and thereby lacking adequate research base. Their activities have usually very little in common with stimulating cooperation between science and business or supporting innovation. It is rather a sign yielding to certain trends and uncritical transposing of solutions applied in highly developed countries, without adapting them to conditions in Poland [20, p. 120].

A number of doubts also raises the practice of unjustified multiplying, especially in larger cities, institutions of a similar profile. It is more rational, perhaps, to organize one but stronger entity, providing services to the whole community.

Conclusions

Integration with the European Union has only marginally improved the innovativeness of the Polish economy. In fact, changes in the post-accession period were very selective and related to a relatively small group of companies, which are able to meet the fierce competition on the single European market. Sadly to say, the overwhelming majority of the Polish companies are not interested in the implementation of any form of innovation. These are predominantly firms from traditional industry sector (low-technology and medium-low technology according to the OECD classification). Perhaps, the only way to improve that unfavourable situation are further structural reforms aimed at increasing the number of high-tech enterprises in Poland. It should be one of the main priorities of innovation policy in the coming years.

Although the main trends in the Polish innovation policy should be underpinned by the priorities of the Community, however, it is an urgent necessity to find such instruments, which will be adapted to the needs and expectations of the business environment, as well as will take into account the specificity of the Polish economy.

Another major challenge will be also to strengthen the ties between elements of the National Innovation System in Poland. The realization of this ambitious goal requires, however, taking long-term measures aimed at raising the general level of social capital, which is in Poland – as in many other post-communist countries – still very low.

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Summary. *The aim of this paper is to present and to evaluate changes in the innovativeness of the Polish economy during the post-accession period. The considerations contained in the article were illustrated by relevant statistical data from the Central Statistical Office of Poland, Eurostat, as well as the European Patent Office. Additionally, the main directions of innovation policy in Poland were also analyzed.*

Key words: *European Union, innovation, post-accession period*