

INNOVATIVENESS OF ENTERPRISES IN POLAND

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Abstract

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At a time of huge economic challenges, innovativeness is perceived as a way of overcoming difficulties, fostering and assuring socio-economic growth of particular countries. It is necessary to improve competitive standing of enterprises both in domestic and international economies.

Launching of new or improved products, application of state of the art technologies and of new organisational and management solutions are key to enhanced effectiveness and better competitiveness of enterprises. Innovation standards of Polish enterprises are considerably lower than those of businesses operating in countries of the old European Union, therefore so much attention is paid to these issues.

This paper undertakes to analyse innovative activities of enterprises in the Polish economy.

Based on the report 'Innovation Union Scoreboard', a comparative analysis of Poland's innovation standards in relation to other member states of the European Union is conducted, levels and structure of financial spending on innovative activities incurred by Polish industrial enterprises are discussed using statistics published by the National Office for Statistics and Ministry of Economy.

innovations, enterprises, competitiveness, socio-economic growth

Capacity for and availability of innovation, ability to introduce innovative technologies and production models are fundamental conditions of attaining and then preserving competitiveness in the global market.

Innovation activities should be seen as a process leading to adoption and propagation of new technologies intended to develop a new process, product and service. Implementation is the final stage of innovation and its propagation means delivery of products and services to consumers (Frejtag-Mika, 2006). In other words, innovative activities involve continuing progress on product quality and design, changes of organisation and management, marketing creativity and modifications of the production process which reduce costs and boost productivity while providing for sustainable development of the environment.

There is no single universally acceptable definition of innovation in specialist literature. J. Schumpeter's definition is treated as the classic approach, according to which innovations concern non-continuous new combinations of the five following developments: introduction of new or

improvement of existing products, introduction of new or improvement of existing production methods, application of a new way of selling or purchasing, finding and development of new markets, use of new raw materials or intermediate products, new organisation of manufacturing (Schumpeter, 1960). Schumpeter understands innovation as inventions converted into the material reality. He perceives innovation as a very broad phenomenon without restricting the terminology to purely technical solutions. He suggested inclusion of economic undertakings and organisational changes in the field of interpersonal relations in its scope (Golińska, 2007). J. Schumpeter's take on innovation is the starting point for discussions concerning importance of innovation in economy. He argues that economic development is a process of innovation-driven positive changes spread over some time (Fagerberg, 2005).

This paper aims to analyse innovative activities of enterprises in the Polish economy.

In reference to an enterprise, innovation should be regarded as creation or modification of processes, products, methods and techniques that a given

enterprise perceives as novel, as well as actions improving efficiency of available resources (Penc, 1999). Innovativeness is the ability of an enterprise to create and implement innovation and its actual skill at launching new, modernised products, new organisation and management solutions, improvement and development of infrastructure, particularly as it relates to collection, processing and provision of information (Wolak-Tuzimek, 2010). It should be noted, however, that innovation remains an elusive concept, connected to such notions as: creativity, novelty or change. Innovations are essential to building of continuing competitive advantage. They determine competitiveness of an enterprise, principally its ability to survive in the market (Grzybowska, 2007). An innovative enterprise is one that has implemented some innovations in a given period.

METHODS AND RESOURCES

A comparative analysis of innovativeness of Poland and other European Union member states is presented in this article. Based on the report Innovation Union Scoreboard, as well as statistics published by the National Office for Statistics and Ministry of Economy, a statistical analysis is conducted of levels and structure of financial spending by Polish industrial enterprises on innovative activities.

The Innovation Union Scoreboard 2011 ranks Poland 22nd among the 27 European Union states (one place lower than a year before). Differences of the Summary Innovation Index (SII) between Poland and the European Union show clearly to the former's disadvantage (Tab. I).

Although Poland has consistently climbed the ranking faster than all the other EU states, it continues to languish in the bottom. Latest figures place Poland at below average of the EU standard of

I: SII value for Poland compared with the EU-27 in 2007–2011

	2007	2008	2009	2010	2011
Poland	0.284	0.293	0.292	0.304	0.296
UE27	0.517	0.526	0.526	0.533	0.539

Source: The author's compilation based on the *Innovation Union Scoreboard 2011*

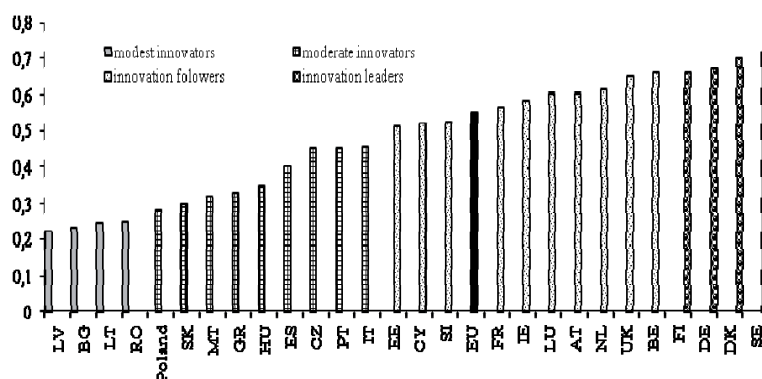
innovation, referred to as 'moderate innovators'. The latter comprise: Estonia, Czech Republic, Slovakia, Greece, Hungary, Italy, Malta, Spain and Portugal. Poland has only outranked Bulgaria, Lithuania, Romania and Latvia (Fig. 1).

Poland's low rank is a function of SII components, namely: human capital, financing and support, investment spending by businesses, cooperation and entrepreneurship, creation of intellectual property, numbers of innovators, economic effects, quality, attractiveness of research (Fig. 2).

GUS analyses indicate that innovative activities of Polish enterprises in 2008–2010 had slightly declined since the two preceding years. In 2008–2010, actively innovative industrial enterprises¹ accounted for 18.1% of all such entities, with most actively innovative enterprises among the largest organisations (Fig. 3). 13.8% industrial enterprises spent on innovation in 2010. In respect of ownership structure, most innovative enterprises operated in the public sector.

With regard to territorial divisions, actively innovative industrial enterprises operated in the following regions: Carpathian, Silesian and Opole (21.8%, 21.1% and 20.3%, respectively). The index was lowest in Lodz region (14.2%).

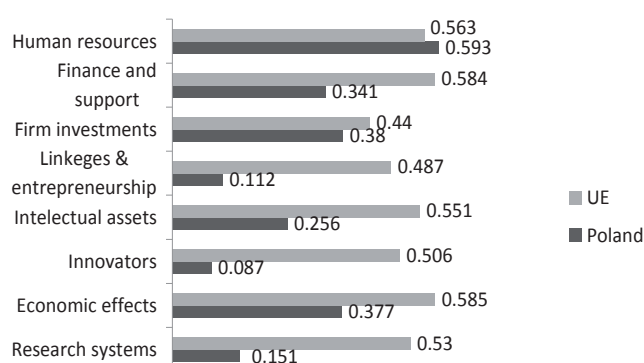
Innovation spending is a key indicator serving to assess innovativeness. Funds expended by enterprises are classified according to types of innovative activities and sources of financing. Innovation spending by industrial enterprises



1: Summary Innovation Index values for selected countries

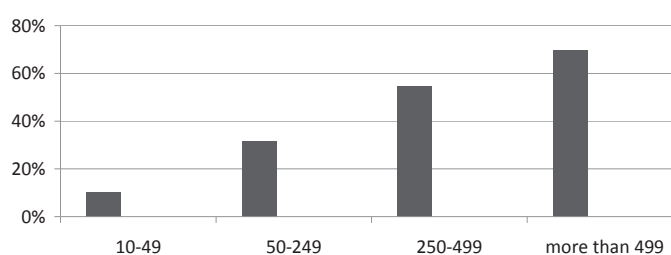
Source: *Innovation Union Scoreboard 2011*, European Union, 2012 p. 7

1 An actively innovative enterprise is one that has, in a period under discussion, carried out a minimum of one product or process innovation or has pursued at least one innovative project which has been interrupted or discontinued (not completed successfully) at the time or has not been completed by the end of the same period).



2: Productivity index (SII) for Poland and the EU as divided into its determining components

Source: Innovation Union Scoreboard 2011



3: Actively innovative manufacturing enterprises in 2008–2010 as a % of all enterprises according to their headcount

Source: The author's compilation on the basis of: *Działalność innowacyjna przedsiębiorstw w latach 2008–2010*, GUS, Warsaw 2012, p. 19

II: Spending on innovative activities by industrial enterprises according to sources of financing (at current prices)

including:							
Year	Total	Owner	Received from state budget	Received from abroad	Bank crediting	Venture capital funds	Other
PLN m							
2008	23686.1	17029.7	284.2	376.8	4889.3	37.6	1068.5
2009	21405.5	14929.3	172.8	568.7	5433.1	0.2	301.4
2010	22379.0	17302.1	233.4	1621.7	1636.5	0.3	1585.0
%							
2008	100	71.9	1.2	1.6	20.6	0.2	4.5
2009	100	69.7	0.8	2.6	25.4	0.1	1.4
2010	100	77.3	1.0	7.2	7.3	0.1	7.1

Source: The author's compilation based on *Nauka i Technika w 2010 r.*, GUS, Warsaw 2012, p.123

ranged from PLN 21.4 bn to PLN 23.7 bn. 2008 saw the highest innovation spending – PLN 23,686.1m. The expenditure fell somewhat in the subsequent years as a result of the aggravating financial crisis and associated problems with obtaining external capital. The spending grew by 4.5% in 2010 over the previous year and reached PLN 22.379m (Tab. II).

Spending on innovation can also be discussed in the perspective of sources of financing for such expenses. The following means of financing for innovation activities can be distinguished: owner, received from state budget, foreign (non-refundable), from venture capital funds and bank crediting. Owner funds were the principal

source of financing for innovation in 2010. They constituted more than three quarters of all spending by industrial enterprises (PLN 17302.1m or 77.3%). Venture capital (PLN 0.3m, i.e. 0.1%) and funds from the state budget – PLN 233.4m, that is, 1% (Tab. III), were the rarest source of financing of innovation expenditure by industrial enterprises

In 2008–2010, industrial enterprises spent the most on purchases of plant and machinery. This spending accounted for more than 80% of all resources assigned to innovation activities and was clearly (approximately 10 percentage points) lower in 2010 than a year before. Spending on research and development, which should be a substantial

III: *Spending on innovative activities by industrial enterprises according to types of innovative activities (at current prices)*

Year	Total	including:					
		R&D activities	Purchase of external knowledge	Purchase of software	Investments into fixed assets	Personnel training related to innovations	Marketing relative to new and substantially improved products
PLN m							
2008	23686.1	1 930.0	261.5	354.2	20 065.7	201.7	580.1
2009	21405.5	2 173.1	267.8	356.6	17 971.7	44.6	345.9
2010	22379.0	3 272.8	910.6	451.8	16 736.7	88.3	440.3
%*							
2008	100	8.1	1.1	1.5	84.7	0.9	2.4
2009	100	10.2	1.3	1.7	84.0	0.2	1.6
2010	100	14.6	4.1	2.0	74.8	0.4	2.0

*the values do not add up to 100% – the remaining expenses in 2008–2010 account for 1% – 2.1%

Source: The author's compilation based on *Nauka i Technika w 2010 r.*, GUS, Warsaw 2012, p.122

item, constituted a negligible share in innovation spending of enterprises, that is, approximately 10% in the entire period under examination. It should be pointed out, though, that these expenses tended to rise and reached PLN 3272.8m, that is, 14.6% in 2010. The low percentage of spending on personnel training directly associated with introduction of product or process innovation, below 1% of the overall enterprise spending, as well as low expenditure on marketing of innovative products, are noteworthy.

Most spending on innovation was incurred by private enterprises. Industrial enterprises of this sector spent PLN 17499.9m, or 74% of the overall spending. In terms of staffing levels, large organisations with more than 499 employees carried out the most substantial spending, both among industrial and service enterprises. Expenses by these firms accounted for 65% of all spending on innovation by industrial enterprises (Tab. IV).

IV: *Spending on innovation by industrial enterprises according to ownership sectors and numbers of staff in 2010*

Specification	PLN m	in %
Total:	23 757.8	100
– public sector	6 257.8	26.3
– private sector	17 499.9	73.7
10–49 staff	1 378.7	5.8
50–249 staff	4 515.0	19.0
250–499 staff	2 418.6	10.2
More than 499 staff	15 445.4	65.0

Source: The author's compilation based on *Działalność innowacyjna przedsiębiorstw w latach 2008–2010*, GUS, Warsaw 2012, p. 56

Manufacturing enterprises operating in the following sectors: production of basic pharmaceutical agents, drugs and other pharmaceutical products, with more than a half of the enterprises (53.1%) launching innovative products/ processes, followed by tobacco

manufacturers (46.2%), proved the most innovative. Clothing manufacturers were the least innovative (4.6%).

Analysis of innovation spending by regions helps to observe a fundamental dependence: the more industrialised and economically active a region, the more innovative the enterprises there. Maximum innovation spending in 2010 was executed by enterprises operating in Mazovian and Silesian regions (26% and 17%, respectively), compared to minimum expenditure by enterprises in Podlaskie voivodship.

In line with the Oslo methodology, technological and non-technological innovations could be distinguished in an organisation [Oslo Manual, 2005]. The former involve launching of a new or improved product as well as application of a new or improved process to production, where the product and process must at least be new from the viewpoint of the introducing enterprise. Non-technological innovations include primarily organisational and marketing innovations. An organisational innovation is implementation of a new organisational method to operations of an enterprise while a marketing innovation denotes implementation of a new marketing concept or strategy which is substantially different than those previously applied by a given enterprise.

Research indicates more entities opt for process rather than product innovations (12.9% vs. 12.1%). In 2008–2010, 13.5% industrial enterprises employing more than 9 staff introduced marketing innovations, compared to organisational innovations undertaken by 13.0% industrial firms, with slightly more entities introducing both types of innovations in the service than the industrial sector (15.5% and 15.2%, respectively) (*Działalność*, 2012). Like before, product or process innovations were normally introduced by large enterprises (employing more than 499) – 69.1% in the case of industrial enterprises. Organisational and marketing innovations were as a rule introduced by large manufacturing enterprises: 53.6% and 37.1%, respectively.

RESULTS AND DISCUSSION

Poland is among the least innovative European Union countries, below the Community average as indicated by the Innovation Union Scoreboard (2011). Innovative activities in Poland are relatively underdeveloped in spite of the high potential in this area. Polish strengths are identified as human resources, business investments and economic performance. Poland can in particular boast of its human capital figures. Structure of the individual factors suggests that Poland tends to exhibit characteristics of the least innovative states in the EU. Our unbalanced innovative potential chiefly relies on human resources with very weak tendency to innovation and research and development cooperation. Thus, the intellectual capital of Poland, a relative strength, is not taken full advantage of relative to the extent of the available potential. Higher ranking states do not display such degrees of imbalance: the higher the innovation, other factors grow in parallel, which affirms the conclusion of the ranking authors concerning key importance of all dimensions of innovative potential to its effective use (Pro Inno Europe 2012). With regard to dynamics of innovative activities, Poland ranks in the middle among European countries, with a number of countries in Central and Eastern Europe (Estonia, Slovenia, Czech Republic) improving their innovativeness far more rapidly.

Balancing of initiatives and bridging of gaps (other than financial) between the Polish system of support and those in the Old Europe are issues that remain to be solved. This applies in particular to gaps in R&D cooperation and implementation of new solutions. A comparison of disaggregated indices for Poland and the EU-27 average and their dynamics in the period under discussion is a better and more reliable method of using the indicators. The strongest area of innovation in Poland, namely, human capital, is above the European average. It should be added that these average indices are quantitative results of an educational boom during the last dozen years. The qualitative aspect of the improving human capital and opportunities for its effective use in the labour market and in research have been ignored in the indicators. Competitiveness of the domestic research networks is rather low. Research is slowly becoming internationalised and its quality is rising, yet it still fails to attract scientists from other countries. Poland ranks very low in respect of R&D spending, which has been growing discernibly slower than the EU average. This area seems to present the greatest obstacle to development of innovativeness by small and medium-sized enterprise sector in Poland. As far as investments by businesses are concerned, they are usually not related to research and development but are rather reproductive in nature and involve acceptance of existing solutions (far above the EU average). This is another proof that innovations are imitative in nature. According to IUS, innovative activities of

the SMEs, which have declined in the second half of the last decade and have brought fewer innovations to be introduced, are a major weakness of Poland, much less than half the Union's average at the moment. Cooperation among entities developing and implementing innovations is weaker than in other EU countries as well – both among businesses (also showing a drop) and between the private and public sector (a growth from an extremely low level). Poland is also far worse at creating intellectual property, with patents, not industrial design or trademarks, being the fundamental problem.

An analysis of figures concerning levels and structure of spending on innovation by industrial enterprises in Poland shows that it had fallen in 2010 by 5.5% relative to 2008. Industrial enterprises assigned the most funds to investments into plant and machinery, with owner resources being the principal source of financing for innovative operations (75% of all expenditure on average). Actively innovative industrial enterprises constituted 18.1% of all organisations tested. The largest enterprises formed the major group with regard to: numbers of actively innovative entities (69.6%), firms introducing technological (69.1%), as well as marketing and organisational innovations (respectively: 53.6%, 37.1%).

Poland needs closer links between public and private sectors, concentration on protection of intellectual property rights and more innovative SMEs. Its National Innovation System should undergo thorough-going modifications as well. Its core objective is to create an innovative environment, that is, efficient and appropriate pro-innovative institutions, and efficient financing for innovative activities. Immature financial institutions working for innovation are a considerable barrier to innovation. This domain requires serious reform, otherwise Poland is bound to continue sliding down the ranks of innovative states. Positive shifts for innovation could also be noted in Poland recently, including the rise of public R&D spending, growing role of venture capital investments, licences and patent revenue, as well as relatively fast growing numbers of trademarks and industrial designs.

Innovation should be perceived as changes introduced by enterprises and part of maintenance or improvement of their competitive standing. There are degrees of innovation, ranging from minor modifications to thorough changes, from novelties in an enterprise to novelties in an entire sector. Continuing rivalry in the free market generates innovations in a variety of areas, including development and acceptance of new products and processes, improvement of products and processes or changing attitudes to marketing and distribution.

As far as the future of enterprise innovations in Poland is concerned, despite the high potential of the country in this respect, innovative activities are developing at an insufficient rate that is not satisfactory to anybody. For Poland to inch up its innovation ranking, the innovation system should

move towards the European model, substantially based on public funding. This requires an efficient and open administration capable of monitoring and coordination of the sector's development, in particular. Provision of national budget funding, which requires the government to be determined and persevering, is a pre-requisite for stimulation of innovation in future. The rise of funding planned for the coming years is not sufficiently ambitious even

in comparison with such states as Estonia, the Czech Republic or Slovakia. What is more, the growth of public R&D spending has in recent years been fully driven by EU funds. If innovative activities of enterprises are to develop at a far quicker rate, a range of crucial measures need to be undertaken to activate the Polish innovative potential. Strong pro-innovative stimuli from the state are necessary – in both the institutional and financial areas.

SUMMARY

Growth of innovation has recently been a key goal of enterprises desiring to enhance their competitive standing in the markets. As a rule, innovativeness denotes introduction of new or improved products, application of state of the art technologies and new organisational and management solutions, improvement and development of infrastructure, particularly as it relates to collection, processing and provision of information. This paper discusses innovativeness of Polish enterprises in light of a comparative analysis in relation to the remaining EU states as well as a statistical analysis of levels and structure of expenditure by Polish industrial enterprises.

According to the data of the Innovation Union Scoreboard 2011, Poland was included to the group of 'moderate innovators'. It is characterized by lower than average for the EU countries Summary Innovation Index (SII) level, but higher (1.79%) than the EU average growth rate of this indicator. Poland's low rank is a function of SII components, namely: human capital, financing and support, investment spending by businesses, cooperation and entrepreneurship, creation of intellectual property, numbers of innovators, economic effects, quality and attractiveness of research.

In terms of the level and structure of expenditure incurred by industrial companies on innovation we may notice the following regularity:

1. Actively innovative industrial enterprises accounted for 18.1% of all such entities.
2. At the end of 2010, innovation spending by industrial enterprises decreased by 5.5% compare to the 2008.
3. Owner funds were the principal source of financing for innovation in 2010. They constituted more than 77% of all spending by industrial enterprises.
4. In 2008–2010, industrial enterprises spent the most on purchases of plant and machinery. This spending accounted for more than 80% of all resources assigned to innovation activities and was (approximately 10 percentage points) lower in 2010 than a year before.
5. Most spending on innovation was incurred by private enterprises. Large organisations with more than 499 employees carried out the most substantial spending (65%).
6. Product or process innovations as well as organisational and marketing innovations were as a rule introduced by large manufacturing enterprises.

Innovativeness of enterprises is largely depended on the level and structure of the capital, which is available to the entrepreneur. Effectiveness of entrepreneurs in this respect is greatly dependent on their competence, management skills, and adopted strategies. For Poland to inch up its innovation ranking, the innovation system should move towards the European model, substantially based on public funding. This requires an efficient and open administration capable of monitoring and coordination of the sector's development, in particular. Provision of national budget funding, which requires the government to be determined and persevering, is a pre-requisite for stimulation of innovation in future.

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