

Brygida Klemens

Opole University of Technology
e-mail: b.klemens@po.opole.pl

Niki Derlukiewicz, Anna Mempel-Śnieżyk

Wrocław University of Economics
e-mails: niki.derlukiewicz@ue.wroc.pl; anna.sniezyk@ue.wroc.pl

BOOSTING INNOVATION AND ENTREPRENEURSHIP IN POLISH ECONOMY

POBUDZANIE INNOWACJI I PRZEDSIĘBIORCZOŚCI W POLSKIEJ GOSPODARCE

DOI: 10.15611/br.2017.1.05

JEL Classification: A10, O11, O30, O38, H19

Summary: The aim of the article is to examine and assess selected aspects contributing to innovativeness of economy and initiatives used by the Polish government to stimulate the development of innovation and entrepreneurship. In the economy. To achieve this goal, the authors analyzed the dynamics of changes in business environment institutions and the actions and programs conducted in Poland at national level. As a result of the research, it can be stated that the activities undertaken in Poland resulted in numerous BEIs institutions and Poland has developed friendly environment for business. The conducted research confirms the increase of employment in R&D in private sector and a constat increase in R&D financing by private sector.

Keywords: innovation, entrepreneurship, region, business environment institutions.

Streszczenie: Celem artykułu jest zbadanie i ocena wybranych aspektów warunkujących innowacyjność gospodarki oraz zachęt stosowanych w Polsce w celu pobudzenia rozwoju innowacji i przedsiębiorczości. Aby osiągnąć cel autorzy przeanalizowali dynamikę zmian instytucji otoczenia biznesu oraz działania i programy realizowane w Polsce, które skierowane są na zwiększenie innowacyjności i przedsiębiorczości. W wyniku przeprowadzonych badań można stwierdzić, że ww. działania podejmowane przyniosły rozwój licznych i zróżnicowanych pod względem oferty instytucji wspierania biznesu, a w efekcie Polska stworzyła przyjazne środowisko dla biznesu. Przeprowadzona analiza potwierdza wzrost nakładów na badania i rozwój w sektorze prywatnym i stale zwiększające się zatrudnienie w B+R w sektorze prywatnym.

Słowa kluczowe: innowacja, przedsiębiorczość, region, instytucje otoczenia biznesu.

1. Introduction

Increasing globalization of the economy and the creation of a knowledge-based economy make it essential for enterprises, organizations, cities, regions and countries to adjust quickly to the new circumstances and become more and more innovative. Innovation and entrepreneurship are considered as significant factors of economic growth and development in the present economy. According to P. Drucker the key response for turbulent and full of changes economy is an innovation [Drucker 2015, p. 16]. Economic crisis in the first decade of the 21st century increased the significance of managing innovation, which became a method for businesses to adapt to new market conditions [Dervitsiotis 2010, p. 903; Kucińska-Landwójtowicz, Adamska 2015, pp. 109-110].

The policy of innovation in Poland is undergoing major changes visible from a strictly economic perspective as well as in system analysis. This policy due to its complex nature includes a large number of actors and uses many instruments. The public authorities by implementing appropriate policies and using specific tools are capable to build favorable conditions for the development of innovations and entrepreneurship which can be supported by innovative environment of businesses. Today, innovation is no longer perceived as a specific result of individual actions, but more as a process, more specifically, a problem-solving process [Dosi 1982, p.148; Lundvall 1992; Malerba 2005]. It is also observed as differentiated learning process (learning may arise from different issues: learning-by-using, learning-by-doing or learning-by-sharing) [Rosenberg 1982, p. 35]. Moreover, this is an interactive process of learning and exchange where interdependence between actors generates an innovative system. In order to support this process, in particular economies, the systems of innovations are developed by public authorities.

The purpose of the article is to examine and assess the chosen aspects of innovative environment and encouragements used by Polish government in order to boost the development of innovation and entrepreneurship. To achieve the aim the authors conducted research based on Central Statistical Office data, analyzed literature of the subject and reports. The authors also present activities and programs undertaken in Poland on national level which enhance innovation and entrepreneurship.

2. Favourable environment for innovation and entrepreneurship in Poland

The creation of appropriate innovation environment is a long process and requires the involvement and cooperation of actors representing three sectors (public authorities, enterprises, business environment institution) [Etzkowitz, Leydesdorff 2001]. An essential action focused on creating innovation environment is a well-functioning system.

In order to support innovativeness and entrepreneurship in the economy the supporting systems are created. Generally, a system depends on [Matusiak (ed.) 2011, p. 288]:

- strategy of socio-economic and spatial development and resulting priorities, aims, tasks and ways of achieving them at national, regional and local level;
- regulatory instruments resulting from legal and administrative regulations and macroeconomic policy;
- supporting programs created as instruments and resulting from EU, national, regional and local policy;
- supporting institutions realizing programs at national, regional and local level.

According to A. Nowakowska the basic innovation systems are national innovation systems, regional innovation systems, sectoral innovation systems, technological systems and innovation clusters [Matusiak (ed.) 2011, p. 288].

Table 1. Elements of programs supporting innovative entrepreneurship

Activities	Examples
Actions initiating change of social attitudes and development of entrepreneurship culture in the scientific community.	Conferences, seminars, changes in the internal procedures of institutions that encourage creating academic spin-off companies, programs bridging business and science.
Increasing accessibility and improving the quality of material infrastructure in the environment of scientific institutions.	Creating incubators and accelerators of entrepreneurship, technological parks, or service centers of laboratories.
Increasing the availability of financial resources for a new company.	Seed capital or start-up money on terms more affordable than general financing in the market, platforms bridging investors and inventors.
Advisory, caring and offering specific knowledge necessary to prepare and launch the project	Tools, methods of project management, system of project monitoring, risks analysis.

Source: own elaboration based on [Matusiak (ed.) 2011, p. 288].

According to K. B. Matusiak it is worth mentioning that building well-functioning support programs is not an easy task influenced by many different barriers, e.g. weak political power to break through and lack of continuity of undertaken programs. The entrepreneurship and innovation activities require a much longer time horizon than the four-year electoral calendar. The role of stabilizing the support system should be independently monitored at the national and regional level [Matusiak (ed.) 2011, p. 287].

One element of mentioned three sectors are business environment institutions (BEIs) which are understood in the paper in a broad sense (as whole institutions which support entrepreneurship and innovativeness e.g. incubators as well as advisory centers). BEIs are perceived as really useful when starting a new business activity. They allow entrepreneurs to expand their knowledge on development opportunities based on innovation. The role of BEIs is to provide specific services, to shape the economic and social environment that is favorable to entrepreneurs and helps start innovative business activity [Matusiak 2010, p. 109].

It is worth noting, that BEIs serve entrepreneurs *inter alia* a pro-innovative services. This type of service consists of e.g. review of profiles of technology suppliers and customers, establishment of contact or help with the implementation of technology and monitoring this process, consulting assistance in conducting research projects that cover technical, technological or organizational undertakings leading to the creation of a prototype. Another type of service that is of a pro-innovative nature, is help in implementing research findings or new technologies in enterprises, help in developing industrial design, help in protecting intellectual property, for example in preparing a patent application [Kornecki, Kowalczyk (eds.) 2010, p. 9].

According to the report prepared for the Polish Agency for Development of Entrepreneurship in 2014 there were 176 active innovation centers and entrepreneurship incubators in Poland (42 technology parks, 23 technological incubators, 24 academic entrepreneurship incubators, 46 business incubators, 41 technology transfer centers) including 130 innovation centers [Bąkowski, Mażewska (eds.) 2014, p. 13]. Moreover, broadening the research area and taking into account other business environment institutions, such as: capital funds, local and regional loan funds, credit guarantee funds, network of business angels, and training and advisory centers, there were 681 institutions in Poland in 2014 [Bąkowski, Mażewska (eds.) 2014, p. 9]. There has been an upwards trend in a number of institution supporting entrepreneurship in Poland since 1990 (Figure 1). This confirms the implementation in the Polish economy of projects and programs aimed at supporting entrepreneurship and innovation through creating favorable environment.

In the report from 2015 M. Mażewska presents difficulties referring to supporting innovation and entrepreneurship. The author underlines that it is difficult to call

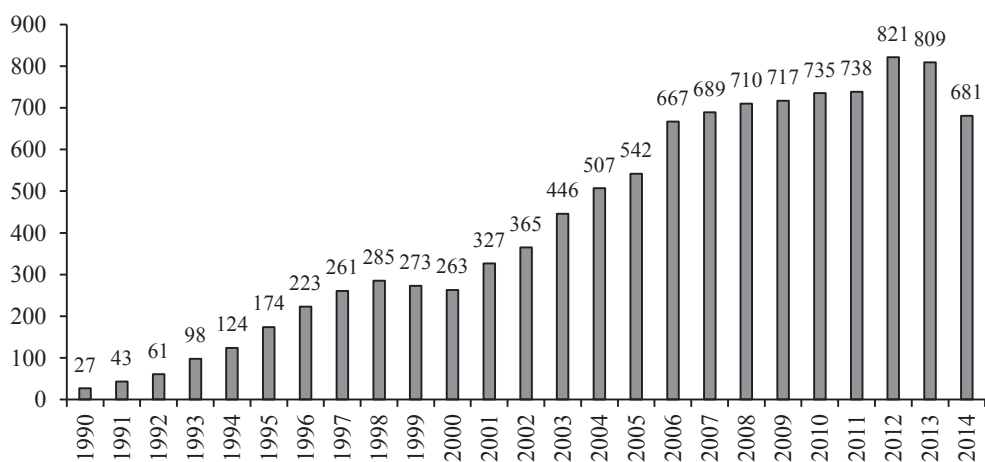


Figure 1. Dynamics of development of centers of innovation and entrepreneurship in Poland from 1990 to 2014

undertaken activities a system. A. Mazewska points out that implemented activities were presented rather as separated programs financed mainly from EU sources, than a well-functioning system. The author also pays attention to the lack of uniform guidelines at the national or regional levels, long-term policy related to centers of innovation and entrepreneurship and lack of cross-sectional statistical analyzes of regional potential and demand for services in particular areas [Bąkowski, Mazewska (eds.) 2015, p. 9].

In the course of our research concerning innovativeness of Polish economy the authors refer to R&D sector. In the paper it is analyzed as a part of business supporting institutions. The authors are conscious that in the literature of the subject referring to R&D and BEIs different approaches are used, and R&D sector is analyzed separately from BEIs.

Cooperation of science and business, national and regional smart specializations, development and innovation implementation are the main elements for developing R&D sector in Poland by 2020 [Szewczuk-Stępień 2017, p. 119].

In order to assess the innovativeness of particular economies *inter alia* the expenditure on R&D sector or employment in this sector are investigated. The expenditure on R&D are crucial in the process of creating an innovative and competitive economy, because of generating effects in the form of innovations, implementations, patents, etc. [Klemens, Heffner 2017, p. 193].

In Poland this sector is represented by the Polish Academy of Sciences, research and development units and other units offering services for science, higher education institutions and also enterprises with their own research centres. To check changes and trends ongoing in this sector in Poland data from Central Statistical Office have been analyzed.

The conducted research shows the increase of the expenditure on R&D in relation to GDP in Poland from 2005 to 2015 (Figure 2).

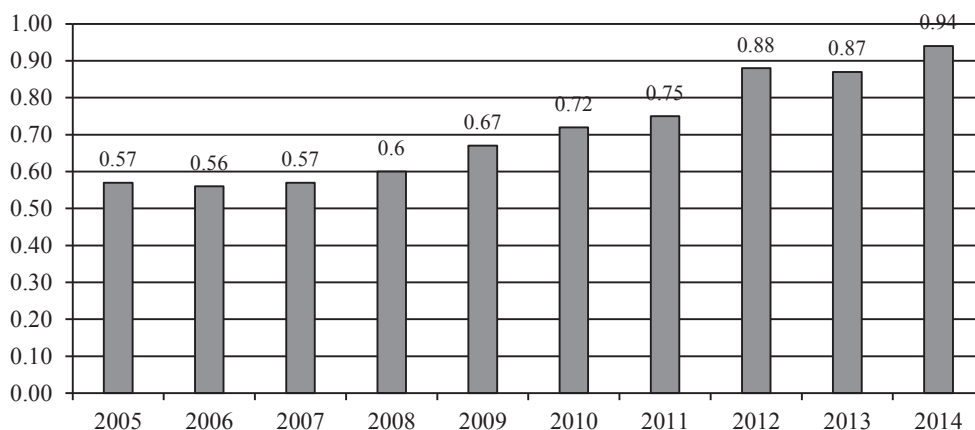


Figure 2. Expenditure on R&D in relation to GDP (in %) in Poland between 2002-2014

Source: own elaboration based on data of Central Statistical Office [www.bdl.gov.pl].

Furthermore, the dynamic of employment in R&D sector was researched. As it results from the study in 2015 in comparison with 2005, the number of employees in R&D sector in Poland rose. It is particularly important that the mentioned increase (reaching 174%) was caused by the number of employees in business sector. There was 17 875 of employees in R&D in 2005 and 48 963 in 2015 (Figure 3).

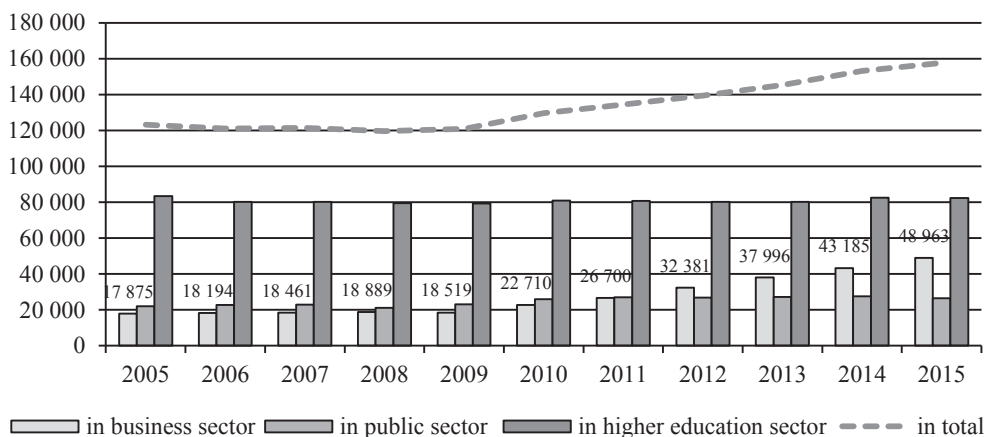


Figure 3. Number of employers in R & D in particular sectors in Poland between 2005-2015

Source: own elaboration based data of Central Statistical Office [www.bdl.gov.pl].

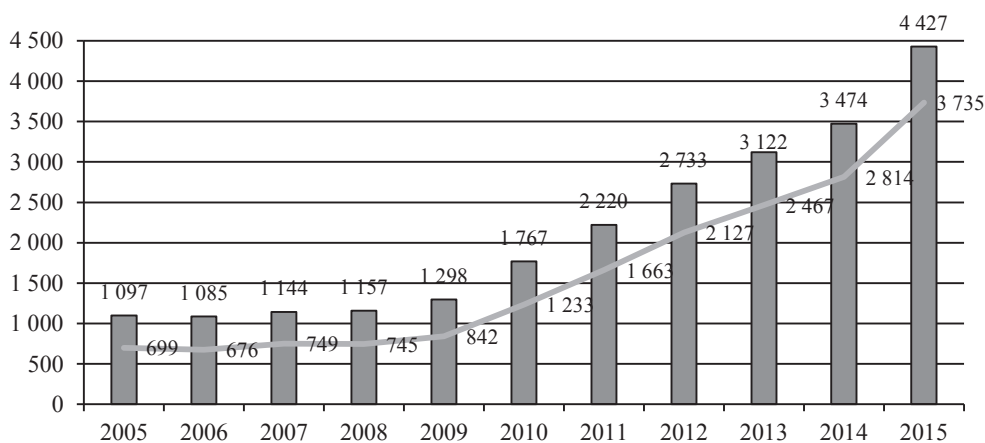


Figure 4. Entities conducting R&D activity in Poland from 2005 to 2015

Source: own elaboration based on data of Central Statistical Office [www.bdl.gov.pl].

Additionally, to accomplish the goal of the paper the financing o R&D sector was also checked. It is significant that R&D activity is more often financed by the private sector. The number of entities conducting R&D activity in Poland increased from 2005 in comparison to 2015 more than 400% of which 84% were

enterprises (in 2005 analogously there was a 63% increase). Moreover, since 2005 the number of enterprises conducting the research and development activity was constantly increasing. In 2005 there were 699 such enterprises and in 2015 3735 (Figure 4).

3. Supporting innovation and entrepreneurship through the Smart Growth Operational Program – analysis and assessment

Many programs and activities aimed at supporting innovation and entrepreneurship can be currently identified in Poland. It is worth starting with a strategic document which refers to this issue. Poland as an EU member country is obligated to implement recommendations according to Europa 2020 document, which influence on the issue of innovativeness and entrepreneurship at national level, and is taken into account in the following strategic documents:

- Long-Term National Development Strategy: Poland 2030. Third Wave of Modernity (LTNDS),
- National Reform Program (NRP),
- “National Strategy of Regional Development 2010-2020: Regions, cities, rural areas” (NSRD),
- National Development Strategy 2020: Active society, competitive economy and efficient state,
- 9 integrated, cross-sectoral strategies for implementing the adopted development goals: Strategy for Innovation and Efficiency of the Economy; Human Capital Development Strategy; Transport Development Strategy; Energy Security and the Environment; Efficient State; Social Capital Development Strategy; National Strategy of Regional Development 2010-2020. Regions, cities, rural areas; Strategy for Development of the National Security System; Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries, and
- 4 over-regional strategies: Strategy of socio-economic development of Eastern Poland until 2020; Development Strategy of Southern Poland until 2020; The Strategy of Development of Western Poland until 2020; Strategy of Development of Central Poland until 2020 with the perspective of 2030.

One of the above cross-sectoral strategies is particularly important from the point of view of promoting innovation, i.e. the Strategy for Innovation and Efficiency of the Economy, “Dynamic Poland 2020” (SIEE), which main goal is to create an innovative and effective economy based on knowledge and cooperation. This goal will be achieved through the following specific objectives:

- adjusting regulatory and financial environment to the needs of an innovative and efficient economy,
- stimulating innovation through the increase in efficiency of knowledge and work,

- increasing the efficiency of the use of natural resources and raw materials,
- increasing the internationalization of the Polish economy.

Currently, the most fundamental program focused on boosting innovation in Poland seems to be Smart Growth Operational Program (SG OP) 2014-2020. SG OP is a national operational program financed from the European Regional Development Fund (ERDF) and is realized in the years 2014-2020. In accordance with the Partnership Agreement, the allocation of ERDF funds for the SG OP is EUR 8614,1 million [Program Operacyjny... p. 14]. The main objective of the SG OP is to boost innovation of the Polish economy by supporting scientific research, developing new, innovative technologies and a variety of measures aimed at increasing the competitiveness of small and medium-sized enterprises. This program is a continuation of the IE OP, but it slightly differs in priorities. The SG OP consists of 4 priority axes, shown in Table 2.

Table 2. Priorities and objectives of the Smart Growth Operational Program 2014-2020

Priority axis	Specific objectives	Examples of projects
I. Support of R&D activities conducted by enterprises and science-industrial consortia	1. Stimulate R&D activity of enterprises	<ul style="list-style-type: none"> • projects concerning the implementation of research and development activities by enterprises or by consortia in collaboration with enterprises
II. Support of innovation in enterprises	2. Increase investments of Polish enterprises on innovation activity 3. Develop risk capital market	<ul style="list-style-type: none"> • implementation of R&D results associated with the implementation of projects co-financed from the sources of the 1st priority axis of the program • creation and development of R&D infrastructure in companies through investments in apparatus, equipment, technology and other necessary infrastructure that serves the creation of innovative products and services
III. Support of environment and potential of innovative enterprises	4. Increase the innovative potential of enterprises 5. Increase the internationalization of activities of enterprises 6. Develop cooperation among enterprises with a view to develop innovative solutions	<ul style="list-style-type: none"> • implementation of projects involving the creation of collaboration platforms, which will contribute to stimulating and facilitating the transfer of technology and know-how between large firms and SMEs • innovation vouchers – purchase of a service related to the development of a new product or service, a design project, a new production technology or a significant improvement of a product or a manufacturing technology • system projects aimed at increasing the knowledge and tendency of enterprises to engage in innovative activities
IV. Increase of science-research potential	7. Strengthen the cooperation between research units and enterprises and the public sector	<ul style="list-style-type: none"> • projects involving research and development activities carried out by scientific and industrial and scientific consortia (only a research unit may be a leader of such projects) • investments in modern research and development infrastructure • development of human resources in the R&D sector

Source: own study based on [Program Operacyjny..., pp. 33-77].

It is worth noting that in the current programming period, as part of the SG OP, funding will be used to support the whole process of building innovation, i.e. from idea incubation, through R&D activity, prototyping to the implementation of the research results.

The following shall be eligible for support under the SG OP: enterprises (in particular SMEs), research units, clusters, business environment institutions, such as: science and technology parks, technology transfer centers, business angels networks and capital funds.

An analysis of the priorities and objectives of the SG OP shows that in the years 2014-2020 special attention will be paid to encouraging cooperation between science and business, in particular with regard to the development of innovative solutions that can be implemented in Polish enterprises. Enterprises will also be encouraged to carry out research and development (independently or in collaboration with external entities i.e. universities, laboratories, etc.) and to increase the expenditure on research and development. Support is also planned for the development of a modern research infrastructure. Therefore, the coming years will be dedicated to intensive development of cooperation between science and business for the development of innovation, which should be considered as a positive phenomenon [Olechnicka 2012, p. 131]. In particular, it should be pointed out that entrepreneurs will be encouraged to get involved in the development of curricula, and participate in meetings with students related to practical education. Although certain elements of this kind of cooperation are already present in Polish universities, it seems that in the coming years, this kind of cooperation will be further developed. This is very important for the education of future personnel that will soon enter the labor market (look also [Abel, Deitz 2012]). Finally, it should be noted that in Poland it is increasingly common to emphasize the necessity for researchers to undertake placements in enterprises in order to both implement research results and to acquire experience, which then can be passed on to students. It seems that all the priorities of SG OP focus precisely on those areas which in the future may result in interesting innovations in the Polish economy.

In an attempt to assess the objectives of the SG OP it can be concluded that all priorities are important and needed for the Polish economy. Of particular importance seems to be the promotion of cooperation between scientists and entrepreneurs. Continued support will also be available for activities aimed at building the so-called bridges between science and business, or for help in finding a suitable partner – which is most often carried out by institutions of the business environment [Geodecki, Mamica 2014, p. 43.] Cooperation will also be promoted between researchers representing different scientific disciplines, which is quite a new phenomenon in Poland.

4. Conclusions

At the present time, we can observe an intensifying process of globalization and the development of an economy constrained by turbulences and fast growth. There are a lot of changes, which are expressed mainly in the growth of the role of innovation in economic development [Chądzyński, Nowakowska, Przygodzki 2007, p. 205].

Innovation and entrepreneurship are the foundation for building a competitive economy in local and international market. In Poland, government have already undertaken attempts to improve innovation in the economy. All mentioned in the article activities and programmes undertaken to date to promote innovation and entrepreneurship in the Polish economy should be considered as valid. The coming years and the funds available within the Smart Growth Operational Program for years 2014-2020 will surely encourage entrepreneurs to cooperate for the development of innovative solutions and their implementation in the form of new products, technologies and services.

As a result of the research, it can be stated that the activities undertaken in Poland resulted in appearing numerous institutions and Poland has created an environment for business. Even though the researchers point out the difficulties in the functioning of the system of supporting innovativeness and entrepreneurship, the investigation showed positive changes. The conducted research confirms the increase of employment in R&D in private sector and a constant increase in R&D financing by private sector as well as slow but continuous growth of expenditure on R&D in relation to GDP in Poland.

In view of the above, it can be concluded that the development of an innovative economy in Poland is supported by many BEIs and programs and that is why it can be expected that in the coming years there will be an increase in innovation of the Polish economy. However, for this to happen, the involvement and cooperation of different stakeholders (public authorities, entrepreneurs, researchers, business environment institutions, etc.) in this process is essential.

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