



## Problems of Polish enterprises in the field of innovation

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### Abstract

Innovative activity of enterprises in Poland is mostly generated by European funds that concern boosting European regions based on its significant resources and new technologies. Polish enterprises development within innovations is based mainly on accumulating new products and new technologies that improve organization and increase sale of products and services. Papers presents research findings that concern problems resulting from the innovations implementing in Polish enterprises comparing with European results. There is presented European Innovation Index providing a comparative assessment of the innovation performance at the country level of the EU Member States and the Regional Innovation Scoreboard (RIS) that presents results of innovative activity in Polish and European enterprises including regional data from the Community Innovation Survey (CIS).

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## 1. Introduction

The world is currently entering the fourth industrial revolution based on digital solutions. 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.

Scientific and technological advances in the areas of robotization, mechanization, automation, energy storage, artificial intelligence development programs and programs for the development of the digital economy can profoundly transform the world economy. The fourth industrial revolution will result in the introduction of technologies that enable communication between machines, the dissemination of digital processes in product management and robotization on a previously unknown scale. This will have a significant impact on education, the labor market and create new consumer needs. As a consequence, there is a high probability of unfavorable impact of technological development on the labor market in subsequent years, as a result of replacing the human work factor with solutions in the field of robotization and automation.

The dynamic development of industry associated with the "fourth industrial revolution" will require high quality human capital. Properly prepared cadre, using mainly knowledge, using modern techniques of obtaining information and data processing in its work, is an indispensable condition of the

assumed "civilization leap". The demand of the Polish economy for qualifications, skills and competences will be determined by trends appearing on European and world markets, which are also present on the Polish labor market. Expectations about the quality of education required from employees will continue to increase and will apply to all levels of education. Therefore, there is a need for better long-term matching of employees' skills and qualifications to the requirements resulting from the so-called the "Industry 4.0" model (Industry 4.0). The increase of the above requirements is forecasted at all levels of employment.

Term of innovation in the 21st century is perceived in a completely different way since it is described as the system generating social challenges resulting from global activity and collaboration through innovation. In accordance to OECD Innovation is a key source of long-term growth, both in traditional and high-growth, high-value added sectors. It can provide crucial contributions to higher productivity and confront global and social challenges. Therefore, we welcome the final report of the Innovation Strategy. In accordance to the Oslo Manual innovation is defined as an introducing the new or significantly changed products, services, processes or solution in the organization or operation (change is associated with improvement or modernization). The key to achieving success in the market by easy access to information and, above all, innovation, allowing for gaining a competitive advantage in the market (Okwiet and Grabara,

2013; Lewis and Wackowski, 2006; Sachpazidu-Wójcicka, 2014).

A literature review was used to generate a representative pool of definitions of organizational innovation, including definitions from the different disciplinary literatures of economics, innovation and entrepreneurship, business and management, and technology, science and engineering. A content analysis of these definitions was conducted in order to surface the key attributes mentioned in the definitions, and to profile the descriptors used in relation to each attribute. However, innovation may involve a wide range of different types of change depending on the organization's resources, capabilities, strategies, and requirements. Common types of innovation relate to new products, materials, new processes, new services, and new organizational forms (Bareghe et al., 2009).

In some studies on technological and marketing innovations the analyses not only focus on the direct relationship between types of innovations but also deal with the issue of impact of technological innovation activities on propensity to innovate in marketing. In this stream of research, technological innovation activities encompass both investments in intangible assets and tangible assets (Lisowski and Starzyńska, 2013; Grzegorzewska and Stasiak-Betlejewska, 2014).

Technological knowledge is a part of innovation capital, which is a bundle of the firm's resources/assets that renders services in the process of new knowledge (innovation) creation and commercialization. Apart from technological knowledge in form of R&D or intellectual property rights, innovation capital encompasses intangibles that are embodied in the organizational routines and thinking of employees. It is worth noting that employees' knowledge offers a specific innovation competence for a firm, since it is a driver of absorptive capacity that manifests itself in the firm's ability to acquire, assimilate and utilize new knowledge, including marketing innovations (Kijek et al., 2013; Stacho, 2017; Weinstein and Oblój, 2002).

There is also identified a strict relation between innovation and business environment conditions related to existence of cluster that support creating innovations (Daddi et al., 2012).

## 2. Evaluation of the current status

Innovation expenditures as percent of total turnover are still high when compared to the EU but they have also fallen significantly from 1999 to 2000. European Innovation Index, which provides a comparative assessment of the innovation performance at the country level of the EU Member States and other European countries, presented in Figure 1 confirms that innovation activity is the most significant in the Scandinavian countries.

Objectives of innovation activities of Polish firms are similar as in the EU. Obstacles to innovation are also similar except very high importance of interest rate as an obstacle to innovation in Poland. One third of innovative firms cooperate in undertaking innovation activities but within this the share of small firms is very small (Niedbalska, 2002; Sieradzka, 2013; Jasiński, 2004; Wolniak, 2010).

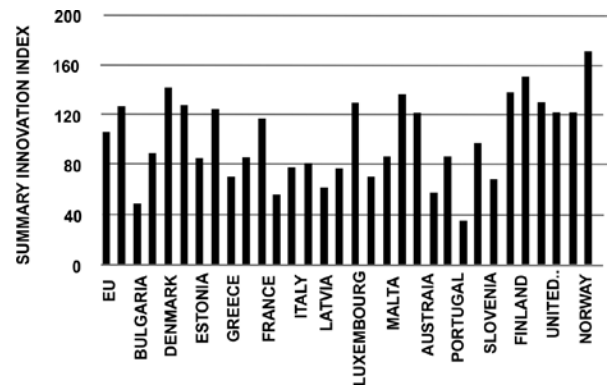


Fig. 1. Summary Innovation Index in European countries in 2017.

In recent years, many changes have taken place in Poland, which have positively influenced the innovativeness of the Polish economy and the ability to think about innovations. The acceleration of the technological catching-up process in enterprises, including through the renewal of the machinery park, construction of new R&D infrastructure, as well as strengthening the competences of staff implementing innovative projects. This was done with a large share of funds from the EU funds. The way of thinking about innovations is also gradually changing - alongside the absorption of ready-made technologies, enterprises recognize the need to develop their own solutions, including those based on the results of R&D works, and to build a competitive advantage on nothing.

Poland occupies a distant place in the international rankings of innovation - innovation in the EU rankings (European Innovation Scoreboard) took 23<sup>rd</sup> position in 2016 that records poor results in many dimensions of innovation, including innovative activity of enterprises (especially SMEs) and cooperation in this field with other entities, international patent activity (Central Statistical Office, 2017).

One of the indicator that was used in the analyzed research paper is Regional Innovation Scoreboard (RIS) that is the regional extension of the European Innovation Scoreboard. The Regional Innovation Scoreboard (RIS) provides a comparative assessment of how European regions perform with regard to innovation.

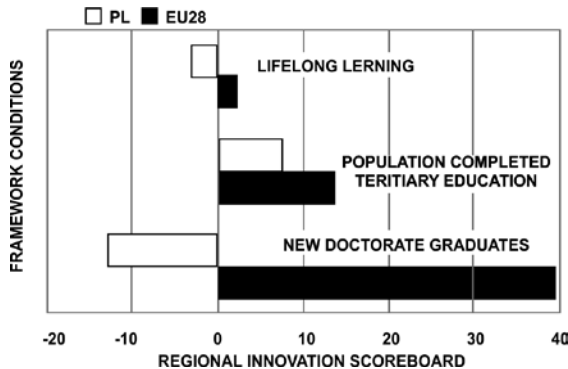
## 3. Results and discussion

In accordance to European statistics the RIS 2018 uses as many indicators as possible from the EIS, including regional data from the Community Innovation Survey (CIS). Figure 2 presents Regional Innovation Scoreboard within framework conditions in Polish enterprises.

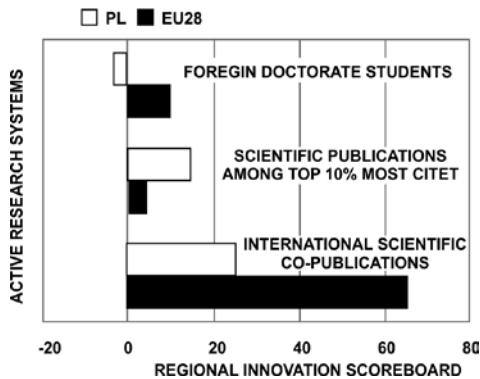
Data presented in Figure 2 confirms that innovations in Polish industry are accumulated within framework conditions mainly owing to new doctorate graduates.

Active research systems in Poland that create innovation progress are based on international scientific co-publications that promote innovative activity in Polish and European enterprises. The significant positive difference is noted with regard to cited scientific publication that include research

findings concerning new product or new technologies solutions.



**Fig. 2.** Regional Innovation Scoreboard indicated for Poland within framework conditions in 2018 in Polish enterprises comparing to European enterprises.

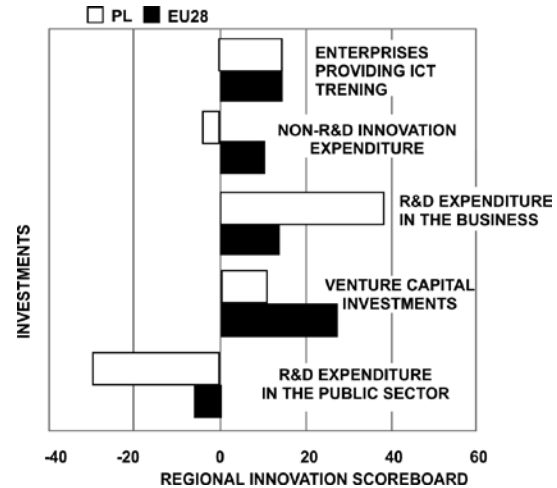


**Fig. 3.** Regional Innovation Scoreboard indicated for Poland within active research systems in 2018 in Polish enterprises comparing to European enterprises.

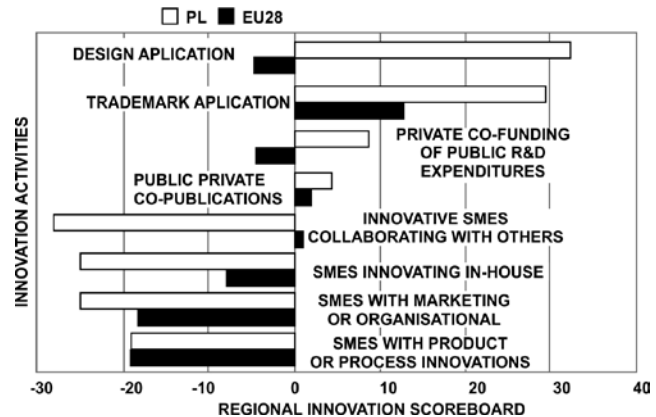
One of the most significant innovation activities noted in Polish enterprises in 2018 concern design and trademark application what was shown in Figure 5. There is still lack of innovation activities within public – private publications as a result of joint innovative projects.

Results of implementing new products or new services or new solutions as innovative activity in Polish enterprises were shown in Figure 6. There was noted that the highest impact resulting from innovative activity is associated with employment in knowledge – intensive activities.

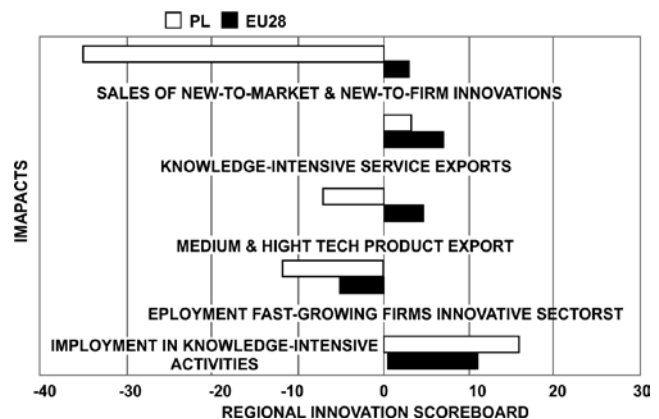
Evaluating the investment attractiveness, take into account the four basic investment microclimates. They are: microclimate, labour resources, microclimate of technical infrastructure, microclimate of social infrastructure (a factor related to human and social capital) and market microclimate. Employment in knowledge – intensive activities is crucial impacts both in Polish and European enterprises.



**Fig. 4.** Regional Innovation Scoreboard indicated for Poland within investments in 2018 in Polish enterprises comparing to European enterprises.



**Fig. 5.** Regional Innovation Scoreboard indicated for Poland within innovative activities in 2018 in Polish enterprises comparing to European enterprises.



**Fig. 6.** Regional Innovation Scoreboard indicated for Poland within impacts of innovative activity in 2018 in Polish enterprises comparing to European enterprises.

The level of automation of Polish production companies shows that for the management staff of Polish companies to a large extent remain the challenges of the third industrial revolution on microelectronic technology.

#### 4. Summary and conclusion

Poland belongs to the group of European innovative countries. Polish enterprises note the progress within innovative activity but it is a very small comparing with European enterprises (European Regional Innovation Scoreboard average is approximately 50% higher). Data on Polish enterprises experience on innovative activity confirms that innovation of Polish economy is indicated below the European average (10%). There is noted a very big problem with investments in research and development activity since R&D activity in majority of Polish enterprises is associated with purchase of new CNC machines and implementing new IT technologies boosting production effectiveness. The consequences are connected with the growing importance of the automatization and luck of the well-qualified workers.

One of the significant weakness of Polish enterprises is related to ability of innovative enterprises to cooperate with public sector what result from different procedures systems and problems concerning implementing innovative outputs such as registered utility models or patents.

The driving factor of the innovating activity in Polish enterprises is the amount of innovation expenditures and continuous improvement in the product and service quality level related t. There was noted a serious increase of enterprises that base own innovation activity n broadband Internet (20.5%) and the use of utility models and trademarks as result of own innovative activities.

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### 波兰企业在创新领域存在的问题

#### 關鍵詞

革新  
企业  
摘要创新指数  
区域创新记分板

#### 摘要

波兰企业的创新活动主要来自欧洲基金，这些基金涉及以其重要资源和新技术为基础的欧洲地区。波兰企业在创新中的发展主要基于积累新产品和新技术，以改善组织并增加产品和服务的销售。论文介绍的研究结果涉及波兰企业实施的创新与欧洲结果相比所产生的问题。提供了欧洲创新指数，对欧盟成员国的国家层面的创新绩效和区域创新记分板（RIS）进行了比较评估，该记录板显示了波兰和欧洲企业的创新活动结果，包括来自社区创新调查（CIS）