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The conditions and change tendencies of the innovativeness of the Polish economy against the background of selected European countries

Introduction

Scientific and technological progress has a special importance in the contemporary economy. Knowledge in its strategic dimension is regarded as a key production factor. Changes in knowledge resources and their implementation decide the role of a given economy in the world. The competitive potential and strategic positions of national economies largely depend on their ability to create, implement and domesticate advanced scientific-technological solutions. They must also effectively utilise human (including intellectual) capital and secure funding that matches their needs in both external and internal markets (Dzhukha et al., 2017). In these circumstances, a special role is played by innovativeness or the ability of a firm or an economy to create, implement and absorb innovation. States characterised by low innovativeness experience slower socio-economic development. Innovation is the only way for the most developed countries to secure sustainable long-run productivity growth (Bloom et al., 2019, pp. 5–31). It is a major part of international economic competitiveness and continuing and sustainable development.

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In this connection, special attention must be paid to countries ranking low in the annual European Innovation Scoreboard (EIS). Its methodology helps to compare innovation systems of particular economies by means of an index based on some appropriately selected partial indicators. The SII (Summary Innovation Index) is the weighted arithmetic mean of a number of innovative characteristics (Wich, 2017, p. 102). Through an examination of the specific metrics included in SII, it is possible to determine which ones primarily represent advantages and disadvantages for the development of innovativeness. This will serve as the foundation for the government's policies to restrict and lessen them.

Poland has a low ranking, so the goal of this study is to compare the innovativeness of the Polish economy to that of a few chosen European nations, as well as to ascertain the factors that influence and alter these trends. Indicating which components of the SII are important to determining the level of innovativeness and which are the most serious barriers in this respect is of particular importance. In this way, it will become possible to define the causes of the distance between the Polish economy and the innovation leaders.

Based on the specialist literature and the authors' observations, the following research hypothesis is put forward – H: The causes of low innovativeness in Poland are varied and multidimensional, and more spending on research and development should be the starting point for its improvement.

Theoretical background

The literature lacks a universal, homogeneous and standard definition of innovation due to the latter's weight and role in economic development and the research perspectives adopted.

The concept was introduced to the specialist literature by J. Schumpeter, who defined it as "a new combination" of production factors leading to the emergence of new products, new production methods, new organisational links, new sale markets, new sources of raw materials or intermediate products, a new organisation of an enterprise in the market (Schumpeter, 1960, pp. 104, 118). He referred to the correlation between innovation and development as "creative destruction". Therefore, the greater the innovation's revolutionary nature, the more conspicuous and simultaneously both destructive and constructive is its influence on the advancement of progress and development (Sieradzka, 2021, p. 218).

J. Schumpeter's ideas were taken up by P. F. Drucker, who identified innovations with tools for entrepreneurs and the sources of wealth through new economic activities or supply of new services (on their first application). He also stressed that innovation and entrepreneurship had become integral parts of economic activities, an impulse to the development of enterprises and the whole economy (Drucker, 1992, p. 29). The approach to innovation has expanded to include improvements

to existing products and services. M.E. Porter (2001, p. 202) points out that even a minor change to the existing processes, methods or products generates economic benefits, technological improvements and broadly defined progress. M.E. Porter's concept is reflected in how innovation is defined in the guidelines of the Oslo Manual. It states that an innovation is "a new or improved product or process (or a combination thereof) substantially different to the earlier products or processes of an entity which has been made available to potential users (product) or put to use by the entity (process)" (OECD, 2018, p. 20).

Various innovations are discussed in the literature, depending on the criteria of division and the goals to be served. Broad and narrow objective approaches are distinguished. As part of the former, each change to the formation, acceptance and application of new concepts, products and services can be treated as innovation. This view is shared by J. Schumpeter (1939), V.A. Thompson (1969), Ph. Kotler (1994), R.L. Draft and A. Amstrong (2012), among others. The requirement of a precise description of the nature of innovation is of utmost importance in narrow terms (Mansfield, 1968; Freeman, 1982; Sopińska, Wachowiak, 2016).

Innovative activity is an arranged set of scientific, technical, organisational, financial, managerial and commercial actions conducted in order to work out and implement innovations (Baruk, 2015, p. 125). It leads to economic progress and is a potential factor in meeting global social challenges. Innovative activity, besides physical and human capital (Wang, 2013; Kansy, 2018, p. 112), is becoming a key factor in determining economic growth (Asheim et al., 2016; Kergroach, 2016). Innovation activity turns out to be a result of vibrant market developments as well as industrial policy, living standards, innovation activity state and regional backings, socio-economic stability and entrepreneurship revitalisation at all levels, including the regional macro-level (Kuznetsov et al., 2017, p. 396).

Innovativeness is a term derived from innovation. It is most commonly defined as the readiness and ability of entities and organisations to search for, implement and diffuse innovation and other (creative and imitative) changes which lead to the emergence of new values in an economy and the adoption of foreign scientific and technical accomplishments.

According to Pangsy-Kania (2007, p. 58), the innovativeness of an economy is understood as the entrepreneurs' ability and motivation to continue searching for and using in-practice research and development, new ideas, concepts and inventions to improve and develop the existing production, operation and service technologies, introduce new solutions to organisation and management, as well as to improve and develop the infrastructure. However, entrepreneurs' ability and motivation require support through a national innovation system. S. Metcalfe (1995, p. 116) points out that a national innovation system is formed by two key factors: 1) the area of research and development work as the source of innovation and the industrial enterprise sector; 2) state institutions and structures that support the creation and

implementation of innovation. An innovation system is seen as an instrument supporting the realisation of programmes that are part of the innovation policy. The significance of cooperation is emphasised between researchers, business and politics, where innovativeness is perceived as a significant factor in conditioning the good state of an economy (Kokot, Pryciak, 2019, p. 93). The state is the most important subject of an innovation policy as it assumes the burden of financing innovation and R&D (Lent et al., 2018, p. 445). The creation of an effective national innovation system (NIS) is the most crucial task of the scientific, technological and innovation policies of each state (Karasev et al., 2018, p. 702). The innovativeness of an economy depends not only on the normal functioning of the particular institutions, but also on the correct management of the system actors and the environment (Szajt, 2008, p. 34).

The models of the innovation creation process by the science and business sectors have evolved along with globalisation. The currency of a non-linear model based on network connections is underlined, with the rate and effectiveness of introducing innovation acquiring more importance (Kaliszczak, Sieradzka, 2018, p. 78). The open innovation model places a special emphasis on intensive contacts and knowledge sharing in the process of creating innovation (Chesbrough, 2006; Inauen, Schenker-Wicki, 2011, p. 479; Poznańska, 2018, pp. 20–21; Rodriguez, Lorenzo, 2011, pp. 77–84).

Limitations to innovative activities are largely a result of the transfer and diffusion of new technology. The following barriers to technology transfer in highly developed countries are mentioned (Kirkland, 1999): legal (intellectual property rights); financial (the insufficient financing of innovative activities); the poor qualifications of the workforce; barriers to communication between the representatives of science and industry; technical barriers. The problems of new product commercialisation include (Poole, Moore, 2002, p. 22): imperfect information; uncertainty and costs of searching; high transaction costs; an inadequate demand for and supply of research and development results. In Poland, some barriers to innovativeness are identified, which are correlated with a stage of innovation creation (Frankowski, Skubiak, 2012, pp. 120–129).

Concerning the limitations of domestic technology transfer, key barriers – particularly important ones – and other obstacles are highlighted (Jasiński, 2006, pp. 150–151). The first class comprises: a low openness and insufficient readiness of research and development institutions to cooperate with business; an inefficient system of innovative activity support; insufficient (own and external) funding; the absence of innovative culture in enterprise actions. The especially important barriers encompass: the bypassing of the research and development sector by foreign direct investment; poor innovation absorption by the economy; the inefficiency of the technology transfer infrastructure; a lack of adequate funding from the national innovation system.

Methods

The need to identify the conditions of innovativeness of the Polish economy arises from its persistently low standing against the background of the European Union countries. The Synthetic Summary Innovation Index (SII), featured in the European Innovation Scoreboard (EIS) report, is employed to gauge innovativeness in both European Union countries and non-EU states (EIS, 2021). It contributes to the annual ranking of the innovation systems of these countries. According to the 2021 report, Poland is positioned as the fourth-lowest, surpassing only Lithuania, Bulgaria and Romania.

The innovativeness of the Polish economy, compared with some selected European countries, is studied for the years 2014–2021. The choice of the countries draws attention to the distance between the Polish economy and:

- The innovation leaders in Europe – Sweden, Finland, Denmark and Belgium;
- The biggest European Union economies – Germany and France;
- Spain – quite often compared to Poland due to their similar populations;
- The countries of the so-called "Visegrad Group" – Czechia (The Czech Republic), Slovakia and Hungary, which joined the EU at the same time (2004) and have been undergoing systemic transformations like Poland.

The cognitive value of the paper consists of studying the causes of the innovativeness distance of the Polish economy with reference to selected, not all countries (the latter comparison is the object of a prevailing majority of the relevant literature). This approach will provide a clearer evaluation of the strengths and weaknesses of the innovation system in Poland and some recommendations for improving the innovativeness level.

The data is sourced from the European Statistical Office Eurostat publications and the European Innovation Ranking from 2021. The innovativeness of the Polish economy is compared to selected EU countries using the EIS methodology and some methods of numerical data analysis: the method of time series; of cross-sectional data; the analysis of phenomena dynamics; comparative analysis.

Results

The European Innovation Ranking, published in 2021, presents the innovation and research results of the European Union countries in 2021 with reference to 2014. In that period, the average innovativeness performance in Europe grew by 12.5%. The EU is better than China, Brazil, South Africa, Russia and India, and is outranked by South Korea, Canada, Australia, the United States and Japan. South Korea is the most innovative country – its result was 36% greater than the EU in 2014 and 21% higher in 2021.

Figure 1 shows the EU-28 countries' ranking in 2014 and 2021. The countries are ranked in descending order based on the 2021 SII. An analysis of the 2019 edition of the SII indicates that some countries are highly developed, while others lag considerably. The countries with the highest indicator value in 2021 were Sweden, Finland, Denmark and Belgium, while Poland, Latvia, Bulgaria, Romania, Slovakia, Hungary and Croatia displayed the lowest values. These countries are classified as emerging innovators in the current edition (EIS, 2021).

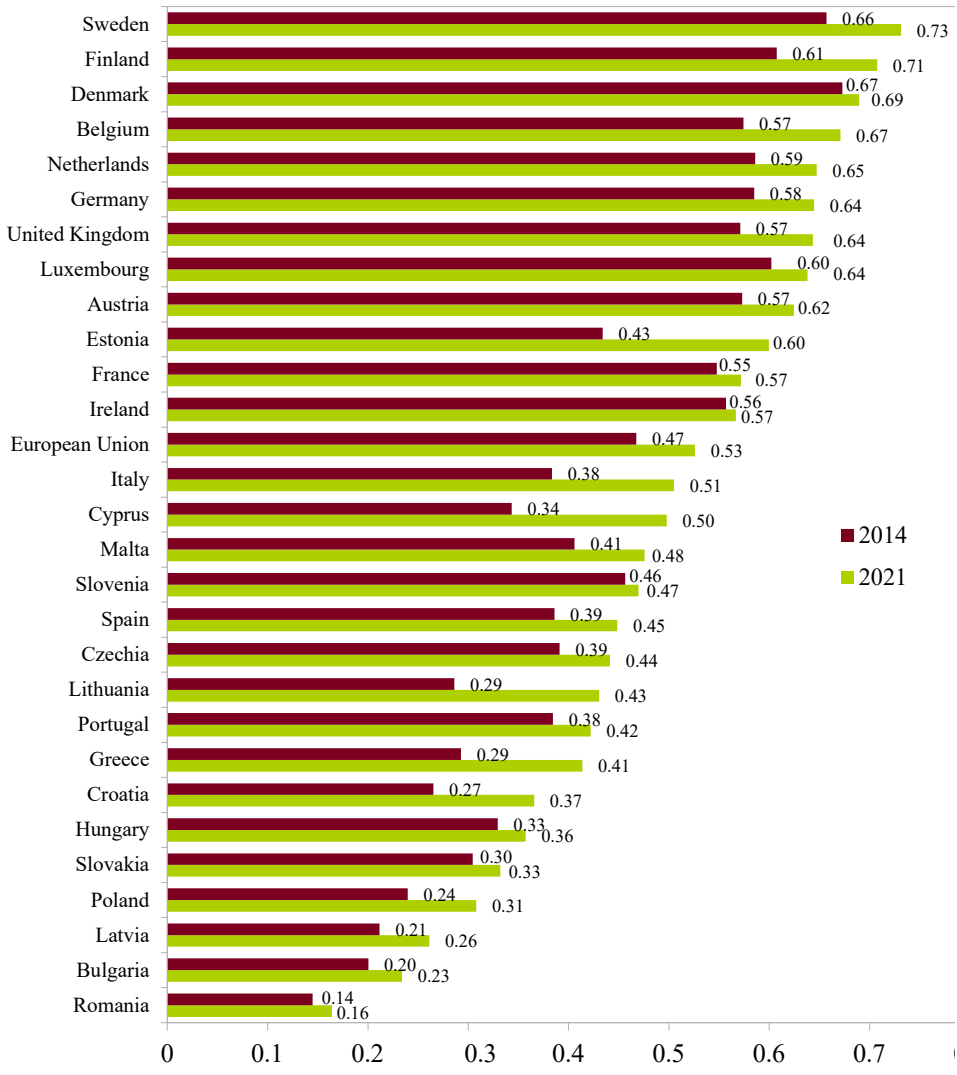

Figure 1. The performance of EU member states' innovation systems according to SII

Source: Authors' work based on EIS (2021).

The figures in Table 1 point to Poland's bottom ranking in the group of selected countries. The distance to the innovation leader is considerable – in 2021, the SII in Poland was lower by 0.423, or 41.4%. However, Poland dramatically improved its innovativeness in the period surveyed – the index had risen by 28.3 percentage points by 2021. Four main types of indicators are taken into account when assessing the Summary Innovation Index: 1) framework conditions; 2) investments; 3) innovation activities and impacts; 4) 12 innovative dimensions that comprise a total of 32 indicators (EIS, 2021).

Table 1. The SII values for selected countries in 2014–2021

Country/ year	2014	2015	2016	2017	2018	2019	2020	2021	Change dynamics 2021/2014
EU	0.467	0.473	0.477	0.482	0.487	0.506	0.513	0.526	112.63
Sweden	0.657	0.661	0.661	0.677	0.685	0.694	0.692	0.731	111.26
Finland	0.607	0.615	0.622	0.620	0.629	0.670	0.681	0.708	116.64
Denmark	0.673	0.674	0.673	0.656	0.664	0.681	0.683	0.689	102.38
Belgium	0.574	0.584	0.588	0.604	0.618	0.634	0.637	0.671	116.90
Germany	0.585	0.582	0.577	0.587	0.594	0.606	0.613	0.645	110.26
France	0.548	0.551	0.556	0.577	0.580	0.574	0.582	0.572	104.38
Spain	0.386	0.395	0.392	0.411	0.416	0.432	0.444	0.449	116.32
Czechia	0.391	0.402	0.404	0.403	0.407	0.425	0.431	0.441	112.79
Hungary	0.330	0.338	0.340	0.337	0.337	0.329	0.341	0.357	108.18
Slovakia	0.304	0.313	0.319	0.324	0.304	0.321	0.335	0.332	109.21
Poland	0.240	0.246	0.254	0.267	0.274	0.286	0.295	0.308	128.33

Source: Authors' work based on EIS (2021).

The indicators contained in Table 2 determine the long-term development prospects of Poland concerning its innovation capacity. An analysis of the 12-part indicators of Poland against the background of selected EU countries shows Poland to score a minimum of 6 (Innovators, Employment Impacts, Attractive Research Systems, Environmental Sustainability, Sales Impacts, Use of Information Technologies – 2021 values).

The low number of innovators (0.09), expressed as SMEs introducing product innovations as a percentage of SMEs and SMEs introducing business process innovations as a percentage of SMEs, is the most significant barrier to innovativeness.

The low value of SII is next determined by the partial indicator of employment impacts (0.15), meaning employment in knowledge-intensive activities as a percentage of total employment (employment in medium-high and high-tech manufacturing and knowledge-intensive services) and employment in innovative enterprises (its value is significantly low).

The attractive research system (0.18) is another weakness of the innovation system in Poland. It consists of an assessment of international scientific co-

Table 2. Twelve (part) indicators included in the SII for selected countries in 2014 and 2021

Index	Sweden		Finland		Denmark		Belgium		Germany		France		Spain		Czechia		Hungary		Slovakia		Poland	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
Framework conditions																						
Human resources	0.86	0.80	0.70	0.74	0.80	0.76	0.47	0.50	0.38	0.43	0.64	0.65	0.43	0.61	0.33	0.36	0.22	0.18	0.29	0.33	0.28	0.28
Attractive research systems	0.67	0.74	0.49	0.64	0.70	0.78	0.65	0.71	0.39	0.42	0.57	0.54	0.43	0.42	0.23	0.34	0.20	0.32	0.15	0.26	0.11	0.18
Digitalisation	0.66	0.92	0.72	0.95	0.83	0.95	0.57	0.72	0.53	0.70	0.44	0.53	0.49	0.79	0.41	0.50	0.58	0.75	0.43	0.51	0.27	0.52
Investments																						
Finance and support	0.57	0.67	0.55	0.68	0.52	0.64	0.54	0.72	0.45	0.53	0.76	0.86	0.39	0.41	0.44	0.40	0.46	0.48	0.15	0.15	0.24	0.32
Firm investments	0.78	0.77	0.63	0.61	0.62	0.43	0.57	0.76	0.75	0.86	0.48	0.53	0.24	0.34	0.36	0.47	0.37	0.34	0.28	0.31	0.32	0.32
Use of information technologies	0.91	0.91	0.97	1.00	0.76	0.77	0.78	0.79	0.62	0.56	0.44	0.44	0.44	0.46	0.47	0.58	0.36	0.38	0.31	0.41	0.21	0.39
Innovation activities																						
Innovators	0.56	0.89	0.57	0.78	0.47	0.73	0.63	0.79	0.64	0.93	0.53	0.64	0.15	0.19	0.42	0.55	0.13	0.22	0.22	0.17	0.02	0.09
Linkages	0.64	0.70	0.55	0.71	0.74	0.75	0.64	0.70	0.45	0.61	0.39	0.51	0.30	0.39	0.30	0.35	0.21	0.37	0.18	0.22	0.24	0.31
Intellectual assets	0.71	0.69	0.69	0.70	0.73	0.73	0.43	0.39	0.77	0.64	0.43	0.35	0.38	0.33	0.28	0.25	0.18	0.20	0.17	0.20	0.31	0.35
Impacts																						
Employment impacts	0.65	0.74	0.58	0.69	0.50	0.58	0.60	0.70	0.68	0.70	0.52	0.54	0.31	0.27	0.40	0.43	0.27	0.22	0.21	0.23	0.13	0.15
Sales impacts	0.54	0.69	0.48	0.64	0.62	0.47	0.54	0.66	0.74	0.77	0.63	0.56	0.43	0.46	0.56	0.61	0.57	0.59	0.44	0.50	0.37	0.39
Environmental sustainability	0.49	0.52	0.50	0.46	0.73	0.76	0.54	0.69	0.66	0.69	0.63	0.66	0.59	0.66	0.52	0.55	0.54	0.42	0.60	0.64	0.27	0.36

a – 2014; b – 2021

Source: Authors' work based on EC (2021).

publications per million population, scientific publications among the top 10% most cited publications worldwide as a percentage of total scientific publications of the country and foreign doctorate students. The latter is particularly low.

Poland scores lower than the selected countries in such areas as environmental sustainability (0.36), sales impacts (0.39) and use of information technologies (0.39). It should be pointed out, though, that a component of environmental sustainability – environment-related technologies – ranks high. Poland's index in 2021 is highest in the areas of digitalisation (0.52), ahead of Czechia and Slovakia and similar to that of France (0.53) (Table 2). Compared with 2014, the value of the digitalisation indicator has risen by 92.6 percentage points (from 0.27 to 0.52). This is an indubitable asset in driving a more dynamic development of innovativeness for both enterprises and the economy.

The intellectual assets indicator is quite good (0.35), with Poland ranking equal to France and ahead of Spain, Czechia, Hungary and Slovakia in 2021. This index encompasses such partial indicators as PCT patent applications, trademark applications, and design applications. Their values vary greatly – design applications are strong, whereas PCT patent applications are weak. The two remaining factors – finance and support and firm investments – are similar (0.32). In this respect, Poland outranks Slovakia, yet France and Belgium exhibit nearly twice higher values (Table 2).

The support for innovativeness is realised with R&D spending in the enterprise and public sectors, investment spending, enterprise investments, and non-R&D innovation expenditure. Their values are compared with the EU scores in 2021 compared to 2014 (Table 3).

Table 3. The results of selected countries in comparison to the EU in 2021

Country	R&D expenditure in the public sector	Venture capital expenditure	R&D expenditure in the business sector	Direct and indirect government support of business R&D	Non-R&D innovation expenditure	Innovation expenditure per employee
Sweden	136.8	219.9	188.2	88.8	75.8	186.5
Finland	133.3	304.1	140.2	41.1	77.6	142.3
Denmark	156.1	212.1	139.4	45.6	124.6	47.6
Belgium	115.8	194.0	156.7	169.6	106.9	186.5
Germany	142.5	136.4	168.5	47.2	160.8	186.5
France	94.7	292.8	109.4	213.4	64.7	137.8
Spain	63.2	172.5	51.2	58.0	80.6	76.3
Czechia	98.2	21.4	90.6	93.4	124.6	73.9
Hungary	31.6	124.3	83.5	174.7	67.3	55.6
Slovakia	35.1	25.0	31.5	27.8	105.7	55.6
Poland	54.4	61.9	61.4	86.9	87.9	48.2

Source: Authors' work based on EIS (2021).

The figures in Table 3 prove Poland is far ahead of Slovakia out of the 'Visegrad Group' countries on most partial indicators, yet the values displayed by the two remaining countries, Hungary and the Czech Republic, show more commitment to business expenses and direct and indirect government R&D support for enterprises. The values of innovation expenditure per employee are more than four times higher in the innovation leaders (except Denmark, where this spending is comparable to Poland's).

Poland ranks last but one (ahead of Slovakia) regarding enterprises spending most on R&D. The indicator value of 0.88 demonstrates the enormous distance between Poland and innovation leaders, as well as strong European economies like Germany and France (Table 4).

Table 4. Indicator of enterprise's spending on R&D activities

Country	Enterprises spending on R&D
Sweden	75.95
Finland	62.21
Denmark	76.97
Belgium	28.80
Germany	26.07
France	16.67
Spain	4.40
Czechia	1.25
Hungary	1.02
Poland	0.88
Slovakia	0

Source: Authors' work based on EIS (2021).

Gross national R&D expenditure (GERD) – i.e., total internal spending on R&D activities and internal R&D expenditure in the business sector (BERD) – must be taken into consideration when analysing an economy's level of innovativeness. The levels of R&D expenditure by the higher education sector (HERD) and the government sector (GOVERD) are also important.

Table 5. The relation of internal R&D expenditure to GNP (%) by executive sectors in 2014–2021 in Poland

Detailing	2014	2015	2016	2017	2018	2019	2020	2021
GERD/ GNP	0.94	1.00	0.96	1.03	1.21	1.32	1.39	1.43
BERD/GNP	0.44	0.47	0.63	0.67	0.80	0.83	0.88	0.91
GOVERD/GNP	0.23	0.24	0.02	0.02	0.02	0.02	0.03	0.03
HERD/GNP	0.27	0.29	0.3	0.34	0.38	0.47	0.48	0.50

Source: Authors' work based on Eurostat data (https://ec.europa.eu/eurostat) and GUS, *Research and development activities in Poland in 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021* https://stat.gov.pl/.

The intensity of R&D work continued to grow in the period analysed, from 0.94% in 2014 to 1.43% in 2021 (Table 5). As far as the business sector is concerned, the relation increased from 0.44% to 0.91%, reaffirming the positive shifts in the private sector's R&D activities in recent years.

Despite a distinct growth of the relation of R&D expenditure to GNP, Poland is still far away from the national objective set for 2020, namely, a GERD/GNP indicator of 1.7%. The desire to reach this goal means boosting efforts to intensify R&D activities in the near future is necessary.

In 2014–2021, the business sector incurred a bulk of the total internal spending on R&D work (BERD/GNP). The indicator reached 0.91% in 2021, more than twice the value recorded in 2014 (Table 5). The gradually rising share of the enterprise sector in the internal R&D expenditure was paralleled by a shrinking share of the government sector – from 0.23% in 2014 to 0.03% in 2021. R&D expenditure of the higher education sector continued to grow year by year.

In striving for economic growth and improved living conditions in its Europe 2020 programme, the European Union indicates the need to increase R&D spending to 3% GNP. This goal was only attained by three member states in 2021: Belgium (3.43%), Sweden (3.40%) and Germany (3.13%). The Polish economy is among the states spending the least on research and development (1.43%). Lower ratios were noted only by the Hungary and Slovakian economies (1.40% and 0.92%, respectively) (Figure 2).

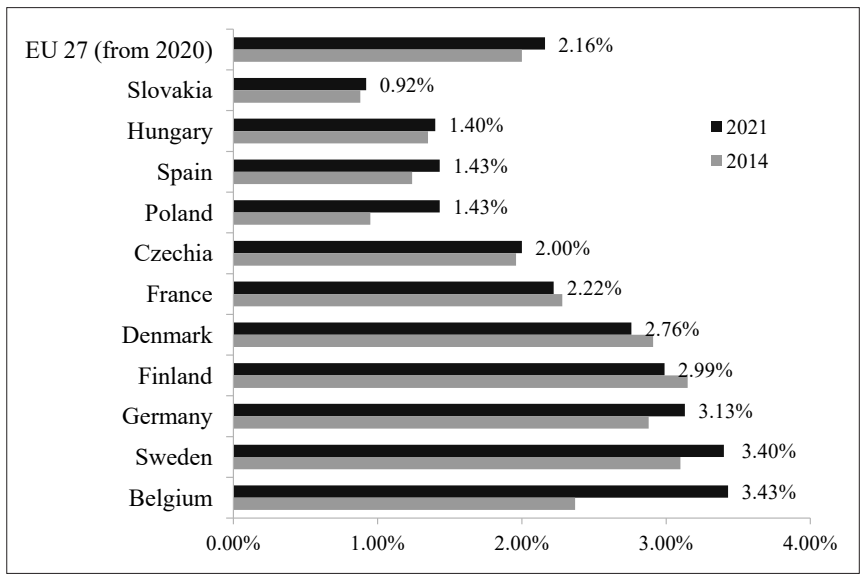

Figure 2. Gross domestic expenditure on R&D (GERD) in selected countries in 2014–2021 (in %)

Source: Authors' work based on *Gross domestic spending on R&D.* https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm.

Conclusion

The 21st century is called 'the age of innovation'; however, a gap continues between the particular countries as far as the creation and transfer of knowledge and innovation are concerned. The analysis of international figures and reports demonstrates Poland's low standing in this respect. "The low level of innovative and technological development is discussed by Firley and Firley (2015, p. 204), who stated that to ensure the achievement of economic and social cohesion, a competitive economy based on knowledge and cooperation of enterprises, administration and sciences should be created" (Bernat, Jasek, 2018, p. 24).

Public institutions in Poland should focus on building the national innovative potential to bridge the gap in private innovation spending and attract foreign direct investments with their high shares of development work. Strengthening the area of R&D will be of paramount importance to the future development of Poland; however, given the huge difference between business expenditure on research and development in comparison with the innovation leaders and the share of research and development expenditure in GNP, Poland's standing is not going to improve soon. R&D spending did grow, but too slowly for the needs in place. The progress in digitalisation is an advantage. Poland invested in boosting saturation with broadband connections in the years under discussion.

The issue of improving innovativeness should be seen in the context of building an innovation system, including linkages and cooperation between science and business. The attractiveness of research systems persists as a weakness of innovation in Poland. Investment in skill development and research and development potential of enterprises are key challenges to the national innovation system. The Polish innovation policy should consider market instruments to a greater extent by adapting the mechanisms of business R&D support applied to the prevailing trends in developed economies. Increased support is recommended for private research and development initiatives and the development of high technology industries, especially with a view to financing the absorption of technology and modernisation of business infrastructure as well as to enhance the insufficient human capital resources in the high technology sector.

Actions for improved innovativeness should, first of all, foster a culture of entrepreneurship relying on a relative strength of the Polish economy – namely, human capital. Pro-innovative attitudes and creative competencies should be nourished since their absence gives rise to barriers to innovativeness.

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Summary

The paper identifies the level of innovativeness of the Polish economy against the background of selected European countries and determines the conditions and change tendencies in this respect. It is of particular importance to designate the SII components that are of high significance to determine the levels of innovativeness. A research hypothesis was posited as well: The causes of

low innovativeness in Poland are varied and multidimensional. More spending on research and development should be the starting point for its improvement.

The theoretical section follows a thorough review of leading specialist literature, while the empirical part uses the Summary Innovation Index (SII), published in the European Innovation Scoreboard (EIS) report. It is used to measure the innovativeness of European countries. Additionally, some selected methods of numerical data analysis were used in order to verify the research hypothesis.

The fostering of R&D will be of paramount importance to the future development of Poland; however, given the huge differences in research and development spending by enterprises in the innovation leaders, Poland's position will not improve soon.

National authorities can use the results as guidelines on the Polish economy's innovativeness growth factors. They also will give information what actions need to be taken to improve the situation.

The cognitive value of the paper consists in studying the causes of the innovativeness distance of the Polish economy with reference to selected, not all countries (the latter comparison is the object of a prevailing majority of the relevant literature). This approach will provide a clearer evaluation of the strengths and weaknesses of Poland's innovation system. It will allow for giving some recommendations for innovativeness level improvement.

Keywords: innovation, economy, barriers of innovation.

Uwarunkowania i tendencje zmian innowacyjności polskiej gospodarki na tle wybranych krajów europejskich

Streszczenie

Celem artykułu jest identyfikacja poziomu innowacyjności polskiej gospodarki na tle wybranych krajów europejskich oraz określenie uwarunkowań i tendencji zmian w przedmiotowym zakresie. W szczególności ważne jest wskazanie, które składowe SII mają istotne znaczenie w kształtowaniu poziomu innowacyjności. W artykule postawiono hipotezę badawczą: Przyczyny niskiego poziomu innowacyjności w Polsce są zróżnicowane i wieloaspektowe, a punktem wyjścia w jej poprawie powinien być wzrost poziomu nakładów na działalność badawczo-rozwojową.

Część teoretyczna artykułu została napisana na podstawie przeglądu wiodącej literatury przedmiotu. Natomiast w części empirycznej do weryfikacji postawionej hipotezy badawczej wykorzystano syntetyczny wskaźnik Summmary Innovation Index (SII), publikowany w raporcie European Innovation Scoreboard (EIS), służący do pomiaru poziomu innowacyjności w krajach europejskich oraz wybrane metody analizy danych liczbowych.

Kluczowe znaczenie dla przyszłego rozwoju Polski będzie mieć wzmocnienie sfery B+R, jednak obserwując ogromną różnicę wartości wydatków przedsiębiorstw na badania i rozwój w porównaniu do liderów innowacji, poprawa pozycji Polski nie nastąpi szybko.

Wyniki mogą posłużyć władzom krajowym jako wytyczne dotyczące czynników wzrostu innowacyjności polskiej gospodarki oraz informacja, jakie działania należy podjąć, aby poprawić sytuację.

Wartością poznawczą artykułu jest badanie przyczyn dystansu innowacyjności polskiej gospodarki w odniesieniu do wybranych krajów, a nie do wszystkich (co obejmuje zdecydowana większość opracowań prezentowanych w literaturze przedmiotu). Takie ujęcie pozwoli na czytelniejszą ocenę mocnych i słabych stron systemu innowacji w Polsce oraz formułowanie rekomendacji dla poprawy poziomu innowacyjności.

Słowa kluczowe: innowacyjność, gospodarka, bariery innowacyjności.

JEL: C10, O30, O12.