INNOVATION AS AN OPPORTUNITY FOR ECONOMIC DEVELOPMENT OF CENTRAL EASTERN EUROPE COUNTRIES (POLAND CASE STUDY)

Oleksandr Oksanych

Kielce University of Technology, al. 1000-lecia PP 7, Kielce 25-314, Poland

Abstract

The aim of the article is to analyze the causes of low innovativeness of the Polish economy and to indicate the directions of its growth. Economic innovation is one of the most important factors in economic development in the context of globalization and instability caused by the pandemic. From the author's point of view the problem of low innovation is systemic and to a large extent determined by the historical conditions of the economic development of Poland and Central European countries. Solving this problem requires the creation and implementation of an effective innovation policy, the goals of which are to adapt education and higher education systems to the needs of the modern economy, increase financing of science, optimize the structure of the economy, develop human capital and create an attractive innovative environment.

Keywords: *innovation, human capital, innovation policy, economic development*

1. INTRODUCTION

The problem of increasing innovation in the economies of European countries seems to be particularly relevant in the conditions of instability of the environment and the need to move to the knowledge-based economy model. An additional challenge is overcoming the economic crisis caused by the COVID19 pandemic.

For Central and Eastern European (CEE) countries, this problem is critical to avoiding the middle income trap. The search for directions for its solution should be carried out taking into account the historical conditions of economic development of these countries and the specificity of creating national innovation policies in each of them.

The subject of the study is the national innovation system of Poland. The juxtaposition of the systemic transformation processes and the creation of the innovation policy of Poland and the countries of Central and Eastern Europe (CEE) lead to the conclusion that the emerging problems and algorithms for solving them are similar in different countries CEE, despite the existence of specific conditions in each of them. Therefore, the results of the study of the Polish experience in creating the national innovation system largely reflect the state and development trends in terms of increasing innovation in economies of other CEE countries.

The compilations and assessments are based on the statistical data of Poland, the Czech Republic, Slovakia, Hungary, Romania and Bulgaria. The Baltic states belonging to the CEE group were not included in the research due to their specificity (location, size, structure of the economy and the nature of relations with other CEE countries).

Desk research and statistical methods were used in the research process.

2. INNOVATIONS AS A FACTOR OF ECONOMIC DEVELOPMENT

The change in the conditions of the functioning of national economies in the last 15-20 years requires the creation of new concepts of economic development. Numerous scientific publications and statements of representatives of political and business circles make it possible to unequivocally state about creating a knowledge-based economy as the only development model capable of meeting contemporary socio-economic challenges and ensuring sustainable development. Knowledge

increasingly determines quantitative and qualitative changes in the economy, determines its competitiveness and ability to integrate within the global economic system.

The attitude of the knowledge-based economy is its innovation, understood as the ability to quickly and effectively generate and implement new ways, techniques, methods to solve problems in the field of technique, technology, production, organization and marketing.

Negligence in this area may not only result in a decline in competitiveness, but also in the so-called middle income trap. The term middle-income trap (MIT) usually refers to countries that have experienced rapid growth and thus quickly reached middle-income status, but then failed to overcome that income range to further catch up to the developed countries (Glave 2016).

The middle income trap is due to many causes. According to IMF analysts, countries in the middle income trap are characterized by unfavorable demographics, an undervalued exchange rate, a low share of the economically active population with higher education, a low share of high-tech sectors in GDP and exports (Eichengreen 2012)

Polish researchers believe that the economy's collapse into the middle income trap is caused by an ineffective justice system, complicated tax law, bureaucracy, insufficiently high quality of higher education, low innovation and unfavorable demographic trends (Stańczyk 2014)

According to M. Aiyar, the phenomenon of the middle income trap is related to the imperfection of the legal system, the lack of proper enforcement of contracts and property rights, a large share of the public sector in the economy, excessive regulation and unfavorable demography, low innovation of the economy (Aiyar 2013).

Scientific publications indicate various reasons for the economy falling into the middle income trap (which is due to the fact that each country has its own specificity), but in all of them one of the basic determinants of this phenomenon is the low innovation of the economy. When analyzing the development trends in the EU, it can be stated that as the knowledge-based economy is created in the EU countries, the growth of innovation as a factor in avoiding the middle income trap will grow.

However, the analysis of the level of innovation, presented by the Summary Innovation Index (SII) of the CEE economies compared to the EU, shows that they have a fairly long distance to make up (fig. 1).

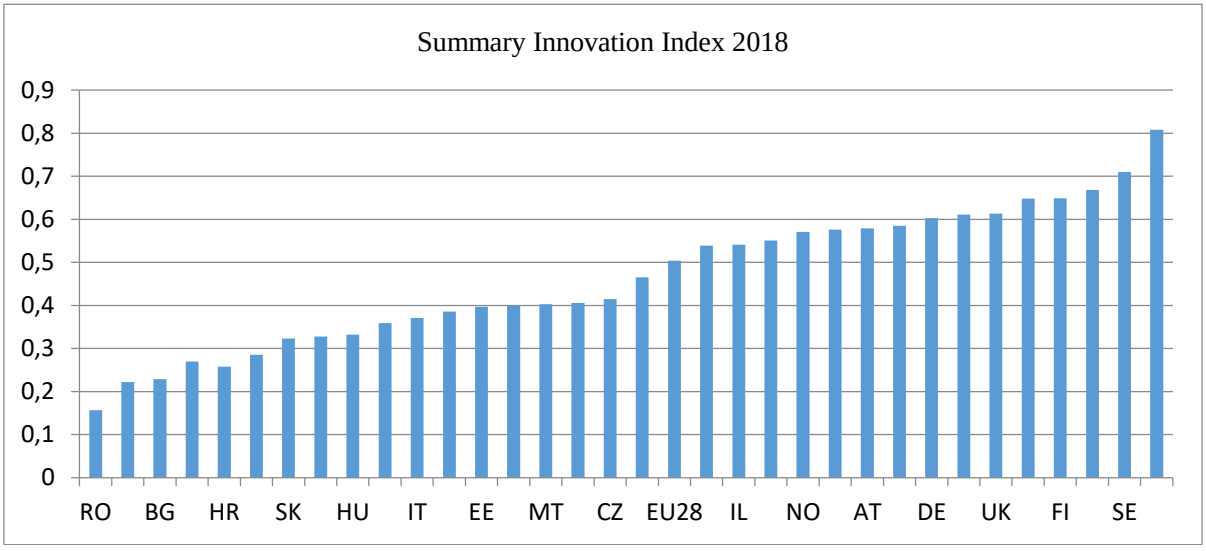


Fig. 1. Summary index of innovativeness of the EU countries, Switzerland and the UK.

Source: own study based on: European Innovation Scoreboard 2018

The reasons for the low innovativeness of the CEE economies should be viewed through the prism of historical conditions of socio-economic development after the systemic transformation at the turn of the 80-90 years of the last century.

A specific feature of the "starting" conditions for the economies of the CEE countries as new entities in the world market economy is the decline in the current level of effectiveness, caused by the process of systemic transformation. The transition from the centrally planned economy to the market economy system was accompanied by fundamental changes in the political system, the ownership structure, and institutional and legal determinants of socio-economic life. It is known that any change in the operating conditions of the system encounters resistance and leads to a temporary drop in efficiency (Lawrence 1969). Systemic solutions effective for Western countries did not bring the expected results and turned out to be less effective due to the existence of a whole series of barriers and limitations caused by the conditions of the transition period. These include:

- lack of organizational infrastructure for a liberal market economy;
- weakness of financial intermediation, unable to efficiently allocate the privatized assets;
- weak management of enterprises in the conditions of deregulated economy;
- lack of infrastructure for policies promoting competition;
- the weakness of the legal and judicial system, i.e. the inability to introduce the tax code and an efficient tax system;
- weakness of the local government, unprepared to take up issues of regional development;
- lack of non-governmental organizations supporting the newly emerging market and civil society (Kolodko 1999).

Economic reforms in most CEE countries were shaped like a program defined as the Washington Consensus, in which the suggested solutions referred to the assumptions of neoliberal policy (Jóźwik 2016). In Poland, the liberalization of the economy based on the Balcerowicz plan (Dziduch 2019, Garland 2015) made it possible to release the entrepreneurial potential, which was a significant factor of economic growth in the second half of the 1990s. The large market capacity and the unsatisfied demand for consumer goods during the period of socialism resulted in a significant increase in trade and services in the private sector and a dynamic increase in household income. Under these conditions, the increase in the innovativeness of the economy was perceived by both the authorities and business as a less attractive development factor, because it required large investments, was time-consuming and was associated with risk..

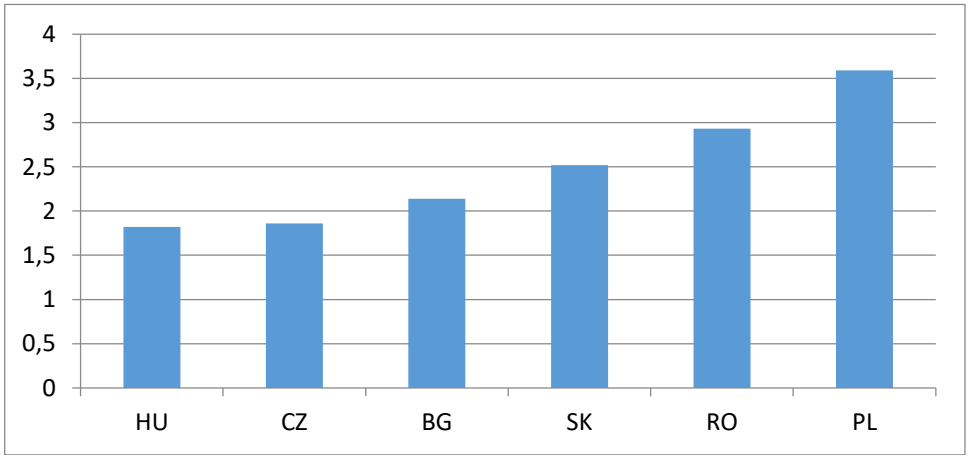


Fig. 2. Average annual real GDP growth rate in CEE countries in 2008-2019.

Źródło: opracowanie własne na postawie danych *Eurostat*

The exhaustion of the possibilities of this potential at the end of the last decade of the last century caused a slowdown in the GDP growth rate and it was necessary to look for new opportunities for the development of the economy. At the beginning of the 21st century, the CEE countries, including Poland, entered the period of pre-accession programs. EU funds began to come to the countries. After Poland joined the EU, financial support from EU funds increased significantly. Poland received around EUR 68 billion from the EU cohesion policy funds in the period 2007-2013 and has EUR 82.5 billion to be used for 2014-2020 (MIR 2015). Among the CEE countries that joined the EU in the same period, Poland received the greatest financial support. This level of inflow of financial resources allowed to accelerate economic growth, the average annual rate of which in Poland, compared to other CEE countries, in the period 2008-2019 turned out to be the highest (fig. 2).

The greater inflow of funds translated into an increase in investments and autonomous consumption, which resulted in a multiplier effect, but did not lead to noticeable changes in the level of innovation of the Polish economy (and other CEE countries). Although, in comparison with other CEE countries, the Polish economy is characterized by an increase in the total innovation index (SII) in the period 2010-2017, it actually remained unchanged compared to the average EU level (53.46% in 2010 to 53.57% in 2017).

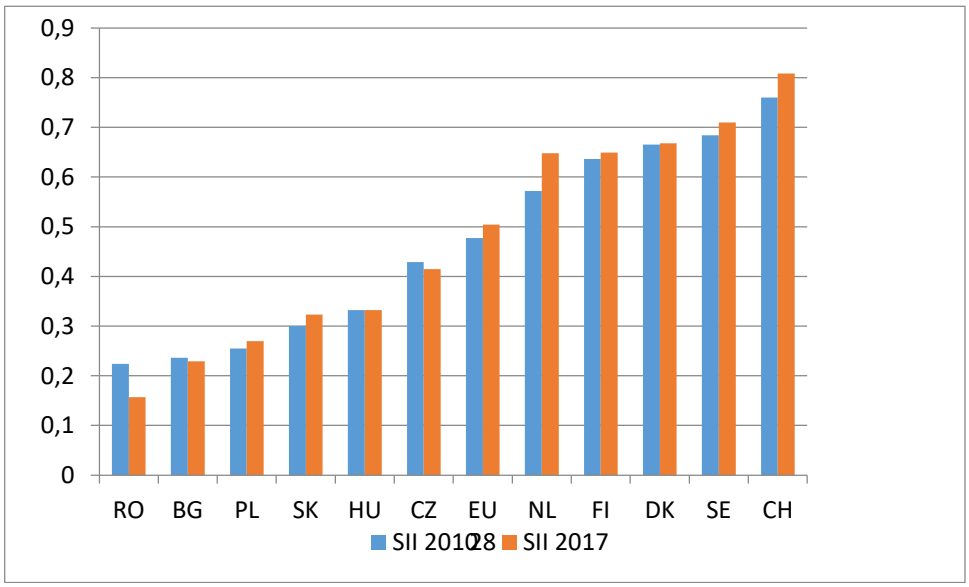


Fig. 3. Dynamics of the level of innovativeness of the leading countries, CEE countries and the EU-28 average.

Source: own study based on: European Innovation Scoreboard 2018.

The inflow of EU funds increased the innovativeness of the Polish economy - its status in the EU countries' innovation ranking, presented in the European Innovation Scoreboard, was changed from a "modest" to a "moderate" innovator. However, the gap in the level of innovation between Poland and the EU average (not to mention the group of leaders) remains quite large - the total innovation index (SII) of Poland is 0.29 with the EU average of 0.495.

The analyzed reports and data show that the inflow of EU funds to the Polish economy destroys innovation. However, this effect does not occur in other beneficiary countries of EU funds. Therefore, the reasons do not lie in the nature of EU aid, but in the mechanisms of distribution of these funds developed by individual countries. In Poland, these mechanisms were designed by the clerical apparatus in such a way that they destroy innovation (Rybiński 2013).

The EU funds received by Poland in order to increase innovation resulted in an increase in technology transfer from abroad, but did not contribute to the development of the national innovation system.

The practice of using EU funds in Poland proves that their effectiveness is lower than expected. The main goal of the National Cohesion Strategy (NSS, NSRF) was to create conditions for the growth of competitiveness of the economy based on knowledge and entrepreneurship, ensuring employment growth and an increase in the level of social, economic and spatial cohesion. It seems, however, that the method of dividing the funds allocated to Poland between individual programs and instruments was not optimal from the point of view of such a goal (Misiąg 2013).

3. CREATING AN EFFECTIVE INNOVATIVE POLICY AS THE BASIS FOR GROWTH OF ECONOMY INNOVATIVENESS

Solving the problem of increasing innovation in the economy should be considered in the context of factors influencing the level of demand and supply of innovations in the market. The figure 4 shows the key factors determining the demand and supply of innovation in the economy.

Innovation means the ability of the economy to use innovation quickly and efficiently. The measure of interest in innovations is the demand for them, which depends on:

- structure of the economy;
- competitive intensities;
- lack of alternative to innovative problem solving;
- pro-innovative attitudes of company managers - beneficiaries of innovative products;
- business conditions. (innovations, primarily technological ones, are associated with time-consuming investments, the implementation of which requires a stable and friendly investment climate) (fig. 4).

The first three factors “force” the management of enterprises to search for and implement innovative products. They are closely related to each other. The greater the share of industries with high and medium-high technology in the economy, the greater will be the demand for innovations. This is due to the fact that, firstly, along with technical progress, the innovation life cycle shrinks, and secondly, enterprises still have to maintain a high level of innovation, because in these sectors it has a much greater impact on competitiveness than in sectors with medium-low and low technology. This explains why innovations significantly change the structure of the economy (Zhang 2017).

In the high and medium-high technology sectors and high competitive intensity, development based on the increase in innovation is often a non-alternative strategy of enterprises operating in them. The higher the effectiveness of competitors in the same industry, the more likely each firm will rely on innovation as a competitive tool and the stronger the sustainability of the innovation will be (Aghion 2005).

Competitive intensities also significantly affect the demand for innovations. Strong competitive intensities, in line with the assumptions of Szumpeter's theory of innovation, force companies to innovate, especially when there are favorable macroeconomic conditions (Schumpeter 1912). Innovations have a direct impact on the efficiency of a company's resources.

Business conditions also determine the level of demand for innovation. This is due to the fact that innovations, primarily technological innovations, are associated with time-consuming and capital-intensive investments, the implementation of which requires a stable and friendly investment climate. Frequent changes to the "rules of the game", amendments to laws, and changes in economic policy priorities lead to an increase in the systemic level of investment risk in innovative projects.

These factors, however, determine the innovative absorption of the economy, but not its innovativeness.

Innovation is characterized not only by the absorption of innovation, but also by the effectiveness of implementation and use of innovations in practice. And this largely depends on the quality of human capital, on the ability and willingness of managers of companies and organizations to implement

innovations in the practice of economic activity. According to P. Drucker, the initiative of managers is one of the key factors in increasing the company's competitiveness (Drucker 1974). An initiative can be defined as a voluntary presentation of an idea. Not every idea transforms into innovation, but every innovation is based on some idea. Therefore, the ability and willingness of managers to generate new ideas (initiatives) has a direct impact on innovation processes in the company. Pro-innovative attitudes of managers mean that the solution of strategic and current problems of the company is based on innovations, which results in an increase in demand for them.

The effectiveness of innovation is largely determined by the source of the innovation origin. Transfer of innovation is a less risky, but less effective way to meet the needs on innovative products. The innovations transferred from abroad are proven on international markets and therefore are less risky. On the other hand, these innovations do not provide a long-term competitive advantage as they are also available to competitors. In addition, what is an innovation for the national beneficiary, it is "yesterday" for the country of origin. Therefore, the innovativeness of the economy is largely determined by the ability to generate own innovations. Unfortunately, for Poland, as well as for other CEE countries, the transfer of innovation is a much more frequently used form of satisfying the demand for innovative products than creating domestic innovative products.

The problem of increasing innovation is systemic and cannot be solved without reforming the innovation policy, which applies to all areas of the innovation process - from education and higher education to commercialization of innovative products), as well as the levels of decision-making - macroeconomic, microeconomic and personal. Innovative policy must be based on the principles of:

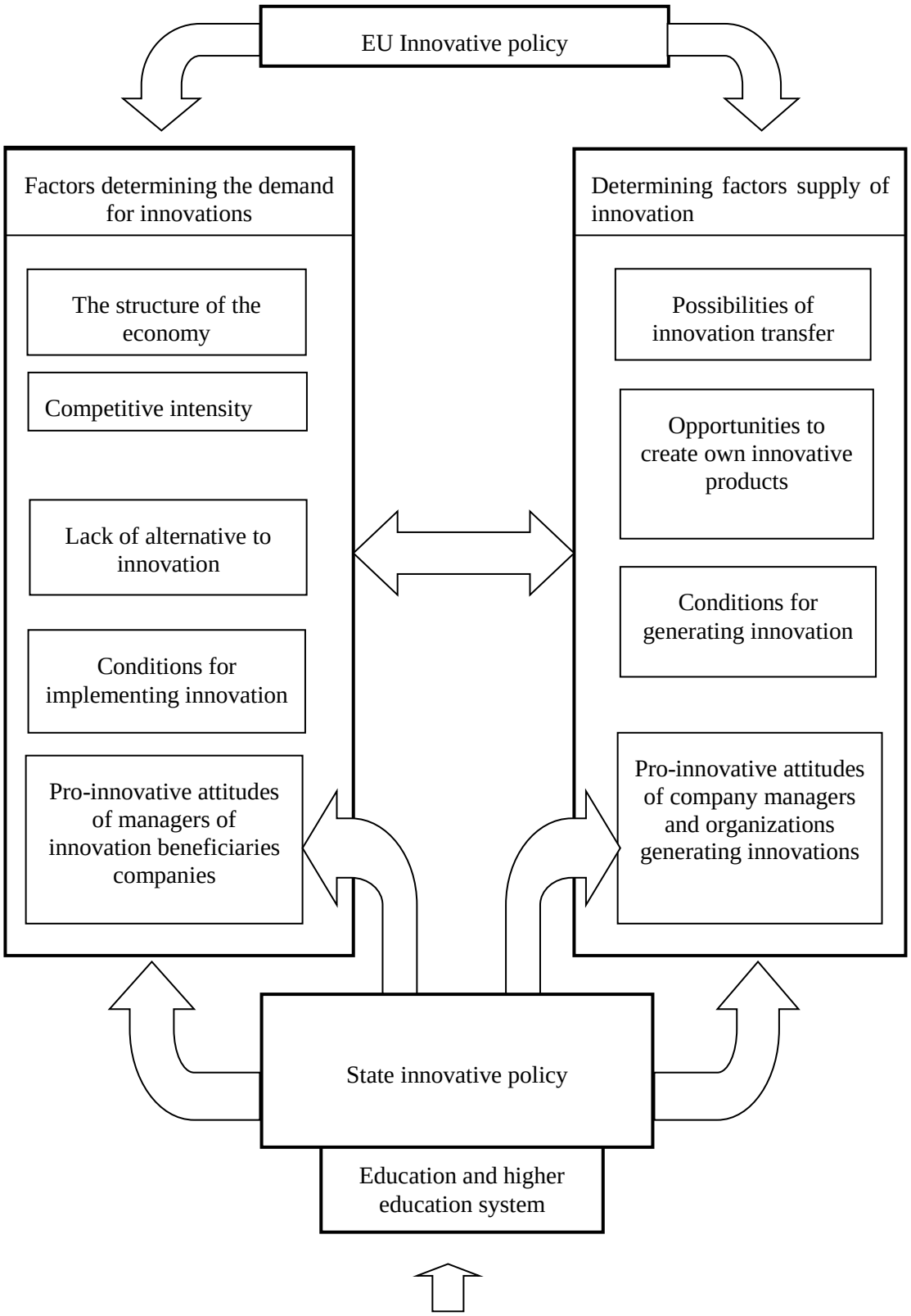


Fig. 4. Factors of innovation in the economy - the demand-supply approach.

Source: own study.

- a combination of market self-regulation and state intervention, which in practice means that the state creates conditions for activities that would make innovative activities attractive for the private sector;
- a compromise (balance) of the economic interests of the state, local communities (regions), business owners and households, which would ensure that the expectations of all interested parties are met;
- efficiency, which means achieving the set goals with a minimum expenditure of resources;
- a systemic approach ensuring that all aspects of innovative activity are taken into account and that decision-makers are highly flexible;
- continuity, which means the consistent implementation of the assumptions of the innovation policy in the practice of social and economic life;
- compatibility with the EU's innovation policy.

Reading scientific publications and analyzing statistical data lead to the conclusion that at the macroeconomic level, the key directions of innovation policy should be considered the next ones.

3.1. Optimizing the structure of the economy

The basic tool for changing the structure of the economy towards increasing the share of hi-tech and medium-high technology branches is creating an attractive investment climate. In developed countries, the production of high and medium-high technology is one of the most dynamically developing industries. Therefore, a characteristic strategy of large companies operating in these industries is the internationalization of production. The distribution of high-tech production in the country by a foreign company has a great impact on improving the structure of the economy and encourages domestic investors to invest in projects related to such a company - e.g., the production of components, the development of services and infrastructure facilities. Establishing economic cooperation with a large foreign investor mobilizes national enterprises and forces them to seek and realize reserves to increase the effectiveness of using their own potential, introduce changes and implement innovations. Dynamically developing branches create a demand for highly qualified employees, which is a strong stimulus to acquire appropriate knowledge both in the higher education system and in education and training centers outside this system. The aforementioned positive effects of foreign direct investments justify using their size as one of the indicators of the attractiveness of the investment climate.

Economic sectors by level of technology in Poland in 2016	Share of employees, %	Share of net revenues from sale,%
Hi technology	4,6	5,5
Medium Hi Technology	23,5	29,3
Medium Low Technology	31,0	31,8
Low Technology	40,9	33,4

Table 1. Structure of net sales revenues and employment structure by technology level in Poland in 2016

Source: Author's elaboration on the basis of (Nauka i technika w2016, p.88,89)

In the CEE countries, especially in the Czech Republic and Hungary, there is a relatively large share of high technology production compared to the EU average. This is the result of shifting the production of these branches from Western Europe for reasons of lower costs while ensuring the appropriate quality of production. On the other hand, the share of medium-high technology production

is lower than in the West. Table 1 shows the structure of employment and net sales revenues by technology level in Poland in 2016.

Presented in tab. 1 data show that 71.9% of employment is in sectors of the economy with medium-low and low technology, and they generate 65.2% of net revenues from sale, which means that labor productivity is almost 10% lower than in the high and medium sectors -high technology.

3.2. Development of the education and higher education system and creation of human capital

The effectiveness of the management system is closely related to the quality of human capital, which is the basis of an organization's innovation. However, the creation and effective use of human capital depend on the external socio-economic environment. The problem of innovativeness of the economy is directly related to the models of acquiring knowledge, qualifications and skills, which are based on the proper functioning of the education and higher education system. The ability to acquire knowledge plays a key role in shaping a personality with pro-innovation attitudes. It is important not only to acquire knowledge, but also to develop the skills to learn and use knowledge. As knowledge ages, the ability to learn becomes an important factor in the quality of human capital. This is confirmed by the example of the Scandinavian countries, where a high level of education quality translates into the highest level of economic innovation in the EU. Denmark, Sweden and Finland, included in the group of innovation leaders, are characterized by a lifelong learning ratio three times higher than the EU average, and in relation to the CEE countries - 6-7 times higher, which indicates the topicality of this aspect of innovation policy for Romania, Bulgaria, Poland, Hungary, Slovakia (European Innovation Scoreboard 2018). Lifelong learning as an indicator of the quality of the education system and learning skills shows a high correlation with the total innovation index SII (R2 = 0.86).

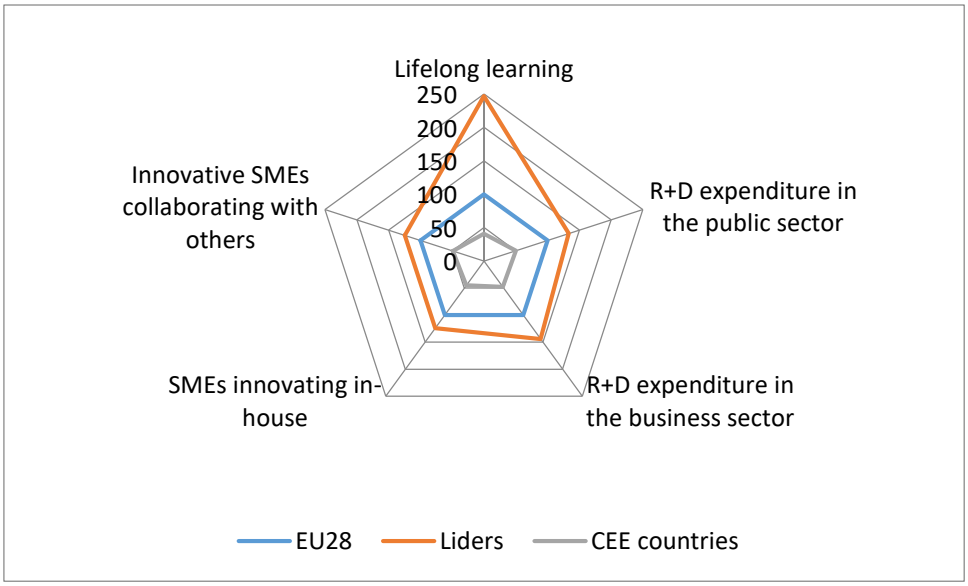


Fig. 5. Average value of selected innovation indicators in the group of leaders in the CEE and EU28 countries.

Source: own study based on: European Innovation Scoreboard 2018

The abilities of university and university graduates to learn, work in a team, generate initiative, based on knowledge and continuous improvement of skills, created in the education system, translate into the development of the culture of organizations and companies, increased effectiveness of using the innovative potential of human capital, awareness of the need for innovation as a key competitiveness growth factor. It is they who determine the scope and effectiveness of activities in the field of innovation. The delay of the CEE countries in this area is reflected in the comparison of the lifelong learning index with the level of the EU28 and the innovation leader countries (fig. 5).

3.3. Financing science

The innovation policy must support the creation of own innovative products, which, compared to the innovations transferred from abroad, allow to generate greater added value, ensure greater job growth and increase the competitiveness of the economy to a greater extent. Own innovations are the result of sustained efforts in the sphere of creating a national innovation system based on scientific research and R&D. Fig. 6 shows expenditure on R&D in the public sector and the total innovation index in the EU countries, Great Britain and Switzerland in 2018. The relationship between public funding of science and the level of innovation in the economy is quite close and is characterized by a correlation coefficient of 0.661. The increase in R&D expenditure in the public sector causes an increase in R&D expenditure in the private sector (this relation is characterized by a correlation coefficient of 0.665). With financing of science at the level of up to 0.4 percent. GDP, it has a socio-cultural function, with an expenditure of 0.4-0.9 percent. Science performs a cognitive function and only after exceeding the level of 0.9% from GDP - economic function. This means that with the amount of expenditure on science below 0.9 percent. On GDP, science is an unprofitable branch of the economy (Маліцький 2007, p. 464). Meanwhile, in 2017, the total expenditure on science in the public sector amounted to 0.43% of GDP, which means a slight decrease compared to 2016 (Tomala L.2016). In 2018-2020, Poland significantly increased these expenditures (0.63% in 2018), although it is much less compared to the countries - leaders of innovation and strong innovators, where this indicator is 1.8-2.5 GDP (fig.1). However, the increase in funding for science should be gradual so as to avoid the phenomenon of excessively sharp increase in expenditure (see eg Freeman and Van Reenen 2009). Other CEE countries are also dealing with a similar problem.

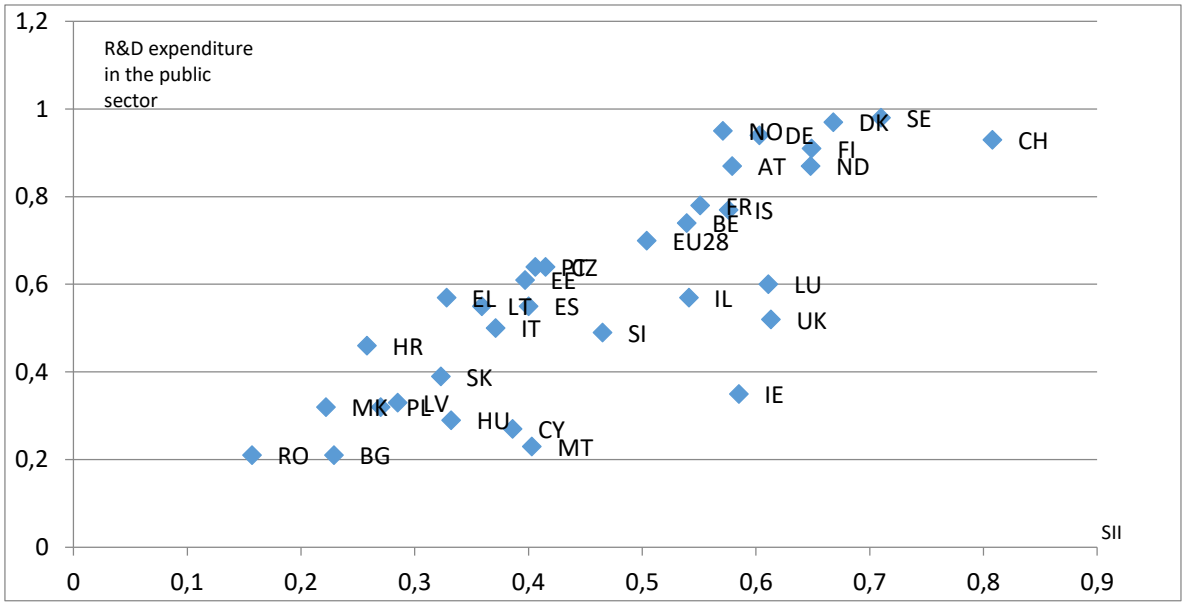


Fig. 6. Summary index of innovation and expenditure on R&D in the public sector in the EU countries, Switzerland and Great Britain.

Source: own study based on: European Innovation Scoreboard 2018.

The growth of innovation requires not only an increase in expenditure on financing science, but also the implementation of consistent steps towards their most effective use. The state has to support the spheres of scientific activity that are not attractive to the private sector, but are necessary for the development of the national innovation system. However, for companies it is important to ensure the effective use of funds allocated to innovative projects. The relationship between a company's level of innovation spending and economic success is, however, tenuous at best. Over the past dozen years, annual Global Innovation 1000 study has found no statistical relationship between dollars spent on

research and development (R&D) and financial performance, suggesting that the way you spend your innovation dollars is more important than how many of those dollars you spend (Staak 2017).

3.4. Development of innovation infrastructure

The intensification of innovative activities is based on a well-functioning innovation infrastructure, whose task is to provide comprehensive support to all participants of innovative processes. Units of innovative infrastructure take on functions, the implementation of which is usually not a necessary element of the innovation cycle, but allows innovative companies to save time and resources, reduce the risk of innovative activities, and make rational decisions. Such units are characterized by a high level of specialization, therefore the quality of their services is sufficiently high, and the value of the services is moderate. Innovation infrastructure develops in line with the demand for innovation and the nature of innovative activity. In Poland, most enterprises use innovative products transferred from abroad, while generating their own innovations or using national innovative products are practiced less frequently. This explains the nature of the services of innovation infrastructure units. They are oriented towards intermediation in innovation transfer operations. On the other hand, consulting, information, marketing and financial support for national innovation "generators" is quite limited.

The basis of the activity of innovative infrastructure must be informational support for all aspects of innovative activity. "The roles and responsibilities of the different actors (including infrastructure and service providers, data owners, and academic and industrial RI users) need to be clearly identified and effective and cost-efficient solutions that fulfill the needs of the industrial users and data owners should be ensured (in cooperation). In particular, the costs for different services and procedures should be made transparent and different economic models for implementing them should be investigated (especially for the commercial re-use of data)" (Moulin 2018).

The development of innovation infrastructure must be based on a combination of state action and private sector initiative. The attempt to transfer organizational and institutional solutions that are effective and efficient in the US and the EU (launching technology parks, business incubators, creating clusters) into the practice of the Polish economy turned out to be not very successful. For example, technology parks in Poland focus on the financial results of their own activities rather than on the implementation of tasks related to innovation policy, as in the USA (Staszków 2015). The reason for this is the structure of demand and supply of innovative products on the market, characterized by a low share of domestic innovative products, low domestic R&D potential and the related low activity of the private sector in this area.

The insufficient development of innovation infrastructure also occurs in other CEE countries, as evidenced by selected innovation indicators of the European Innovation Scoreboard, e.g., innovative SMEs collaborating with others (fig. 5).

3.5. Institutional and legal development

The effectiveness and flexibility of the institutional and legal system is one of the most important conditions for the development of the economy, however, it is of key importance for the growth of innovation in the economy. This is because:

- innovation activity is more sensitive to political, legal and economic fluctuations due to higher risk and significant investments with low liquidity;
- innovations are based on the implementation of an idea that needs copyright protection, simplification and shortening of bureaucratic procedures.

Changes in the Polish legal system over the last three years cause concern in European countries, as they are contrary to the norms and fundamental values of the EU (Wahl 2020). Unfortunately, the analysis of the functioning of the basic state institutions indicates a significant deterioration of the investment climate, which adversely affects the innovative absorption capacity of the economy. Business and investors have picked up on the fact that doing business in Poland holds political risk. (Balcerowicz 2019). Problems with the institutional and legal system also occur in Hungary (Rankin

2019). This aspect of the problem of increasing the innovativeness of the economy seems to be particularly important as it concerns the basic conditions for running a business.

The presented directions of growth of the innovativeness of the economy will be effective only with the improvement of economic and legal instruments of implementing the innovation policy. They must be flexible enough and ensure a quick reaction to changes in the external and internal conditions of the economy, support the mechanism of market self-regulation and competition.

Increasing the innovativeness of the economy for the CEE countries is important not only in terms of increasing resource efficiency and competitiveness. It is a very important factor in creating new attractive jobs for employees with higher education, which increases the chance of slowing down the pace of migration of human resources to Western European countries and significant economic growth.

4. CONCLUSIONS

The CEE countries are characterized by a low level of innovation, which results from:

- delays in socio-economic development caused by the systemic transformation at the turn of the late 1980s - early 1990s;
- structures of the economy with a large share of low and medium-low technology production;
- orientation on the transfer of innovation from countries belonging to innovation leaders and strong innovators, and insufficient development and use of own scientific and research potential;
- insufficiently effective policy of creating and developing human capital;
- subsidies from EU funds that weaken the functioning of the competition mechanism.

The lag in the development of innovation threatens to trap an average income due to:

- flow of human resources to countries with more developed economies;
- increasing the role of knowledge as a factor of socio-economic development, which for low-innovation countries may lead to a reduction in competitiveness on international markets;
- high share of sectors based on the use of low and medium-low technologies.

In conditions of instability and COVID19 pandemic, economies with a large share of the services sector (primarily financial, R&D, management and marketing services, consulting, engineering) are doing better. The innovation cycle includes phases, most of which are carried out in the field of services (research, R&D, innovation testing, design, etc.). Innovative economy is easier to adapt to the limitations caused by the pandemic and allows the use of remote forms of work organization.

The problem is systemic and requires the creation and implementation of an effective innovation policy, implemented on the basis of:

- a combination of market self-regulation and state intervention;
- compromise of interests of business, state and regions;
- systemic nature, providing for the coordination of activities in all socio-economic spheres, directly or indirectly related to the innovation cycle;
- international cooperation.

The main goal of the innovation policy of the CEE countries must be to eliminate the delay in innovation in relation to the countries - innovation leaders and strong innovators. To achieve this goal, I need:

- changes in the structure of the economy towards an increase in the share of high and medium-high technology production;

- supporting one's own science sector, R&D by increasing and optimizing financing of science, reforming education and higher education, creating an effective innovation cycle management system,
- changes in the concept of human capital management, creating pro-innovative attitudes of managers, creating conditions conducive to the development of creativity of university graduates, providing them with opportunities for development and professional growth;
- ensuring the protection of copyrights and inventions.

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