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Barriers and Drivers to Business Growth and Innovativeness: Example of Polish Companies

Abstract

The aim of the article is to analyse the factors and barriers affecting the growth and innovativeness of Polish enterprises. The author analysed the factors favouring and barriers limiting the growth and innovativeness of Polish enterprises, presenting the results of an empirical study conducted among 70 companies of different sizes. The sample was selected in a stratified random way, taking into account such strata as company size or section of PKD (Polish Classification of Activities). It is a research-analytical study based on literature review, secondary data analysis and survey applying quantitative research techniques (CATI). The article thesis indicates a varying level of innovativeness of Polish companies strongly depending on the size of the company and limited development of innovation due, for example, to the lack of financial resources, insufficient research and development infrastructure and poor cooperation between companies and scientific institutions. The findings also reveal that internal resources of firms such as human capital and adaptability and external factors such as regulatory stability and access to finance, are crucial for the implementation of innovation. The author concludes that effective elimination of barriers and active use of factors supporting innovativeness can significantly increase the competitiveness of Polish companies on the domestic and international markets.

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JEL Classification Codes: O31, O32, F63, D25

Bariery i czynniki napędzające wzrost i innowacje przedsiębiorstw: przykład polskich firm

Abstrakt

Celem artykułu była analiza czynników oraz barier wpływających na wzrost i innowacje polskich przedsiębiorstw. Autorka dokonała analizy czynników sprzyjających oraz barier ograniczających rozwój i innowacyjność polskich przedsiębiorstw, prezentując wyniki badań empirycznych przeprowadzonych wśród 70 firm różnej wielkości. Próba w badaniu została dobrana w sposób losowo-warstwowy, uwzględniający takie warstwy jak wielkość firmy, sekcje PKD. Artykuł ma charakter badawczo-analityczny, oparty na przeglądzie literatury, analizie danych wtórnych oraz badaniu ankietowym, w którym zastosowano ilościowe techniki badawcze (CATI). Teza artykułu wskazuje, że poziom innowacyjności polskich przedsiębiorstw jest silnie zróżnicowany w zależności od wielkości przedsiębiorstwa, a rozwój innowacji ograniczają m.in. brak zasobów finansowych, niewystarczająca infrastruktura badawczo-rozwojowa oraz niska współpraca między firmami a instytucjami naukowymi. Wyniki badań ujawniają również, że kluczowe znaczenie dla wdrażania innowacji mają zasoby wewnętrzne firm, takie jak kapitał ludzki i zdolność do adaptacji, oraz czynniki zewnętrzne, jak stabilność regulacyjna i dostęp do finansowania. Autorka konkluduje, że skuteczna eliminacja barier i aktywne wykorzystanie czynników wspierających innowacyjność mogą znacząco zwiększyć konkurencyjność polskich przedsiębiorstw na rynku krajowym i międzynarodowym.

Słowa kluczowe: innowacje, czynniki innowacyjności, bariery innowacyjności, rozwój, przedsiębiorczość, konkurencyjność

Kody klasyfikacji JEL: O31, O32, F63, D25

Introduction

Statistics show that the innovativeness of the Polish economy is low in comparison to other countries. That is why it is so important to conduct cyclical studies on the factors of innovation development in the Polish economy and to identify the

barriers hampering this development. This is an area that should be constantly analysed because, in the face of a difficult economic situation, many companies have problems with developing their activities. Entrepreneurs are afraid to invest in modern solutions due to a lack of market certainty. Meanwhile, it is innovation that is key to gaining an advantage on the market. Companies that invest in research and development are better prepared for what lies ahead. By introducing modern technologies, products or services, by automating processes, companies become more attractive to customers and more resistant to market changes. However, innovation is not everything. Many companies still do not know what their potential is or what is limiting them, they do not do any research in this area. Furthermore, it should be pointed out that innovation is a major factor in economic development. The innovative position of an economy determines its prospects for further development. Furthermore, it is worth mentioning that one of the objectives of the Lisbon Strategy was to create a knowledge-based, competitive and dynamic economy, capable of sustainable growth and offering more jobs.

The aim of this article is to analyse the drivers and barriers limiting growth and innovation in Polish enterprises. The author used targeted literature reviews, secondary data analysis and a survey, which was conducted among 70 enterprises registered in Poland. The survey covered companies of different sizes, from micro-enterprises to large entities, and aimed to determine their level of innovativeness and identify difficulties related to the implementation of innovative solutions. The analysis showed that most of the companies surveyed were engaged in innovative activities, but the scope and intensity of these activities depended on the size of the company. Large and medium-sized enterprises were more often involved in innovation processes, especially in product and organisational areas, while micro and small companies had limited possibilities in this respect. Innovations were mainly introduced at the regional level, while process and marketing innovations occurred less frequently. It was also shown that most companies, especially smaller ones, did not have research and development (R&D) departments, which limited their ability to systematically implement new solutions.

The study aimed to address the following research questions:

1. What is the level of innovativeness among Polish enterprises of different sizes?
2. What are the main barriers and drivers influencing innovation activity in Polish companies?

Based on the literature review and the survey, the following hypotheses were formulated:

H1: Larger enterprises are more likely to engage in innovative activities compared to micro and small enterprises.

H2: Companies with access to R&D departments are more likely to introduce product and process innovations.
H3: Financial constraints are the most commonly cited barrier to innovation, regardless of company size.

Review of the literature

Innovation in Enterprises: Concepts and Methodological Approach

Innovation as a concept is of interest to various scientific disciplines. Therefore, it is difficult to give a single and universal definition of it. The first comprehensive definition of innovation was indicated by Schumpeter (1939, 2003), who emphasised the crucial importance of innovation in the development process. Schumpeter constructed a model of an economy in which no changes in technology take place. Such an economy would have to enter into the modes of an iterative process in which there would be no uncertainty. According to Schumpeter, a positive rate of interest can only be provided by technical innovation. Schumpeter emphasised the effect of the 'novelty' of products and solutions, he understood innovation as not only the introduction of a new, previously unknown product onto the market, but also the implementation of a new production process. He also understood innovation as the opening up or creation of a new market for a particular industry, the use of new raw materials or materials for production, or the application of a new production organisation (NBP, 2016).

The neoclassical theory of economic growth proposed by R. Solow (1988) demonstrated the importance of technological progress in economic growth or value-added growth. Solow noted that the growth rate is not only not proportional to the growth rate of savings/investment, but is actually independent of them. In the model of R. Solow only changes in the rate of technical progress have growth effects, while changes in other factors only affect the level of the economy. Only technical progress is able to sustain the long-term growth of economies in terms of per capita income (Solow, 1994).

Based on the J. Schumpeter's theory, making a change can be considered innovation when three conditions are simultaneously met: firstly, the introduction of a new or modified existing solution, which concerns a product, a process or a way of organisation, occurs as an effect. Secondly, the solution has not previously been used by other companies. Thirdly, the solution has been successfully implemented for use in business activities (Kamińska, 2007).

The following types of innovation are mentioned in the literature:

1. Product innovation, which involves the introduction of a new product.
2. Process innovation, which is related to carrying out a new production method.
3. Market innovation, which relates to a new sales or supply market.
4. Innovation in the sphere of management, which is connected with running a new structure of activity (Chądzyński, Nowakowska and Przygodzki, 2007).

In the contemporary study of innovation in the economy, the definition of innovation used in the research methodology of the Central Statistical Office seems to be the most relevant. The definition refers to the standard international methodology, which was presented in the Proposed Guidelines for Collecting and Interpreting Technological Innovation Data – Oslo Manual on the principles of innovation surveys developed by the OECD and Eurostat (1997). This manual provides a basis for considering the innovation of the economy in the context of the results of surveys of official statistics in the countries of the European Union. The Polish version of the second edition of the Oslo Manual was published by the Committee for Scientific Research in 1999. Based on the Oslo methodology, innovation surveys are currently carried out not only in the OECD member states and the European Union, but also in countries outside these organisations. The third edition of the Oslo Manual was published at the end of 2005. Compared to the second edition, the change concerns the widening of the scope of statistical surveys of innovation by including organisational and marketing innovation. This is a consequence of the introduction of a new taxonomy of innovation, which includes four types of innovation:

1. Innovations – products.
2. Innovations – processes.
3. Organisational innovations.
4. Marketing innovations.

The full implementation of the Manual's recommendations took place in 2005 in the CIS survey, which was conducted under the aegis of Eurostat in the EU and EFTA countries as part of the international research programme Community Innovation Survey.

According to the methodology of the Central Statistical Office, innovative activity is the totality of scientific, technical, organisational, financial and commercial activities that lead or are intended to lead to the implementation of innovation. Some of these activities are innovative in nature, others are intended to lead to the implementation of innovation. Innovation activities also include research and development (R&D) activities that are not directly related to the creation of a specific innovation, but contribute to the creation of new knowledge and actively participate in the innovation process. Namely, a common feature of innovations is that they are implemented (CSO, 2010).

To measure innovation at the macro level, the SII (*Summary Innovation Index*), published in the European Innovation Scoreboard (EIS) report, has been used since 2000. This indicator was primarily used to monitor the level of innovation of individual Member States and other selected countries as defined in the Lisbon Strategy. It was based on 25 indicators divided into two groups: input and output. The selected groups of indicators are presented in the table below.

Table 1. Indicators for measuring entry group innovation according to the EIS (2007)

Output group indicators	
1. The driving force behind innovation	Number of technical graduates per 1,000 population aged 20–29
	Percentage of population with tertiary education aged 25–64
	Broadband penetration rate per 100 inhabitants
	Participation in continuing education, (% of population aged 25–64)
	Level of educational attainment (% share of young people aged 20–24 with secondary and tertiary education in total population of that age)
2. Knowledge creation	Share of research and development (R&D) expenditure in % of GDP
	Share of research and development (R&D) expenditure in business in % of GDP
	Share of R&D expenditure of medium and high technology in total R&D expenditure in industry
	Share of enterprises receiving public funds for innovation in total number of enterprises
	R&D expenditures of universities financed by private business
3. Innovation and entrepreneurship	Share of innovative SME in the total number of SME (in %)
	Share of innovative SME cooperating with other SME in the total number of SME (in %)
	Expenditures of enterprises on innovation activities in comparison to the total turnover (in %)
	Share of early stage venture capital in GDP (in %)
	Expenditure on information technology (ICT) in % of GDP

Source: European Innovation Scoreboard 2007, Comparative Analysis of Innovation Performance, Pro Inno Europe, February 2008, http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=275&parentID=51.

A detailed analysis of the aforementioned indicators enables an assessment of Poland's economic innovativeness compared to other EU countries. It also provides valuable information on the barriers that hinder this development and weaken the competitiveness of the Polish economy vis-à-vis EU countries.

Information on the level of innovativeness of Polish enterprises can also be found in the report of the Polish Agency for Enterprise Development entitled Monitoring innovativeness of Polish enterprises. Innovation maturity indicator – 2023. (PARP, 2023). The report presents a detailed assessment of the innovativeness of companies in Poland, measured by the Innovation Maturity Index (WDI), which in 2023 amounted to 34.6 points out of a possible 100. Although there was an increase of 2.5 points in this indicator, compared to the previous survey, the results still indi-

cate a relatively low level of innovation maturity of Polish companies. Companies in Poland are increasingly engaging in innovative activities, but these their conduct is not yet fully realised in the market. Although research and development initiatives are undertaken, the results of these activities are still not sufficiently translated into the commercialisation of innovations, i.e. the introduction of new products or services to the market. There is therefore a gap between the theory and practice of innovation, with many companies failing to effectively implement innovative ideas in their day-to-day business operations. The report also shows that one of the main constraints to the development of innovation is the difficulty in raising adequate funds. Polish companies struggle with financial problems and point to insufficient support from financial institutions. Lack of access to funds for the development of innovation means that companies are unable to implement more ambitious projects that could affect their competitiveness on the domestic and international markets.

Table 2. Indicators for measuring exit group innovation according to the EIS (2007)

Input group indicators	
1. Implementation	Employment in high-tech services in total employment (in %)
	Export of high-tech products in total exports (in %)
	Sales of new and upgraded products in total turnover (in %)
	Sales of new products to companies in total turnover (in %)
	Employment in medium-high and high-tech manufacturing in total employment (in %)
2. Knowledge creation	New patent applications at the EPO* per million inhabitants
	New patent applications at the USPTO per million inhabitants
	New triadic patents per million inhabitants
	New trademarks registered in the EU per million inhabitants
	New industrial designs per million population

Source: European Innovation Scoreboard 2007, Comparative Analysis of Innovation Performance, Pro Inno Europe, February 2008, http://www.proinnoeurope.eu/index.cfm?fuseaction=page.display&topicID=275&parentID=51.

Recent data from the European Innovation Scoreboard (EIS, 2024) confirm that Poland remains in the group of moderate innovators, although it has shown slight improvement in selected indicators, such as the share of innovative SMEs collaborating with others and public R&D expenditures. Nevertheless, Poland still lags behind EU leaders in terms of innovation outcomes and business-science cooperation. Moreover, the Monitoring of Innovation Trends – Report 16 by the Polish Agency for Enterprise Development (PARP, 2024) emphasises the growing role of digitalisation and green transformation as key innovation drivers among Polish

enterprises. According to the latest report by the GUS, in 2020–2022, 36.1% of industrial enterprises and 34.2% of service enterprises showed innovative activity. Outlays on innovation activity incurred in 2022 amounted to PLN 26 011.7 million in the industrial sector and PLN 29 689.1 million in the service sector. In the same period, the share of revenue from sales of new or improved products introduced to the market in 2020–2022 accounted for 6.9% in industrial enterprises and 2.7% in service enterprises (GUS, 2023). According to the Polish Development Fund's December 2024 report, in 2023, spending on research and development (R&D) in Poland reached EUR 11.7 billion, accounting for 1.56% of GDP. This represents an increase of 22.6% compared to the previous year. The largest share of this outlay came from the business sector, which allocated almost EUR 7.5 billion to R&D, accounting for 65% of total expenditure (PFR, 2024). According to the Global Innovation Index (GII, 2024), published by the World Intellectual Property Organization (WIPO), Poland maintained its position among moderate innovators, ranking 40th globally. The report highlights an increase in R&D expenditure in Poland, but also points to the need for improved efficiency in innovation investment and stronger collaboration between the scientific sector and industry. These findings align with national reports indicating that while innovation capacity is growing, challenges remain in translating research efforts into market-ready solutions.

Factors for developing innovation

The drivers of business innovation are a key area of interest for both research and economic policy. The article highlights that innovation is driven by a complex interaction of internal and external factors that together influence the ability of firms to create new solutions and implement them.

These factors are complex and depend on a number of interdependent elements. One key factor is human capital, which includes the level of education, the availability of a highly skilled workforce and the ability of employees to adapt to changing conditions. Research shows that investing in education, at both primary and tertiary levels, significantly increases the ability of societies to generate and implement innovations (Romer, 1990). Data from a McKinsey Global Institute report (2021) shows that companies that invest in digital technologies have on average a 20% higher growth rate than those that do not.

The development of an economy's innovativeness is mainly stimulated by two groups of factors. The first group consists of factors belonging to the area of the enterprise and it is these that determine its capacity for innovation. The second group of factors are those belonging to the socio-economic environment of the enterprise

and it is these factors that determine its innovation capabilities. The most important factors that shape a company's ability to innovate include:

1. The ability to acquire scientific and technical knowledge, which is essential for the implementation of innovations. This knowledge manifests itself mainly as the ability to anticipate the changes that result from the implementation of the innovation.
2. The intellectual capacity of the enterprise, endowed with the ability to acquire knowledge of new works and techniques within the scope of the enterprise's manufacturing activities and to develop competencies related to the implementation of innovations. The ability to implement change also requires intellectual autonomy, the integration of employees' goals with those of the enterprise, the ability to work together in teams.
3. Willingness to take risks and actions to minimise those risks. Enterprises should have methods of acquiring and processing knowledge, which is essential in the process of creating innovative activities.
4. The openness of enterprises to their environment and their willingness to cooperate. This requires a high degree of activity on the part of enterprises that undertake cooperation in innovative activities and share their experience in this field.
5. Knowledge of the possibility of support for innovation activities of the enterprise from the socio-economic environment.

The second group of factors that influence business innovation are those in the socio-economic environment. Among the most important of these are:

1. Capital accumulation and investment in R&D.
2. Availability of capital and credit to support innovation.
3. An incentive-based intellectual property regime. Legal stability, protection of intellectual property and incentive systems such as R&D tax credits have a direct impact on the motivation of firms to undertake innovative activities (Nelson and Winter, 1982).
4. A high level of education to market needs.
5. The development of universities and research institutions.
6. Cooperation between universities and enterprises in the field of knowledge transfer, as well as the training of competent personnel for innovation. According to Schumpeter's model (1942), companies with high R&D intensity have a higher potential to create breakthrough innovations. In addition, cooperation between science and business is a key mechanism for knowledge and technology transfer.
7. The creation of pro-innovation policies that provide support for innovation.
8. An extensive communication network, access to modern information technologies and support from innovation assistance institutions such as technology

parks or business incubators contribute to the creation of an environment conducive to the development of innovation (Porter, 1990).

The positive impact of the above-mentioned factors may favour the development of innovativeness of enterprises and the whole economy. On the other hand, their absence or low impact may cause the emergence of numerous barriers that will hamper the development of this process.

One of the main stimulators of innovativeness is the state's pro-innovation policy, including financial, regulatory and institutional support systems. In Poland, according to a report by the Central Statistical Office (GUS, 2010), only 23% of enterprises use public funds for research and development activities. Meanwhile, Scandinavian countries, where support for R&D exceeds 3% of GDP, perform best in innovation rankings (European Innovation Scoreboard, 2021). Examples of effective measures include R&D tax credits, venture capital funds and support for incubators and technology parks.

In summary, innovation drivers include both internal aspects, such as human capital and organisational culture, and external aspects, such as access to finance, technological infrastructure and cooperation with the socio-economic environment. The effective use of these factors is key to increasing the competitiveness of Polish companies.

Another important aspect of innovation development, increasingly relevant in the context of the European Green Deal and global sustainability goals, is the implementation of green innovations. These include environmentally friendly technologies, energy-efficient production processes, circular economy solutions and ecological product designs. The green transformation of the economy is becoming a strong external driver of innovation, especially due to regulatory changes, access to EU funding and growing market demand for sustainable solutions. Polish enterprises are gradually recognising the potential of green innovations, although their implementation is still at an early stage, particularly among SMEs. The shift towards sustainability is expected to become one of the dominant trends in innovation policy in the coming years.

Barriers to innovation

A lack of awareness or understanding of innovation by managers can be a significant barrier to business growth. A wrong perception of innovation leads to ignoring opportunities for change or wanting to sustain outdated solutions. An example of this approach could be sticking to traditional sales methods, despite the growing popularity of e-commerce.

It is worth noting that a lack of understanding of innovation may result from a lack of knowledge of new technologies, market trends or customer needs. If this is the case, it is necessary to invest in developing the competencies of managers and employees across the organisation so that they can make informed decisions about innovation. Otherwise, companies will lag behind their competitors, who will be able to adapt more efficiently and quickly to changing market conditions.

The development of innovative activity may be hampered by a number of factors that will act as barriers inhibiting or even preventing its proper course. The cyclical scientific and statistical studies conducted indicate the numerous occurrence of barriers in the process of innovation development. The most important of these include (GUS, 2010):

1. Lack of access to modern technology, insufficient infrastructure or lack of technical skills are significant barriers that can hinder innovation in a company.
2. Insufficient infrastructure is another barrier that can hinder innovation. Companies need to have adequate resources, such as buildings, machinery or IT systems, to be able to innovate. The lack of these resources can lead to delays in innovation projects, as well as reduced opportunities to introduce new solutions.
3. Firms operate within a framework of specific laws, regulations and standards that may limit the scope for innovation. Legislation can affect various aspects of a company's operations, such as intellectual property protection, competition rules or health and safety requirements.
4. Low level and dynamics of research and development, as well as low participation of enterprises in their financing. In the case of R&D expenditures, it is important to note the very low share of enterprises in their financing.
5. Poor cooperation between R&D and enterprises, which results in the fact that sold production in industrial processing concerns mainly medium and low-tech products. One of the reasons for this state of affairs is the insufficient commercialisation of scientific research and the lack of transparent legal regulations in this area.
6. Low level of inventiveness, which in turn is confirmed by the low number of patents filed with the European Patent Organisation (EPO). Taking Poland as an example, this may result in a focus exclusively on importing components, equipping with machinery or equipment and adapting solutions proven in highly developed countries.
7. Lack of cooperation between enterprises, which is a necessary condition for the diffusion phase in the innovation process. Cooperation between enterprises in the innovation process brings them a number of benefits. First and foremost, through such cooperation, knowledge and experience can be exchanged, enterprises can reduce risks and costs of their activities.

8. Organisational culture, company structure, resistance to change or inflexibility are all factors that can inhibit innovation in a company. Organisational culture plays a key role in the innovation process, as it affects the way decisions are made, how employees communicate or cooperate.

It should be pointed out that the above-mentioned barriers to the development of innovation in Poland represent only part of the impediments to the introduction of innovation. These barriers are monitored on an annual basis. Extensive research in this field in the SME sector is conducted primarily by the Central Statistical Office (GUS) and the Polish Agency for Regional Development (PARP). The results of these studies can provide valuable clues for developing assumptions and directions for innovation activities. Overcoming barriers to innovation requires both adequate competence and organisational flexibility. Companies that are able to innovate effectively will gain a competitive advantage on the market and will be better prepared to meet the challenges of the future.

The report entitled "Innovativeness of Polish enterprises" (Polish Business Roundtable, 2016), provides a detailed analysis of the state of innovation in Polish companies, pointing out the key challenges and barriers faced by entrepreneurs in this area. The main conclusion of the report is that Polish companies face low effectiveness of research and development (R&D) activities. Although an increasing number of companies recognise the need to invest in innovation, the scale of such activities remains limited. Polish companies still do not engage in R&D activities on a sufficient scale, which results in a low level of innovativeness in comparison with companies from other European Union countries.

Research methodology

The survey was conducted between July and September 2024, covering a sample of 70 companies of different sizes: 27% micro businesses, 41% small businesses, 17% medium-sized businesses and 14% large businesses. The sample selection process used the random-layer method, taking into account the diversity of companies in terms of size and their affiliation to specific sections of the Polish Classification of Activities (PKD). The structure of the sample ensured representativeness for the main industries, including manufacturing, IT services, trade and consultancy activities. Interviews were conducted in the form of face-to-face conversations with management. The collected data were recorded and organised in an Excel spreadsheet, which enabled further statistical analysis. The methodology of the study was based on quantitative research techniques, which aimed to assess the level of innovation,

identify barriers and explore factors that foster the implementation of innovation in Polish enterprises.

The stratified random sampling method applied in this study was based on two key stratification criteria: company size (micro, small, medium, and large enterprises) and section of activity according to the Polish Classification of Activities (PKD 2007). The sampling frame was constructed using official national business registries – CEIDG (Central Registration and Information on Business) for micro and small enterprises, and REGON (National Official Business Register) for medium and large entities. Within each stratum, companies were randomly selected using proportional allocation, aiming to reflect the actual structure of the enterprise population in Poland. However, due to the relatively small final sample size (n = 70), the degree of representation within individual strata – particularly at the level of PKD sections – is limited.

The surveyed companies represented a range of industries, including manufacturing (32%), information technology (21%), trade and distribution (19%), consulting and business services (17%), and others (11%). These shares are generally consistent with the structure of active Polish enterprises in the national economy according to GUS statistics (2024).

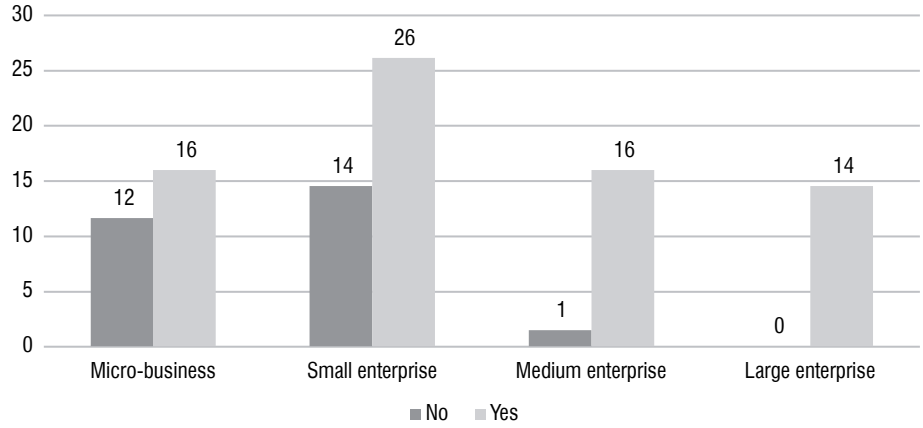
The questionnaire included questions on, inter alia: innovation activities of companies, exports, employment structure, strategic plans, technological know-how, ownership of research and development (R&D) departments, use of interdisciplinary teams and patents, barriers and sources of funding for innovation. In addition, the survey addressed issues related to the frequency of acquisition of new technologies, innovation adoption and the use of digital platforms. An important element of the study was to assess the impact of factors such as market trends, new market opportunities or the availability of funding sources on the level of innovativeness of companies. The analysis provided insights into the structural differences between companies of different sizes, as well as their ability to implement innovations. The results also made it possible to identify the main obstacles to the development of innovative activities and to identify areas requiring support from public policy and industry initiatives.

Results

A survey of 70 Polish companies of different sizes identified key factors driving the development of innovation and barriers limiting this process. The results of the survey confirmed that the level of innovativeness of Polish companies is strongly correlated with their size and the availability of resources.

In the survey, the vast majority of respondents (72%) indicated that their enterprise is engaged in innovative activities, with 16% of people – representatives of micro-enterprises, 26% of people – working in a small enterprise, 16% of people – in a medium enterprise, and 14% of people – in a large enterprise. One person did not give an answer (see Figure 1).

Figure 1. Does the company carry out innovative activities? (in %)



Source: own study.

Most of the surveyed enterprises were active in innovation, but its scale and nature varied. Large and medium-sized companies were more often involved in research and development (R&D) activities, while micro and small enterprises faced significant difficulties, such as lack of specialised staff or limited financial resources. A particularly significant problem was the lack of dedicated R&D departments, which hindered systematic innovation.

The survey also revealed that innovations in Polish companies mainly concern products and organisation, while process and marketing innovations are less frequent. Enterprises most often implemented innovations at the regional level, which may indicate a limited ability to expand into international markets.

The results of the survey are in line with the European Innovation Scoreboard (EIS) 2023 report, which indicates that Poland ranks in the group of countries with a moderate level of innovation, significantly diverging from leaders such as Germany or Sweden. Similar barriers to innovation, such as lack of funding, low cooperation with the scientific sector and limited R&D infrastructure, were identified in analyses by the Polish Agency for Enterprise Development (PARP, 2022). In particular, the PARP report showed that only 25% of Polish companies actively cooperate with

universities, which is reflected in the survey, where the lack of cooperation with the science sector was one of the most frequently indicated barriers.

Data from the OECD's Business Innovation Report (2023) confirms that larger companies have greater capacity to implement innovation, which is also reflected in our survey. The OECD indicates that micro and small enterprises in developing countries face difficulties in financing innovation and accessing modern technology, which was a key concern among respondents to our survey.

In contrast, the McKinsey & Company (2023) report on the digitalisation and innovation of companies in Europe showed that companies using advanced digital technologies achieve higher levels of innovation. The results of the survey indicate that only 47% of the companies surveyed regularly analyse market trends and use digital tools, suggesting the need to increase awareness of and access to modern technologies.

Table 3 shows the types of innovations introduced by the companies that took part in the survey. According to the table, most companies introduce product innovations (80% of companies) and organisational innovations (66% of companies). Among these organisations, small enterprises were the most numerous. As for process and marketing innovations, opinions were divided in this area. Slightly more than half of the companies participating in the study introduce the indicated innovations, most of which also belong to the small enterprise sector. At the same time, product and process innovations were introduced by most companies at the regional level.

Table 3. Types of innovation introduced by companies (in %)

	Does the company innovate with products?		Is the company introducing process innovation?		Does the company innovate organisationally?		Is the company innovating in marketing?	
	No	Yes	No	Yes	No	Yes	No	Yes
Micro-business	4	23	20	7	14	13	16	10
Small enterprise	11	30	17	24	11	30	19	23
Medium enterprise	4	13	7	10	6	11	13	4
Large enterprise	0	14	0	14	3	11	7	7
Summary	20	80	44	56	34	66	54	44

Source: own study.

A closer look at the structure of responses reveals that product innovations were introduced by 85% of small enterprises, compared to 64% of micro-enterprises, which confirms the hypothesised positive correlation between company size and innovation activity. Similarly, 78% of medium and large enterprises reported having R&D departments or access to innovation teams, compared to just 28% among

micro-enterprises. This supports the hypothesis that resource availability – closely related to firm size – plays a key role in innovation adoption.The detailed breakdown by company size is shown in Figure 1 and Table 3.

Table 4. Innovation Performance of Enterprises by Voivodeship in Poland

Voivodeship	National Rank	Innovation Performance Characteristics
Mazowieckie	1	Highest level of innovativeness, supported by numerous universities, research institutes, and large enterprises investing in R&D.
Małopolskie	2	High innovation activity, driven by a strong academic sector in Kraków and well-developed research infrastructure.
Dolnośląskie	3	Dynamic innovation growth, especially in technology sectors, supported by technical universities and technology parks.
Pomorskie	4	Notable innovation activity in maritime and logistics sectors, supported by developed port infrastructure and research centres.
Wielkopolskie	5	Stable innovation performance with a strong industrial base and growing R&D capabilities.
Śląskie	6	Structural transformations fostering innovation, particularly in Industry 4.0 and modern technologies.
Łódzkie	7	Moderate innovation level, with emerging potential in textiles, manufacturing, and business services sectors.
Lubelskie	8	Low innovation level due to limited access to skilled labor and low R&D investment.
Podkarpackie	9	Increasing innovation activity, especially in the aerospace sector, supported by regional specialization and defense industry links.
Kujawsko-Pomorskie	10	Average innovativeness with potential in the chemical and food industries, though cooperation between science and business remains limited.
Zachodniopomorskie	11	Moderate innovation activity, particularly in maritime economy and tourism, but with limited R&D infrastructure.
Lubuskie	12	Low innovation level due to peripheral location and limited support infrastructure.
Opolskie	13	Limited innovation activity, with few large firms investing in R&D and weak links to scientific institutions.
Świętokrzyskie	14	Low innovation performance, caused by limited human capital and underdeveloped research infrastructure.
Warmińsko-Mazurskie	15	One of the lowest levels of innovation, due to geographic peripherality, poor infrastructure, and limited access to skilled workforce.
Podlaskie	16	Lowest innovation level in the country, facing talent outflow and a lack of major R&D investments.

Source: own elaboration based on reports by PARP and Statistics Poland (GUS).

The table 4 presents a comparative overview of the innovation performance of enterprises across Poland's 16 voivodeships. It ranks the regions based on their overall innovation activity, highlighting key characteristics and factors influencing their position. Leading regions, such as Mazowieckie, Małopolskie, and Dolnośląskie, benefit from strong academic institutions, developed R&D infrastructure,

and access to funding. In contrast, eastern and northern regions like Podlaskie and Warmińsko-Mazurskie face challenges related to limited resources and infrastructure gaps. This regional differentiation emphasizes the need for tailored innovation policies to bridge the gap between high- and low-performing areas.

Innovation is crucial to the long-term success of an organisation. Examples of this innovation, such as the development of new products or services, the introduction of new business models or gaining a competitive advantage through innovative solutions, can lead to growth and a sustainable position in the market. According to those taking part in the survey, the attitude of a company's management very often influences a company's innovativeness. This was the answer given by 37% people. Due to the fact that most of the companies participating in the survey do not have an R&D department, this unit was not shown to be a driver of company innovation. As far as the company's employees are concerned, the vast majority of respondents showed that employees are rarely a driver of the company's innovation. This response result is quite a surprise, as when a company has quality employees and a good reputation in the market, it will find it easier to innovate in new areas. Regarding intellectual property rights, according to the majority of respondents, this is not a factor that determines the introduction of innovation. In the case of certification and the introduction of other standards, these are factors that often influence innovation. In the case of legislation, it is a factor that very rarely determines the innovativeness of an entity. On the other hand, sources of financing, new market opportunities, market trends, including benchmarking, improvement of the quality of products or services and the development of new products or services are factors that very often determine the introduction of innovation in a given entity (see Table 5).

Table 5. Drivers of innovation and their frequency (in %)

The question	Very rarely	Rarely	Sometimes	Often	Very often	Never	Applicable
How often is the attitude (mindset) of a company's management a driver of innovation?	1	9	19	34	**37**	0	0
How often is a company's R&D department a driver of innovation?	4	9	7	13	14	0	**53**
How often is employee initiative the driver of innovation?	**43**	24	21	9	0	0	3
How often are intellectual property rights a driver of innovation?	23	11	14	4	1	**43**	3
How often is certification or other standards a driver of innovation?	21	17	11	**31**	1	16	1
How often is legislation a driver of innovation?	**36**	13	11	3	1	**36**	0
How often do sources of funding drive innovation?	3	17	14	**36**	30	0	0
How often do new market opportunities (including demand from the customer) drive innovation?	6	19	11	30	**34**	0	0

cont. Table 5

The question	Very rarely	Rarely	Sometimes	Often	Very often	Never	Applicable
How often do market trends (including benchmarking) drive innovation?	6	23	14	**26**	31	0	0
How often is improving the quality of products or services a driver of innovation?	11	21	14	**26**	27	0	0
How often is the development of new products or services a driver of innovation?	**24**	9	16	20	31	0	0

Source: own study.

Respondents were also asked about the barriers that prevent or hinder the introduction of innovation in a company and the frequency of their occurrence. Among the barriers proposed in the survey questionnaire, respondents indicated that technical constraints were the biggest barrier to innovation, followed closely by increased wage costs and financial constraints of the company. The smallest barriers according to the respondents are the strategic plans of the state, access to soft skills or the legislation indicated earlier (see Table 6.)

Table 6. Barriers to company innovation and their frequency (in %)

	Very rarely	Rarely	Sometimes	Often	Very often
How often is access to hard skills (mainly technical) a barrier to company innovation?	13	20	**27**	**27**	13
How often is access to soft skills (e.g. communication, management) a barrier to company innovation?	**64**	6	20	10	0
How often is legislation a barrier to company innovation?	**50**	24	17	7	1
How often are technical constraints a barrier to company innovation?	17	11	16	**46**	10
How often are financial constraints a barrier to company innovation?	0	21	23	**36**	20
How often are rising wage costs a barrier to company innovation?	33	4	19	**37**	7
How often are state strategic plans a barrier to company innovation?	**84**	1	14	0	0

Source: own study.

A detailed analysis of the conducted survey showed that 70% of the surveyed companies carry out innovative activities, with only 58% of micro-enterprises declaring innovative activities. Companies implementing innovations most often focused on product (79%) and organisational (65%) improvements. In most of the surveyed companies, the number of employees remained stable or increased, especially in the case of small and medium-sized enterprises. 52% of the surveyed companies had

dedicated innovation departments, but these were mainly large companies, while micro and small companies rarely had dedicated R&D teams.

The results of the survey indicate that 43% of the companies had the appropriate technological know-how to design and implement innovations, but most of these were medium and large companies. Only 31% of the surveyed companies had patents or industrial designs, indicating a relatively low level of intellectual property protection among Polish companies. Most companies financed innovations from their own resources (65%), while only 23% used EU or government funds. 12% of companies indicated bank loans as an important source of financing, while private investors were the least popular source of capital (8%). Financial constraints were the most frequently cited barrier (57%), with micro and small businesses reporting the most difficulties in this regard. 43% of companies had problems accessing qualified staff, due to both a shortage of specialists and difficulties in retaining talent. 39% of companies indicated a lack of cooperation with scientific institutions, which limited access to modern technology and expertise. 35% of companies reported difficulties related to access to modern technologies, which affected their ability to implement innovations. 28% of companies indicated regulatory barriers, which in their view slowed down the implementation of innovative solutions. 61% of surveyed companies identified market trends as an important driver of innovation, with changes in customer expectations and digital developments being the most significant. 47% of companies indicated that benchmarking and competitive analysis were key influences on innovation decisions.

Summary and conclusions

Conclusions from the literature and our own research indicate the complex nature of the factors influencing innovation and challenges faced by companies. The literature analysis confirmed the crucial importance of innovation for economic growth and business competitiveness. Research has shown that the development of innovation depends on the firms' internal resources, such as human capital, access to technical knowledge and the ability to adapt in a changing environment. At the same time, innovation is stimulated by external factors such as regulatory stability, availability of financing, cooperation with the scientific sector and the development of technological infrastructure. The literature results also indicated that the biggest barriers to innovation are lack of funding, low levels of cooperation between businesses and research institutions and technical constraints. These barriers limit the possibility

to introduce modern solutions, especially in countries such as Poland, which lags behind more developed economies in innovation rankings.

A comparison of the survey results with other national and international analyses shows consistency in the challenges faced by Polish companies. Similar to the OECD, PARP and McKinsey reports, the results of the survey confirm that the key barriers to innovation are financial shortages, limited cooperation with the scientific sector and difficulties in accessing qualified staff. Companies should increase their involvement in digitisation processes and develop innovation strategies to improve their competitiveness on the international market.

To sum up, both the literature analysis and the author's own research confirm the key importance of innovation for economic growth and indicate the need to eliminate barriers that limit the development of innovative activities. The results suggest that effective support for pro-innovation policies, better cooperation between the science and business sectors, and greater expenditure on research and development may contribute to the increase in innovation in Polish enterprises. The author intends to conduct further research in the area of innovation of Polish enterprises in comparison with other European countries.

Author Contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of Interest

The author declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Ethics Statement

The author certifies that the research published in the text was carried out in accordance with the research ethics of the affiliated university.

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