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IDENTIFYING INNOVATION AMONG HOUSING DEVELOPERS IN POLAND

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Purpose: The aim of this study is to identify the innovation of housing developers in the real estate market in Poland.
Design/methodology/approach: Two research methods were used in this study. The first was Desk Research, which analysed existing data, including reports published by GUS, EUROSTAT and EIS, and the second was a narrative literature review of publications included in the SCOPUS database, among others. The second research method involved two CATI surveys conducted among developers implementing housing projects characterised by the construction of multi-storey, multi-family housing buildings in Poland.
Findings: The most important conclusions include, first and foremost, the fact that the activities of housing developers in Poland are characterised by a low degree of innovation. This level is similar to the overall level of innovation in Poland. It has been proven that developers with a broader scale of activity are more inclined to introduce innovations than those operating locally, and the most frequently introduced innovations belong to the technical and technological group. It has been pointed out that developers work on their own innovations to a negligible extent, without cooperating with external research units in this area.
Research limitations/implications: The general population of the survey was determined based on a market analysis of entities involved in multi-storey multi-family housing construction, rather than on the basis of the Polish Classification of Activities (PKD). This eliminates entities that are insignificant for the study, but makes it difficult to determine the general population in detail, which may be subject to an error of +/-5%. The study was general in nature and allowed for the identification of possible areas for future research, such as the analysis of technical and technological innovations taking into account RES or the analysis of factors determining the development of own innovations.
Social implications: The research indicates a low level of innovation and a small share of own innovations introduced by developers, with a simultaneous lack of cooperation with research units. This shows the need for systemic changes in order to increase innovation and establish research cooperation.
Originality/value: The article presents the level of innovation of housing developers in Poland, which is not examined in detail by statistical or other entities. The research can be used by public entities to imply systemic solutions.
Keywords: housing market, innovation, housing developer, RES, sustainability.
Category of the paper: Research paper, Literature review.

1. Introduction

In an era of dynamic technological development, its impact on various sectors of the economy is becoming very important. Therefore, a key element today is the implementation of broadly understood new technologies in economic activity through the introduction of innovation into business operations. Innovation increases competitiveness, but today its importance in many sectors has grown not only to increase competitive advantage in the market and achieve a leading position, but also to become a factor that determines whether a company can even survive in the market (Skibiński, Sipa, 2015).

So what is innovation and how has it been defined? The definition of innovation has evolved along with the changing environment, technology and needs. Joseph A. Schumpeter (Schumpeter, 1934) defined innovation as a concept relating to five areas:

1. the introduction of a completely new product or a new type of existing product,
2. the implementation of a new method of production or sale of a product,
3. entry into a new market where a given branch of the economy was not yet present,
4. the acquisition of a new source of supply of raw materials or semi-finished products,
5. introduction of a new structure or organisation of activities.

More recent definitions of innovation interpret the concept more broadly, also including the social aspect. Peter Drucker (Drucker, 1992) argues that innovation should be analysed in relation to the role of people in the process, thus elevating the aspect of entrepreneurship to a key factor in this area.

Michael Porter defines innovation as the successful exploitation of a new idea, which means that innovation is not only something new and unique, but also its successful implementation in the organisation's activities, resulting in certain economic benefits (Porter, 1990).

From 2018, the current "Oslo Manual" (OECD/European Union, GUS, 2018) provides a standard, broad definition of innovation used in economic practice and statistical research. The concept of innovation is defined as the implementation of a new or significantly improved product, service, process or organisational method in economic practice. This definition implies that innovation is a process in which new ideas are transformed into economic and social value through the implementation of a new or significantly improved product, process, marketing method or organisational method. The definitions emphasize that innovation is not only about groundbreaking inventions, but also about gradual improvements that lead to greater efficiency, quality, or competitiveness. The key elements are novelty, usefulness (benefit) and actual implementation.

In Poland, the Central Statistical Office defines innovation as the implementation of a new or significantly improved product (good or service) or process, or a new organisational method, whereby new processes or organisational methods are implemented when they begin to be used in the actual operation of the enterprise (GUS, 2012).

It follows from the above that innovation is currently a key element in gaining a competitive advantage for the entire economy, which is becoming extremely important in the reality of global competition. However, innovation is not only a way to increase competitiveness, but also a way to achieve sustainable development, which, according to the UN definition, is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The UN guidelines identify three key elements like economic growth, social inclusion, and environmental protection whose coherence is necessary to achieve sustainable development. Innovation is therefore becoming crucial not only for the purpose of increasing economic efficiency, but also for achieving environmental and social goals that are important for the entire planet, such as equalising opportunities and eliminating social exclusion in the broad sense (Sustainable Development GOALS, 2015).

From the point of view of real estate and its role in the economy, it can be said that the entire real estate sector should therefore be a field of intensive development of broadly understood innovation. Due to their high capital intensity, real estate properties constitute a large part of national wealth and play an important role in the economy as a whole, influencing, among other things, the financial system, which is largely a source of financing for the real estate market. Furthermore, real estate has a huge social dimension, satisfying the basic human need for a "roof over one's head", i.e. the need for shelter, or fulfilling the function of providing a place to conduct business activities.

Therefore, innovations implemented in the field of sustainable development must include the real estate market, as real estate is becoming the living environment in which people spend most of their lives. Real estate related to business activities can increase its efficiency by, for example, reducing property operating costs, obtaining energy from renewable sources, or organizing space, thereby increasing employee productivity. On the other hand, housing real estate can be more environmentally friendly, energy-efficient, or even zero-emission through the use of innovative solutions, or it can eliminate barriers related to social exclusion, such as disabilities. Therefore, the aim of this study is to identify the innovativeness of housing developers in the Polish property market.

2. Literature review

Due to the importance of innovation for entire economies, many institutions, agencies and researchers are addressing this topic. Among the most reliable data is the European Innovation Scoreboard (EIS) published by the European Commission, which contains a comparative assessment of research and innovation in EU Member States in 2018-2025. The summary innovation index presented in the scoreboard is calculated on the basis of 32 indicators covering the scope of activities and factors related to innovation.

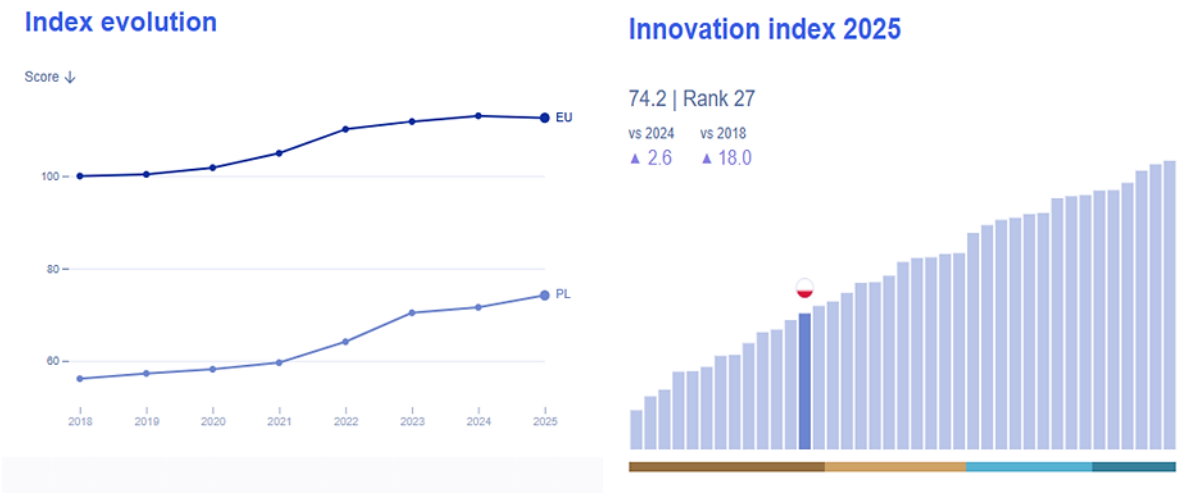


Figure 1. Innovation index for Poland.

Source: https://projects.research-and-innovation.ec.europa.eu/en/statistics/performance-indicators/european-innovation-scoreboard/eis#/eis/countries/PL

As the chart shows, Poland ranks only 27th among EU countries, including neighbouring countries. Furthermore, in 2025, we achieved a score of 74.2 of the EU average baseline for 2018. Despite the complexity of the indicator and the possibility of presenting different variants, the European innovation scoreboard does not allow for specifying the level of innovation in the real estate sector, let alone more detailed areas such as the housing real estate market or the property development companies operating in it.

A similar situation occurs in the case of other reports presented by Eurostat or the Central Statistical Office (GUS), which are usually based on the CIS (Community Innovation Survey). Therefore, the reports do not provide detailed data characterising the real estate market as a whole, the housing real estate market, or the development companies operating in this market. Despite the publication of data broken down into the main sections of economic activity according to PKD (Polish Classification of Activities), we are unable to specify innovation in relation to the real estate market (GUS, 2024). Such information should therefore be sought in reports prepared by industry organisations or in articles published by researchers. These sources often focus on information about individual innovations or a group of innovations of a particular type. Therefore, it seems important to present the types of innovation, particularly in the context of real estate.

Until now, the definition of innovation based on the Oslo Manual 2005 (Piasecki, 2022) has been in force, which distinguished four types of innovation (OECD/Eurostat, 2008):

- product,
- process,
- organisational,
- marketing.

Product innovation was defined as a significant change, expressed in qualitative and quantitative indicators, which distinguished the product from solutions with similar functionality available on the market.

Process innovation, on the other hand, was defined as the introduction of a significant change in technology, equipment or software in an enterprise, expressed in qualitative and quantitative indicators.

The last two types of innovation mentioned above were complementary in nature.

The new Oslo Manual 2018 defines only two types of innovation, but significantly broadens the definition of product innovation by specifying functional characteristics (quality, technical specifications, reliability, durability, economy and robustness in use, affordability, convenience and usability) (OECD/European Union, GUS, 2018).

The second type of innovation in the business process concerns in particular the area of management, such as marketing, information and communication systems, administration, and product and business process development.

Innovations in the real estate market can also be classified according to the guidelines of the Oslo Manual, but authors focusing on the real estate market provide other classifications. Referring to the division of innovations according to the criteria used in the literature on real estate, the following classifications can be distinguished:

- means of creating innovations (Bac, 2014):
  - technical,
  - technological,
  - organisational innovations,
  - mixed,
- according to the field of activity to which they relate (Brzeziński, 2001):
  - product and subject innovations,
  - technological and process innovations,
  - organisational innovations,
  - functional innovations,
- by the effects of innovation (Prystom, 2012):
  - product and process innovations,
  - technical and product innovations,
  - process innovations,
  - organisational innovations.

Particular attention should be paid to modern technical and technological solutions used in construction, which constitute product and process innovations. These innovations are interrelated because the production of a new or modified product that requires a new combination of inputs is most often carried out using a new process innovation at the same time. At the same time, a new or improved production process forces product innovation because it changes the characteristics of the goods produced (Prystrom, 2012).

The fourth technological revolution, also known as Industry 4.0 in the real estate market, identified with PropTech, is the current phase of industrial development based on the combination of modern digital technologies with automation (Siniak, 2020; Bartkowiak et al., 2023), which defines PropTech as a small part of the broader digital transformation of the entire real estate industry. Shaw (Shaw, 2018), on the other hand, sees PropTech as the sum of digital platforms that connect various stakeholders in the real estate market.

PropTech is, on the one hand, a name that refers to all technological innovations in the real estate segment and, on the other hand, the industry itself, the business sector and, more generally, the trend driving change in the real estate industry's mindset (Bartkowiak et al., 2023).

The common denominator of all PropTech definitions is to achieve greater efficiency and effectiveness in real estate, which involves three main real estate industries: *facility*, *property* and *asset management* (Maududy, Gamal, 2019). The greatest investor activity is observed in the area related to meeting housing needs and property management (Luque, 2021).

The PropTech sector is relatively new, having emerged in the late 1990s, just before the technological revolution. This is the reason for the existence of various classifications (Tagliaro et al., 2020) and categorisations of PropTech (Bartkowiak et al., 2023). The figure shows industries as areas of PropTech application according to (Baum et al., 2020).

Figure 2. PropTech Elements by Baum.

Source: Bartkowiak et al., 2023.

The most important areas are: the property market, smart cities, smart buildings, the sharing economy, the construction sector and property financing.

The property market consists of platforms based on modern technologies that facilitate the operation and management of real estate, control the performance of buildings, and facilitate or control services (Baum, 2017).

Smart cities – are internet portals as knowledge bases, agglomerations equipped with information and communication technologies (ICT) (Anthopoulos, 2015).

Smart buildings – intelligent and computer technologies that facilitate the combination of comfort and energy consumption (Wang et al., 2012).

Shared economy – technology-based platforms that facilitate the use of real estate assets. Platforms may simply provide information to potential users and sellers of space, or they may more directly facilitate or conduct rental or fee-based transactions (Baum, 2017).

Construction sector (ConTech) – technological innovations in the design, planning and construction of real estate (Bartkowiak et al., 2023). ConTech construction technologies are concepts that integrate digital innovations, advanced materials and automated systems with the traditional model of the construction process.

Real estate financing (FinTech) – the use of technology and innovative business models in financial services (Szpringer, 2017). FinTech refers to innovative companies and technologies used to provide financial services through the use of modern technologies.

Another classification of PropTech segments is proposed by MIPIM (International Real Estate Exhibition for Professionals). This is an annual event, one of the most important in the world for the real estate market, which takes place in Cannes, France, dividing them into: mart buildings / IoT, smart city sustainability, market place, crowdfunding, ConTech, 3D / VR, data and research analytics (Tagliaro et al., 2021).

Under the influence of PropTech, the real estate industry is undoubtedly undergoing significant changes, which are mainly reflected in market transparency (Porter et al., 2019; Siniak et al., 2020). In a broader sense, PropTech is beneficial for territorial competition and territorial development strategies (Siniak et al., 2020). Finally, within the framework of various institutional solutions, PropTech can influence the changing structure of the real estate market (Braesemann, Baum, 2020).

3. Methodology

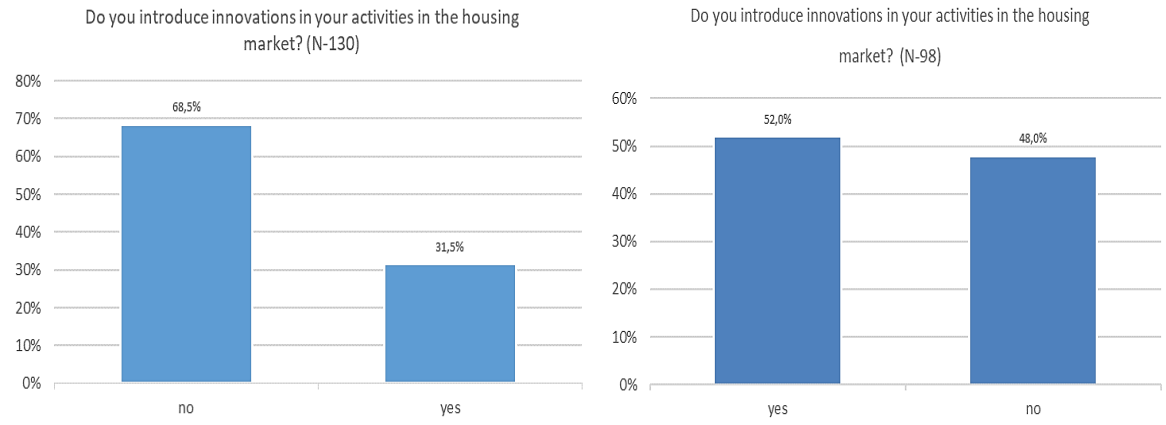
A combination of two research methods was used to conduct the study. The Desk Research method of analysing existing data, which involves the use of secondary data, i.e. data previously collected by other researchers, agencies or institutions. In the case of the study described, industry reports and reports published by GUS, EUROSTAT and EIS were used. In addition, a narrative literature review method was used in relation to data collected by researchers and published in works included, among others, in the SCOPUS database. To achieve the objective of the study, a second research method was also used, consisting of collecting primary data through CATI surveys, which involved conducting telephone interviews with respondents using a computer. The survey was addressed to managers of development companies implementing housing projects characterised by the construction of multi-storey, multi-family housing buildings. The first survey was conducted in August 2020 on a sample of 130 respondents out of a total population of 314 entities identified at that time. Then, at the turn of October and November 2022 another survey was conducted using the same method on a sample

of 98 respondents selected from a total population of 280 entities. The surveys conducted made it possible to identify and analyse the structure of innovation and draw conclusions for the future with regard to the activities of developers on the housing property market in Poland.

4. Results

The survey on innovation used by Polish housing developers is an important aspect showing the overall levels and trends on the housing property market. As a result, innovation in the real estate industry is not only about new sources of projects, financing or cooperation, but also about a thorough modernisation of IT and management systems – all in order to increase the flexibility, transparency and quality of projects. However, the specific effects associated with this need to be preceded by further, more detailed research. The study conducted allows us to identify precisely such areas.

The survey presented made it possible to determine, approximately, the level of housing developers who introduce innovations as part of their activities on the real estate market in Poland (Figure 3). Before answering the questions, the respondents were provided with all the necessary information and definitions to increase the reliability of the survey – in this case, the definition of innovation.



a) survey 2020 b) survey 2022

Figure 3. Percentage of developers innovating (2020 and 2022 survey).

Source: Own study based on data from (Sitek, 2023; 2023a; Sitek, Sipa, 2024).

Comparing the data presented in Figure 3, there has been an increase in the number of developers declaring that they introduce innovations into their projects over a two-year period. Furthermore, the increase from 31.5% to 48% should be considered a very good result. However, in order to interpret this data correctly, it is necessary to refer to the market conditions prevailing during the period under review. Namely, it was an extremely difficult period in which there were many risks affecting the activities of entire economies, including entities on the real

estate market. At that time, we had the COVID-19 pandemic, rising inflation affecting high interest rates and thus lending, the outbreak of war in Ukraine, which caused a sharp increase in the prices of raw materials and thus building materials, which drove inflation to very high levels.

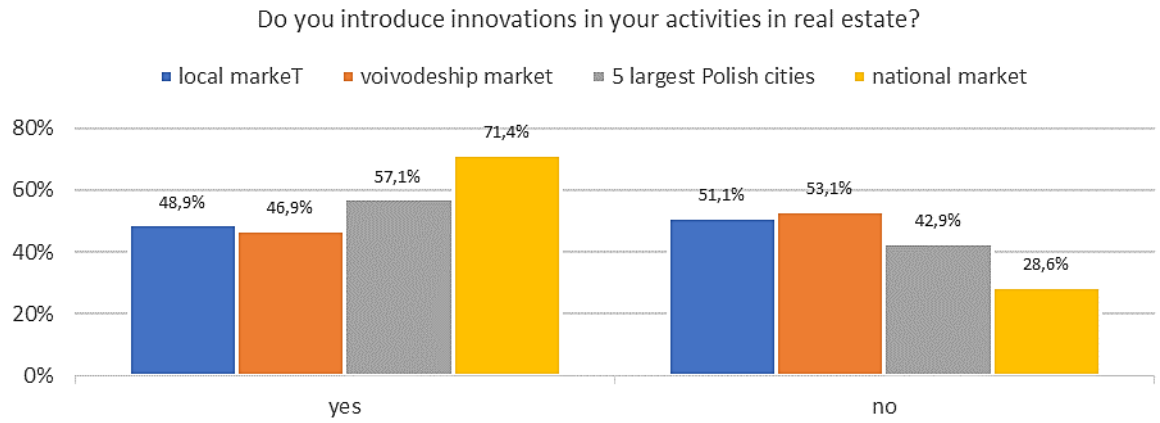


Figure 4. Developers' willingness to innovate according to their territorial scope of activity.

Source: Own study based on data from (Sitek, 2023; 2023a; Sitek, Sipa, 2024).

A detailed analysis of developers introducing innovations (Figure 3) based on the scope of the market in which they operate (Figure 4) showed the percentage of developers operating on the local market, the provincial market, the national market and within the five largest cities in Poland that introduce innovations. The data clearly shows that entities operating on a broad market, such as the national market, introduce innovations more often than those operating on a smaller scale, locally.

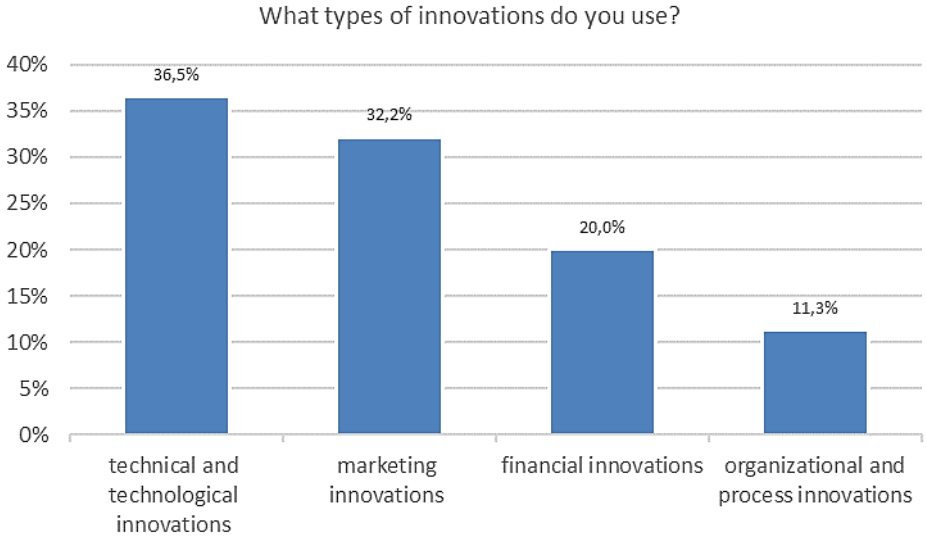


Figure 5. Types of innovations introduced by developers.

Source: Own study based on data from (Sitek, 2023, 2023a).

The next question analysed concerns the type of innovations used. As can be seen in Figure 4, the study adopted a different classification of innovations than the Oslo manual, which is the result of an analysis of publications on the types of innovations characteristic of real estate. In addition, the broader spectrum of innovations presented allows for more detailed conclusions. As presented, the most commonly used innovations include those from the technical and technological group, i.e., those that affect, among other things, operating costs or ecological solutions, where we can distinguish renewable energy sources or specific ecological building materials.

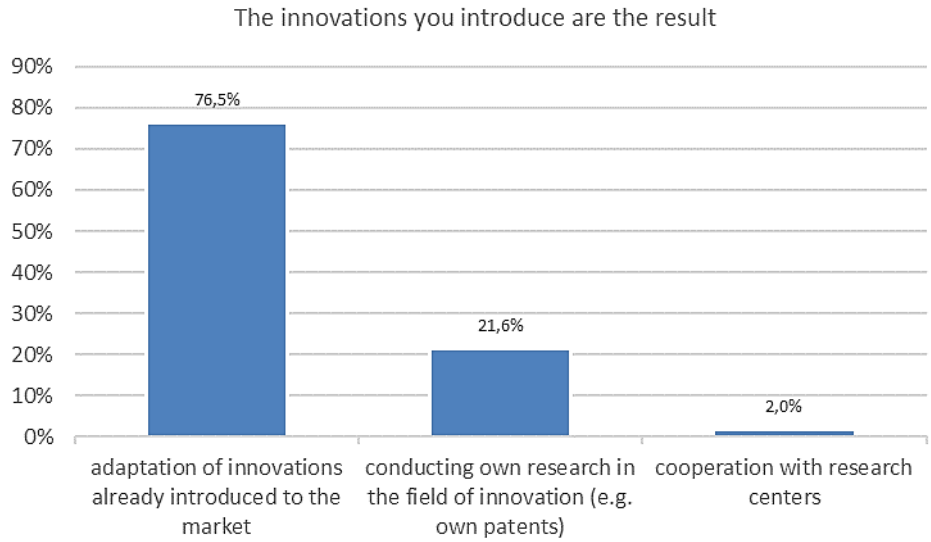


Figure 6. Ways to acquire innovations by developers.

Source: The Author's own elaboration.

Further analysis of the problem of innovation implementation by residential developers shows that developers adapt proven innovations, while conducting research on their own innovations to a small extent – 21.6% of respondents. Less than 2% cooperate with research centres to develop their own innovations.

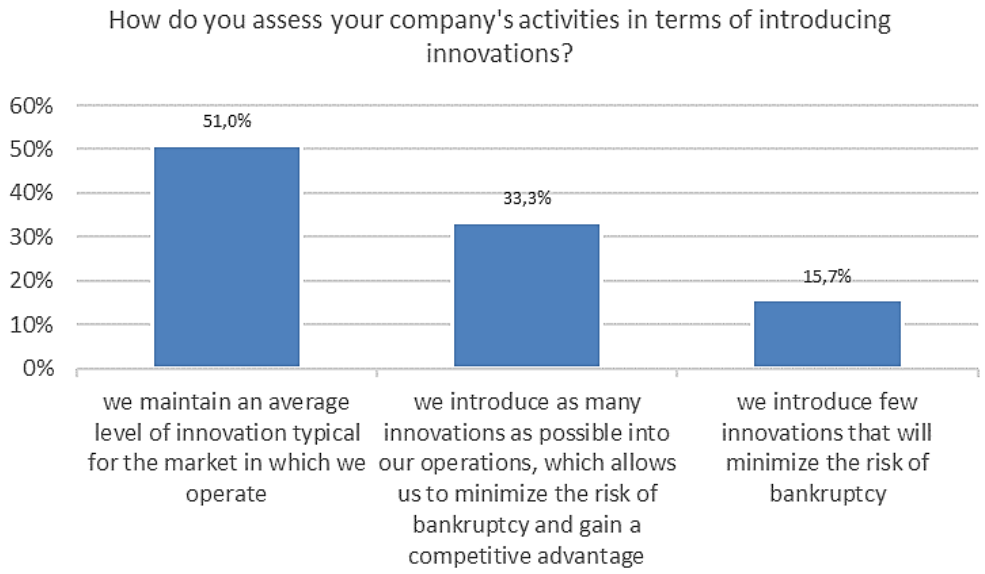


Figure 7. The scope of innovation in developer activities.

Source: The Author's own elaboration.

Developers declare that the majority (51%) maintain an average level of innovation characteristic of the market in which they operate, 33% of them express a willingness to introduce as many innovations as possible, motivated by the desire to gain a competitive advantage, while the smallest percentage (15%) introduces only a minimum amount of innovation to counteract the possible threat of bankruptcy. This shows how the market's need for innovation is shaping up.

To sum up, we note an increase in the number of housing developers in Poland declaring that they introduce innovation in their projects, but its dynamics require deeper analysis. Developers introducing innovations focus primarily on technical and technological innovations, as this group allows them to demonstrate, among other things, broadly understood energy efficiency, which, in conditions of high electricity and energy raw material prices, becomes an important decision-making factor for buyers. Furthermore, in-house research on innovation accounts for a small percentage, and cooperation with research institutions that could accelerate the dynamics of introducing "own" innovations is practically non-existent.

5. Discussion

Comparing the above data collected in our own research with the available existing data, it can be clearly stated that they supplement the current state of knowledge on the innovativeness of housing developers in Poland. When analysing the level of innovativeness of Polish enterprises, reference should be made to the reports presented by the Central Statistical Office (GUS) on the innovativeness of Polish enterprises.

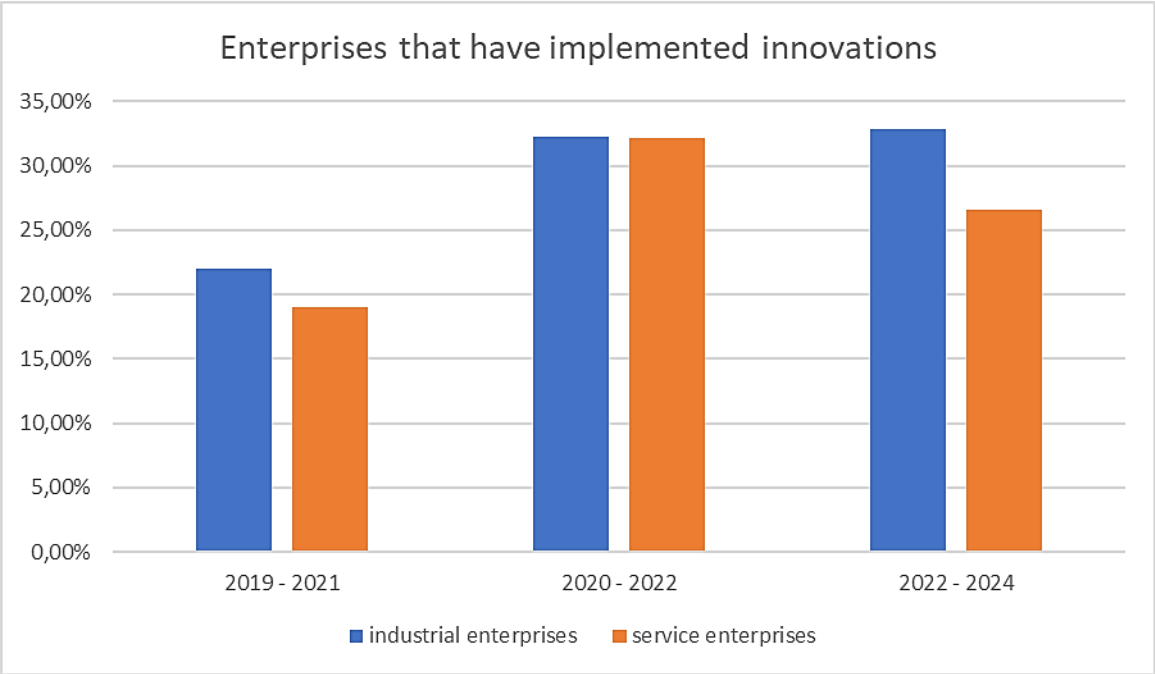


Figure 8. Enterprises that have implemented innovations.

Source: Own study based on data from (GUS, 2024).

The data presented in the figure does not show the level of innovation of housing developers. It could be assumed that developers are a component of industrial enterprises, but this is not entirely true. If a developer has its own resources to complete a project without the involvement of subcontractors, the result is a final product. A flat developed by a developer can be classified as a manufacturing enterprise. However, if a developer only manages a project by hiring subcontractors such as architects, solicitors or construction companies and then trades in real estate, i.e. sells it, we can classify them as a service company. It should therefore be emphasised that national or even European statistical data do not allow us to specify the level of innovation of housing developers. The only noteworthy similarity is the fact that in the period from 2020 to 2022 and in the similar period presented by the Central Statistical Office (GUS) from 2019-2021 to 2020-2022, both housing developers and enterprises in general recorded a clear increase in innovation. However, this increase was probably caused by difficult market conditions that resulted in business closures and even bankruptcies. It can therefore be assumed that companies that did not implement innovations and were thus less competitive disappeared from the market.

The results of the study showed that developers operating on a smaller scale, i.e. locally and within a province, were much less willing to innovate than those competing nationwide or in the market of the five largest cities, which is also the most demanding. It is therefore the need to compete that motivates innovation. This is confirmed by research conducted by Kilip and Owen (Klip, Owen, 2020), who report that entrepreneurs operating locally in the real estate market do not usually introduce innovations, unlike those who operate on a large scale.

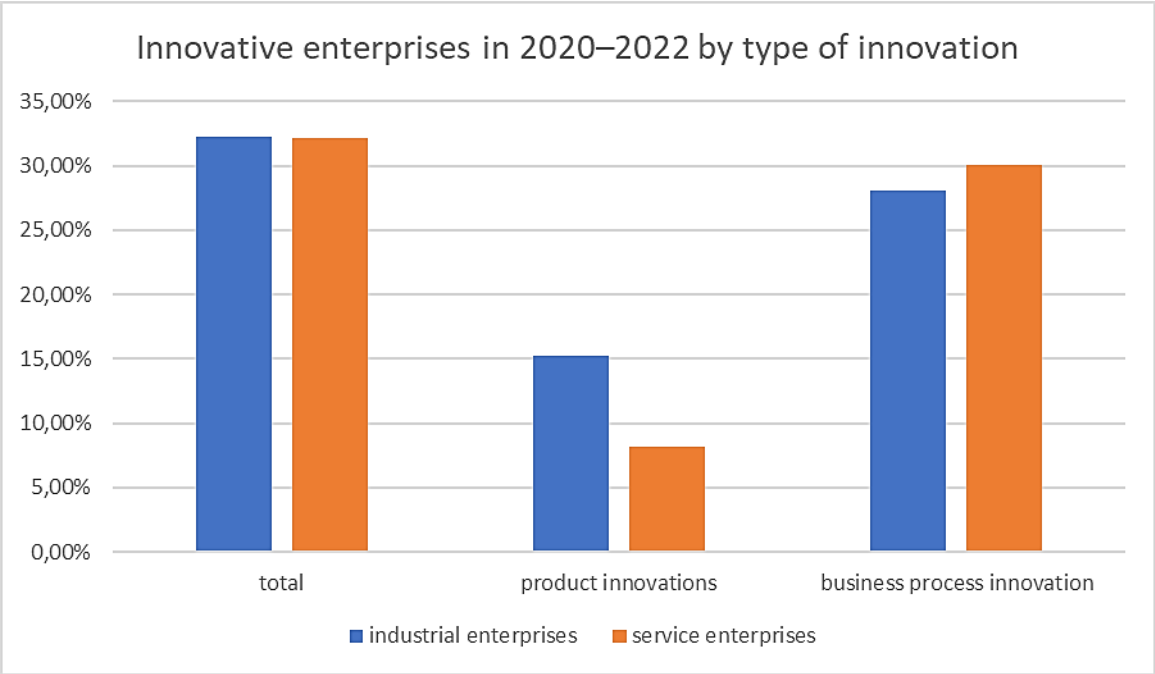


Figure 9. Innovative enterprises in 2020-2022 by type of innovation.

Source: Own study based on data from (GUS, 2024).

In the case of types of innovation, we see a complete discrepancy between the GUS research and the declarations of developers in the survey. Developers primarily introduce technical and technological innovations, which, according to the Oslo Manual classification, are classified as product innovations. This points to the need to conduct specific research within the scope of the activity in question – multi-family housing construction – because the real estate market is extremely specific.

Research conducted in 2022 in Poland on the use of renewable energy sources in housing construction (Szymańska et al., 2022) shows that RES are overwhelmingly introduced in single-family homes rather than in multi-family construction (43.38% vs. 5.40%) and in rural areas (48%). However, in the studies presented in this paper, the most frequently selected innovations belong to the group of technical and technological innovations, which include RES, and are most often introduced by developers operating on a national scale and in the five largest cities. Admittedly, these studies cannot be directly compared because in this case both new and older buildings were analysed, but the results differ so much that it is worth analysing this problem in depth, which may be the subject of future research.

The last two questions presented in the article concern the introduction of own innovations and cooperation with research units, as well as the intensity of innovation in their activities. These answers give a picture of innovation in the housing property market, namely the minimal share of developing own innovations and the virtual absence of cooperation with research units in this area. In addition, the majority of developers (over 50%) declare that they only introduce innovations at the standard level characteristic of the market in which they operate.

6. Conclusion

The presented research results provide a general overview of the innovativeness of housing developers in Poland and aim to identify areas for further detailed research, allowing for possible implications of solutions to improve the implementation of innovation in the housing property market in Poland.

The most important conclusions presented in connection with the research undertaken include, above all, the fact that the activities of housing developers in Poland are characterised by a low degree of innovation. This level is similar to the overall level of innovation in Poland, which, according to the EIS, is classified as emerging innovators.

Despite the presented increase in the level of innovation among developers from 31,5% of responders in the 2020 to 52% in the 2022, we cannot fully classify this increase as being solely related to the growth of applied innovations. This increase was influenced by market conditions that caused a decline in the number of developers operating on the market and, consequently, a decline in the general population and the research sample in 2022. The increase in innovation among developers is therefore seen as being linked to the withdrawal from the market of developers who do not implement innovations, as they are not very competitive. It should be noted, however, that no detailed research has been conducted in this area, so this is more of an author's hypothesis than a fact, which may also be a contribution to further research.

When analysing the structure of the innovations introduced, it is clear that the leading group are technical and technological innovations, pointed by 36,5% of responders, that have a tangible effect, i.e. the end product – a flat. This group includes, among others, RES and building materials that help to reduce the energy consumption of buildings and thus reduce operating costs. However, an interesting fact revealed in the discussion is that other studies show a small share of RES in multi-family housing construction. This is another research problem that could be the basis for future studies. Marketing innovations are the second most prevalent, accounting for 32.2% of all responses. These innovations are often characterised by their reduced cost and ease of implementation when compared with technical and technological innovations. This factor is likely to contribute to their popularity among developers.

According to other sources and existing data, the study showed that the scope and scale of developers' activities influence innovation. It was confirmed that the greater the scope of a developer's activities, the more willing they are to introduce innovations. A survey of developers operating within the broadest scope of activity analysed revealed that 71,4% of respondents operating on a national scale declared that they introduce innovations in their projects, compared to 48.9% of developers operating locally.

The last two questions presented reveal the weakness of Polish housing developers in terms of innovation. The vast majority of entities admit that they adapt innovations already implemented on the market (76,5%), and only a small fraction develop their own (21,6%),

with virtually no cooperation with research units in this area (only 2%). In addition, developers themselves are interested in introducing innovations that will ensure them a standard level characteristic of the market. Only slightly more than 30% of respondents want to introduce as many innovations as possible and become a leading entity. The final conclusion is therefore that efforts should be made to develop own innovations by developing attractive systems of cooperation between enterprises and research units. It is imperative to emphasise that the proposed recommendation must be informed by forthcoming research that investigates the prevailing barriers, alongside the expectations of developers with regard to support from the broader Romanian state. Furthermore, the identification of priority areas is crucial in the context of enhancing the development of their own innovations. The data presented herein has the potential to inform the development of systemic solutions that could be integrated into the innovation policy framework within the residential real estate market. This will not only allow developers to develop their own innovations, which, in addition to being implemented in their own activities, can also be sold to other entities. It would allow the Polish economy to rank higher in the innovation ranking of countries. Without our own innovations and by only adapting innovations, we will not become an economy at the forefront of the innovation ranking and thus competitiveness.

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