

THE ROLE OF INNOVATION IN THE STRATEGY OF RESIDENTIAL DEVELOPERS IN POLAND

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Purpose: Identification of the role of innovation in the activities of residential developers in Poland in the context of changes caused by the geopolitical crisis and EU legislative initiatives.

Design/methodology/approach: The work will present the innovative activities of residential developers and the changes that are taking place in this area in connection with the outbreak of the war in Ukraine and the introduction of EU regulations regarding broadly understood sustainable development. The above assumption was based on the research conducted using the CATI method, which involves interviewing respondents by telephone using a computer. The study focused on developers implementing residential projects characterized by the construction of multi-story, multi-family buildings and was conducted in August 2020 and November 2022.

Findings: The conducted analysis of the research results allowed for the diagnosis of a low level of innovation implementation by residential developers in Poland, technical and technological innovation as the dominant group in the innovation structure, clear problems with innovation project management, including risk management, and developers' needs in developing innovative activities.

Research limitations/implications: The article points to the need to introduce innovation in the housing market due to EU legislation and thus to develop a national system supporting the process of implementing innovation based primarily on public entities. Thus, the direction of future research on identifying the needs of developers in the development of innovation, especially in the context of the implemented EU legislation, was indicated.

Originality/value: The article identifies the state of innovation development in the primary residential real estate market, showing the state in November 2022, indicating the need to intensify tasks related to the development of innovation in the context of the "Fit for 55" regulation.

Keywords: innovation, residential developer, "Fit for 55" package, RES.

Category of the paper: Research paper.

Introduction

In 2004, following Poland's accession to the European Community (EU), the pace of changes taking place in the global economy became the driving force of economic development. Initially, this development in Poland was driven by the market conditions that were created within the EU, i.e., the free movement of goods, services, employment, business opportunities and cultural wealth, thus creating a single internal market of the EU (The internal market..., 2023).

Further dynamic development of global economies, the European Union and Poland is possible due to the introduction of innovation (Hult et al., 2004; Jin et al., 2004). Within the EU, innovativeness is perceived as a priority for the EU's development and competitiveness on global markets. Article 173 of the Treaty on the Functioning of the European Union (TFEU) (Art. 173, functioning of the EU, Dz.U. 2004) states that "The Union and the Member States shall ensure that the conditions necessary for the competitiveness of the EU's industry are met." The innovation policy is consistent with other EU development strategies and developed consequently in subsequent years. Under the Lisbon Strategy in the years 2000-2020 (Lisbon Strategy, 2000), the Europe 2020 Strategy for smart, sustainable, and inclusive growth in the years 2010-2020, and currently as part of a sustainable Europe by 2030 and initiatives such as the Green Deal, and thus the Fit for 55, the European Union clearly places emphasis on sustainable development, ecological transformation and achieving climate neutrality, which is possible by implementing innovation (Innovation policy, 2023).

The above states that the changes regarding green transformation will largely concern the real estate sector, because this sector is highly energy-intensive and responsible for a large share of greenhouse gas emissions. (Thompson, 2015). Moreover, the changes also apply to the banking sector, which, due to the high capital intensity of real estate, largely funds investments in this sector.

Sustainable finance (European Securities..., 2018; Krukowska, 2021; School of Energy, 2022), which will concern banking activities, including granting mortgage loans, is to redirect the funding stream to activities aimed at achieving the objectives of sustainable development. This will translate into the possibility of financing only sustainable construction with a mortgage loan, i.e., buildings with low or zero emission and energy consumption (Hamilton et al., 2016).

Another factor stimulating the development of innovation in the real estate market is the geopolitical situation, namely the armed conflict in Ukraine. Russia's attack on Ukraine, which took the form of a full-scale war that began on 24 February 2022, had serious consequences throughout the world economy, in the economies of EU countries, and particularly in countries directly adjacent to the conflict, such as Poland. A direct consequence of Russia's invasion of Ukraine was a dynamic and sudden increase in the prices

of raw materials, especially energy resources, such as crude oil, natural gas and coal, of which Russia is a strategic exporter. The situation was even more serious because the main supplier of energy raw materials to the EU was Russia, which, combined with the subsequent restrictions introduced, such as an embargo on imports of individual raw materials from Russia, resulted in a cascading increase in their prices as well as the risk of energy security. The above was another factor in the increasing importance of innovation, in this case especially regarding renewable energy sources ensuring not only climate neutrality but also energy security (Colgan et al., 2023).

The presented circumstances were the incentive to raise the subject of this article relating to the issue of innovative activities carried out in residential development projects. The objective of the article was to identify the role of innovation in the activities of residential developers in Poland in the context of changes caused by the geopolitical crisis and EU legislative initiatives.

The work presents a review of literature covering the issues of innovation in the real estate market, legislative initiatives undertaken by the EU, especially in terms of innovation, climate and energy policies, and the consequences of the conflict in Ukraine in the economy and state policy. Having analyzed the existing state of knowledge, the research method was presented, used to accomplish the objective of the work. The author's own survey was used, conducted among residential developers in Poland in the second half of 2020 and in the second half of 2022. Then, the research results in the analyzed area were presented and a discussion was held in the context of the previously included literature review. At the end of the work, the conclusions were drawn and directions for future research were proposed.

Definition of sustainable construction in the light of the EU

The idea of sustainable development (Sustainable Development Goals, 2015) has accompanied society for many years. In 1987, its concept was presented in the Report of the World Commission on Environment and Development (Brundtland Commission, 2021). Sustainable development assumes intergenerational solidarity, and thus, when satisfying their needs, current generations should take into account the needs of future generations.

The definition of sustainable development is included in the Report of the World Commission on Environment and Development (Brundtland Commission, 2021), where sustainable development is described as “the development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

Initially, in the context of the principle of sustainable development, only the need to limit the negative impact of the economy on the natural environment was discussed. Today, the discussion related to sustainable development is not only about environmental

protection, but also about the issues of social progress and economic growth. These three elements are interconnected and together may lead to the prosperity of current and future generations. The first actions regarding sustainable development in a global context are already being taken. The “2030 Agenda for Sustainable Development” (What is sustainable development-..., 2022), adopted by 193 UN member states, contains 17 goals and 169 tasks to be implemented. The 17 Goals campaign was signed by the leaders of UN member states in the document “Transforming our world: 2030 Agenda for Sustainable Development” at the summit in New York in 2015. Its assumption is to transform the world with respect for the environment, with future generations in mind and taking into account the needs of the least privileged social groups. Declared countries have an obligation to introduce and monitor sustainable development in 5 areas: people, planet, prosperity, peace, partnership (5xP).

In the case of the EU, actions for sustainable development were undertaken much earlier and with greater intensity. The leitmotif of the Europe 2020 Strategy was development which is to be smart, sustainable, and socially inclusive. These goals were to be achieved, among others, by strengthening the position of innovation in the EU and then its implementation. The Innovation Union was established, one of the seven flagship initiatives under the Europe 2020 Strategy, which was intended to improve the conditions for funding research and innovation in the EU and enable the use of innovative ideas for real products and services to increase economic growth and the number of jobs. In 2022, the Commission adopted the new European Innovation Plan, proposing 25 specific actions in five priority areas: funding scale-ups; enabling innovation through experimentation spaces and public procurement; accelerating and strengthening innovation in European Innovation Ecosystems across the EU.

Another extremely important document from the point of view of sustainable development and thus the implementation of innovation in the real estate sector is the Green Deal (Green Deal, 2022). The European Green Deal is a package of policy initiatives which aims at putting the EU on a green transition path and ultimately achieving climate neutrality by 2050. It supports the transformation of the EU into a fair and prosperous society with a modern and competitive economy, stresses the need for a holistic and cross-sectoral approach in which all relevant policy areas contribute to achieving the overarching climate objective. The package includes initiatives in a range of closely interconnected areas, such as climate, environment, energy, transport, industry, agriculture, and sustainable finance. The Fit for 55 package (Fit for 55, 2023) is to translate the climate ambitions of the Green Deal into specific regulations. The European climate law includes a mandatory EU climate goal: reducing emissions in the EU by at least 55% by 2030. EU countries are working on new regulations that will help achieve this goal and make the EU climate neutral by 2050.

It should be emphasized that the consequence of the adoption of the Energy Efficiency Directive is the introduction of the ban on the sale and rental of apartments that do not meet the requirements for generating a carbon footprint. The idea is to motivate the owners of the existing buildings to make thermal modernization investments (the EU EPBD Directive in Poland will be implemented from January 2024), while the ban on the sale and rental of real estate not meeting energy standards will result in earlier large investments in the thermal modernization of a building or an apartment. This directive will be significant in the case of introducing innovation into residential construction.

Another element that will contribute to the need to implement innovation in residential development projects will be the introduction of legal changes regulating broadly understood sustainable finance. The Green Deal forces taking legislative initiatives aimed at redirecting the funding stream to activities aimed at implementing sustainable development goals. Legislation in the area of sustainable financing covers many issues, including:

- sustainable investments,
- ESG risk management,
- taking into account ESG factors in credit activities,
- taking into account ESG factors in the financial products offered,
- using ESG indicators and ratings,
- disclosing information on the impact of the financial institution's activities on achieving sustainable development goals,
- relationships with customers, business partners and owners,
- ESG due diligence,
- Green bond issuance.

As can be seen, the scope of activities regulated by sustainable finance is wide and includes credit activities and products shared, which will affect the need to implement such investment projects and development projects that meet the conditions for sustainable development, in this case construction (Nykvist, Maltais, 2020). The areas which are particularly important from the point of view of sustainable finance and real estate funding include:

- Taxonomies – criteria determining whether a given economic activity qualifies as contributing to achieving one of the environmental goals - adaptation to and mitigation of climate change.
- ESG risk disclosure – in accordance with the requirements of CRR Pillar III and climate risk management by banks.
- Preparing disclosures based on the CSRD directive - sustainability reporting.

Another important factor that influenced the global market and especially the situation in Poland was the official start of the war in Ukraine on 24 February. Russia, under the pretext of freeing Ukraine from the Nazis, decided to launch an attack which was called a special operation by Russian propaganda. The consequences of the invasion included air and sea

blockades and international responses from the UN, the Council of Europe, the European Union, and NATO. However, the reactions of states include military and cyberwar assistance for Ukraine, as well as the reaction of the international community.

Economic consequences of the war in Ukraine for Poland (Kolany, 2022) are:

- depreciation of the Polish zloty. The Polish currency remains almost record weak, significantly reducing the purchasing power of Poles' earnings and savings; it is an important pro-inflation factor,
- a significant increase in the prices of raw materials: oil, diesel oil, gasoline - i.e., an energy crisis and grain prices (wheat, corn, rapeseed, and coffee),
- higher inflation and higher loan installments,
- costs of supporting a significant increase in the wave of refugees from Ukraine,
- a significant increase in military spending in Poland as a frontline country.

The consequences of the invasion and the reactions of states were dictated by threats to the stability of the European economy (Figure 1). During the study (Fig. 1) carried out by Minds&Roses in 100 bank branches on behalf of the Polish Bank Association in July 2022, the bankers, when asked about the greatest threats to the stability of the European economy, indicated the conflict between Russia and Ukraine (33%), as well as high inflation (26%) (ZBP, 2022). The subsequent positions indicated dependence on energy carriers from Russia, internal problems in EU countries, as well as disintegration processes within the EU.

From the point of view of the topic discussed, the most important consequence of the war in Ukraine is the increase in prices of energy raw materials and, above all, the increase in the risk of supplies of such raw materials. This resulted in an even stronger emphasis on the development of renewable energy sources for the sake of energy self-sufficiency (Martinez-Garcia et al., 2023).

The real estate market is considered one of the most conservative, as shown by the last few decades. The most innovative markets must be those that are characterized by a high risk of losing asset liquidity. However, nowadays also in the real estate market, innovation allows for gaining a competitive advantage and generating higher income (Jiang, Payne, 2019; Maassen, 2017). Innovation is therefore an inherent element of a modern, efficiently functioning and developing real estate market. However, innovation is not uniform, thus its generic structure should be indicated. According to the OECD, we can distinguish four types of innovation: product innovation, process innovation, organizational and marketing innovation.

On the other hand, for the real estate sector, the distinguished groups of innovation depending on the activities conducted by business entities, in accordance with the works, can be characterized as follows:

- technical and technological innovation includes modern solutions used in construction,
- process and organizational innovation related to the implementation of technical innovation, legal changes in relation to the modern real estate market customer,

- marketing innovation as related to the strategy of both sales and distribution of products and services on the real estate market,
- financial innovation enabling real estate market entities to undertake investment activities using modern financial instruments.

All the above-mentioned types of innovation play a very important role, however, in the current reality of enormous changes in the geopolitical situation in the world initiated by the Russian invasion of Ukraine, technical and technological innovation, namely renewable energy sources (RES), are becoming particularly important. Increasing the production of electricity from renewable sources is not only pro-ecological activities, but also activities aimed at ensuring the energy security of countries, in particular those that are forced to import energy raw materials completely or partially.

Every type of activity - also in the real estate market - is burdened with risk and in each type of activity the risk must be taken into account. When innovation is introduced to the real estate market, new uncertainties and innovation risk appear [according to: (Knight, 1964), measurable uncertainties] (Abusalah, Tait, 2018). It must be recognized so that it can be managed, and its negative effects can be reduced. Generally, the risk of innovation activities related to the implementation of innovation is defined as the risk of occurrence of threats and consequences (Sitek, 2013). Therefore, the basis for making investment decisions is the relationship, the proportion between risk and achievable income (Sipa, 2017).

The research by Zhang which indicated that one of the factors driving innovation in the Chinese real estate market is risk, is very interesting. It shows that risk has a positive impact on companies' innovation performance, including investments in research and development, innovation level, and other innovation performance (Zhang, 2020).

In the context of legislative changes implied by the Energy Efficiency Directive, it should be emphasized that in addition to implementing new projects, modernization of the existing resources is becoming more important (Lowe, Chiu, 2020). The modernization market in the light of the new directive will certainly expand significantly. Killip and Owen claim that in order to examine the process of implementation of investments in the real estate market, most often the secondary one, it is necessary to analyze two markets: the first market of repair, maintenance and improvement (RMI) of houses, in which the efficiency energy, and thus introducing innovation, is not the most important issue; and the second market of deep modernization, where the main goal is energy efficiency, and thus the implementation of innovation (Killip, Owen, 2020). The first RMI market is dominated by small and medium-sized enterprises, especially micro-enterprises, operating on local markets. These companies do not maximize profits or focus on the energy efficiency of buildings. In the second market, companies are focused on energy efficiency, and these are usually large enterprises cooperating on the regional and national market. The same situation occurs in the primary residential market.

Developers, including residential ones, carry out various projects, ranging from the construction of apartments on undeveloped land in new locations, reconstruction, and modernization of existing resources, as well as reconstruction, modernization and adaptation of buildings originally intended for a different purpose into residential space, e.g., lofts. Brown distinguishes several elements of a successful modernization management model. He points to value as the guiding principle of innovation management, assuming that value must be based on comfort, well-being, health, and aesthetics. He also notes the very current issue of energy saving guarantee and the integrated supply chains associated with the savings that can provide a “whole-home approach”. The above elements distinguished by Brown concern an integrated, low-cost model of funding such projects and a single point of contact with the client. He also pays special attention to the coordination of all the elements he specifies (Brown, 2018).

As can be seen, innovation is an inherent element of a successful project management model. The use of ecological (healthy) building materials, renewable energy sources, providing as many door-to-door services as possible as part of a whole-home approach to residential space, and financial innovation are some examples of value creation in the investment management process on the residential market (Rossiter, Smith, 2018).

Materials and methods

The study of innovation among developers of the primary residential market, the motives for their implementation, and the changes that have occurred in this field in recent years was based on the research conducted using the CATI method, one of the modern research methods used in quantitative research, which involves conducting phone interviews with respondents using a computer. The answers to the questions were also expected about the extent to which entrepreneurs manage investments in activities conducted and whether they include them in their strategies. The study focused on developers implementing residential projects characterized by the construction of multi-story, multi-family buildings. In this case, the criterion that narrowed the general population was the selection of only developers who carry out construction projects of multi-story, multi-family residential real estate. Therefore, the study was not limited to one group of developers, e.g., medium-sized enterprises, but both small, medium-sized, and large enterprises were examined, because the selection criterion was the capital strength of enterprises, i.e., the implementation of large residential projects. Such research was decided on because even developers classified as small enterprises implement large investment projects in Poland, involving subcontractors in their projects. The study was conducted twice at a 2-year interval.

The first study was conducted in August 2020 on a research sample of 130 respondents with a total population of 314 entities identified at that time. Subsequently, at the turn of October and November 2022, another survey was conducted using the same method on a sample of 98 respondents selected from the total population of 280 entities. The conducted research allowed for the identification and analysis of developers' perception of innovation in the period before and after the outbreak of the war in Ukraine. It should be emphasized, however, that the study was conducted before the approval of the EU Energy Efficiency Directive (25 July 2023), which probably increased the importance of innovation for developers.

Results and discussion

The survey concerned the research on innovation in development companies operating on the primary real estate market. Innovation research among residential construction companies on the primary market was carried out in August 2020 as well as in November 2022. The survey among enterprises was conducted using the CATI—Computer Assisted Telephone Interview method. Research using this technique is often used to develop a company's strategy or marketing activities. The study was conducted on a nationwide sample. The research sample, in 2020, consisted of 130 entities, with the general population constituting ($\pm 5\%$) 324 entities building multi-storey, multi-family houses in Poland (figure 2).

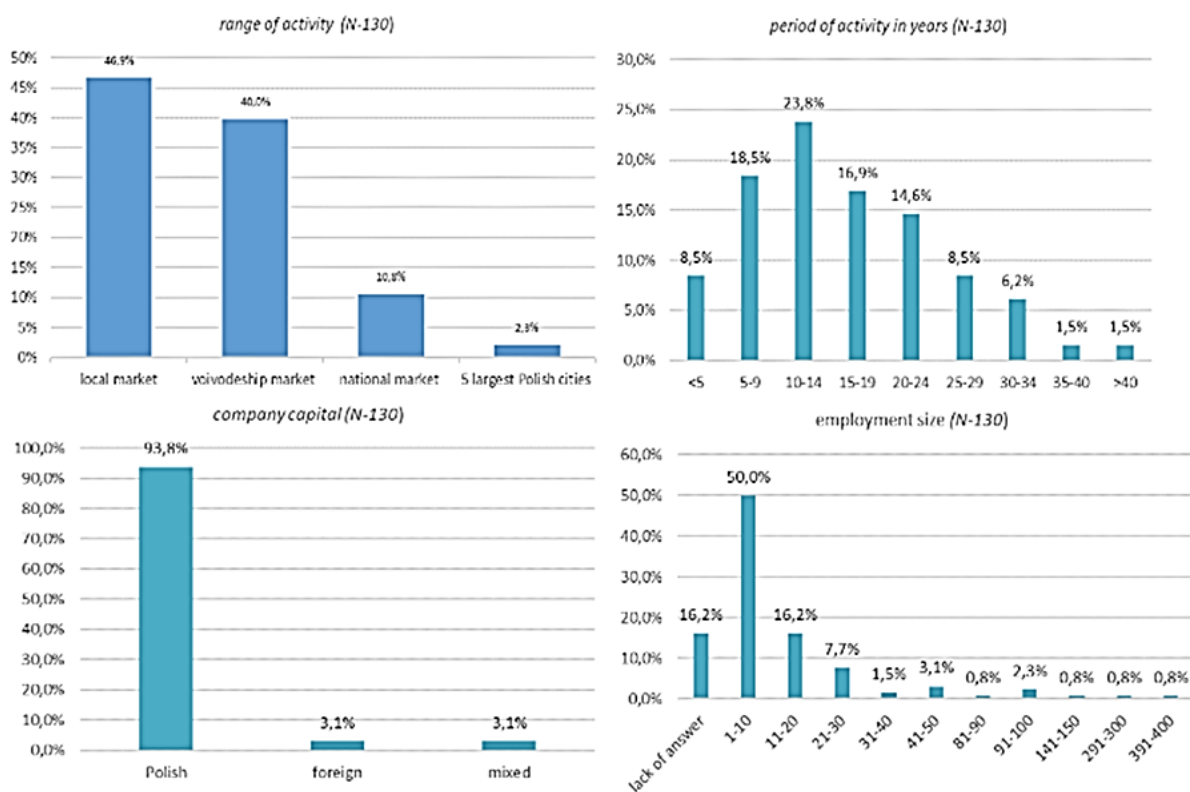


Figure 2. The research sample in 2020.
Source: author's elaboration.

The research sample, in 2022, consisted of 98 entities, with the general population constituting ($\pm 5\%$) 280 entities building multi-storey, multi-family houses in Poland (figure 3).

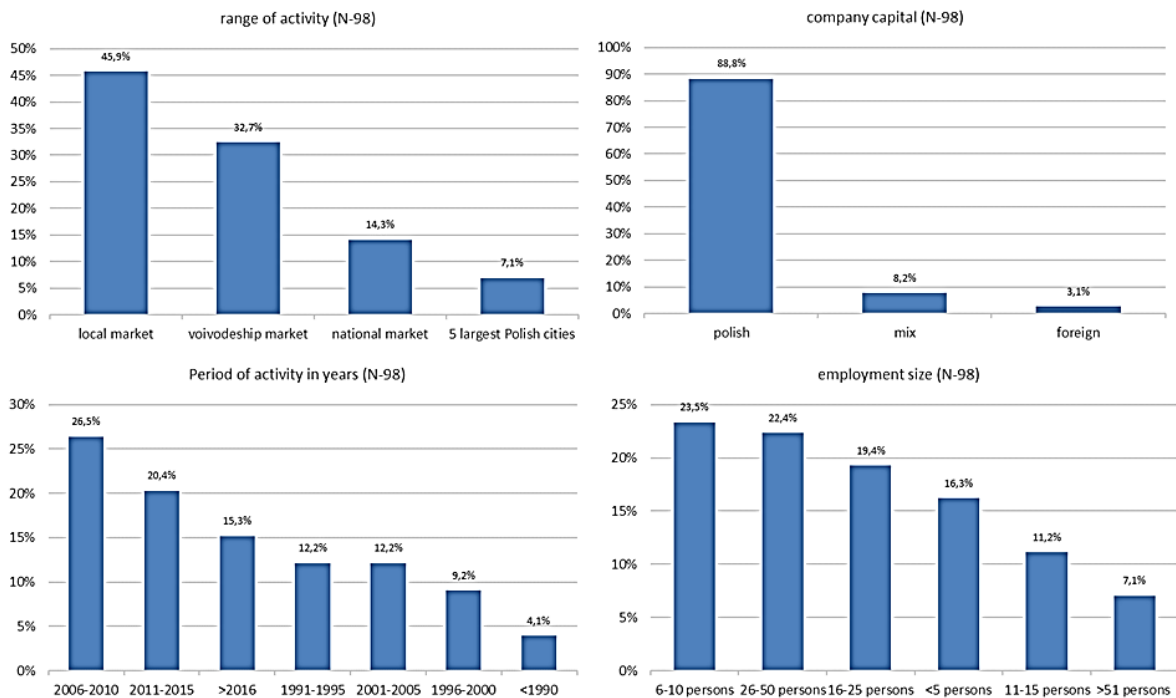


Figure 3. The research sample in 2022.

Source: author`s elaboration.

In terms of the introduction of innovation to the real estate market, in 2020, 31.5% of developers responded positively, while in 2022, 52% of the surveyed developers confirmed the introduction of innovation in their activities. As can be seen, the number of developers declaring the introduction of innovation in their investment projects increased significantly (figure 4).

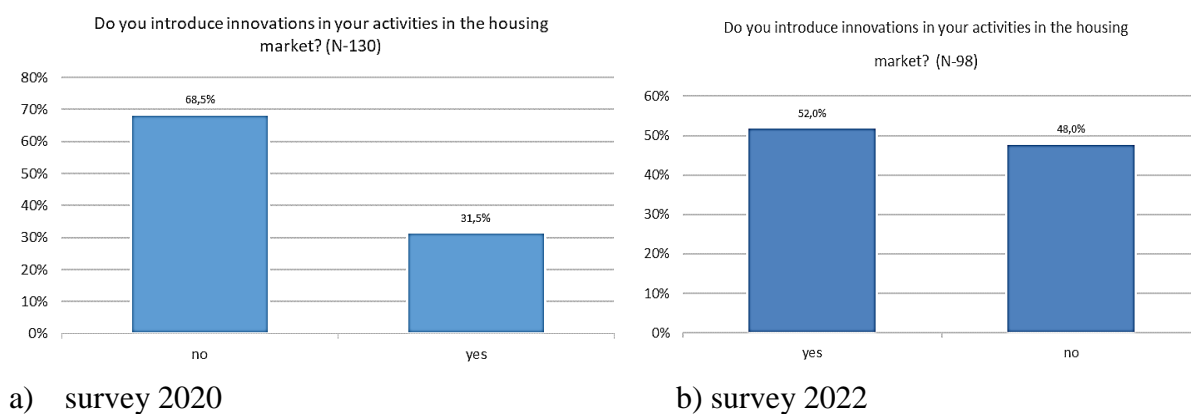


Figure 4. Do you introduce innovations in your activities in the housing market?

Source: author`s elaboration.

The low percentage of enterprises declaring the introduction of innovation in 2020 was determined primarily by 3 main factors, namely the fact that customers choose standard construction, i.e., no demand - 23.6%, followed by preference for proven solutions - 22.5% and high costs of innovation 15.7%. On the other hand, as the three main determinants of not implementing innovation in their activities, in 2022, developers considered the lack of such a need - 23.4%, a difficult market situation - 23.4% and the lack of innovative projects. This shows, firstly, that the awareness of the need to introduce innovation by residential developers is high, which results in an increase in the number of enterprises declaring the introduction of innovation and, secondly, that despite the continued importance of the lack of demand/need and the preference for proven solutions, high investment costs were not indicated in 2022 as one of the main determinants of the lack of implementation of innovation. This situation shows that the EU in particular provided decision-makers with tools for funding innovation and that entrepreneurs are looking for information about such tools, increasing their knowledge and experience in this area, and are more willing to use them. Additionally, comparing studies from 2020 and 2022, it can be seen that in the later study, the respondents clearly indicate a difficult market situation. This indication can be explained by the consequences of the war in Ukraine, namely an increase in costs for developers combined with a decline in demand. The decline in demand was caused by high inflation and, consequently, high interest rates and limited access to mortgage loans. On the other hand, the increase in costs was caused by the high price of raw materials, which translated into an increase in the prices of construction materials. Here, it is possible to point out, on the one hand, a huge increase in the price of coking coal and, consequently, steel, but also, on the other hand, the prices of, e.g., wood, which was imported in large quantities in Poland, among others, from Ukraine.

It is impossible not to mention that the most important factor indicated by the respondents in both studies, i.e., the lack of need/demand, changed dramatically in July 2023 in connection with the adoption of the Energy Efficiency Directive. This directive imposes such a need from above, i.e., it determines the demand for sustainable construction, where buildings should be energy self-sufficient and even generate a surplus of energy obtained, obviously, from renewable sources. It can be expected that this will result in a very high increase in enterprises declaring the introduction of innovation.

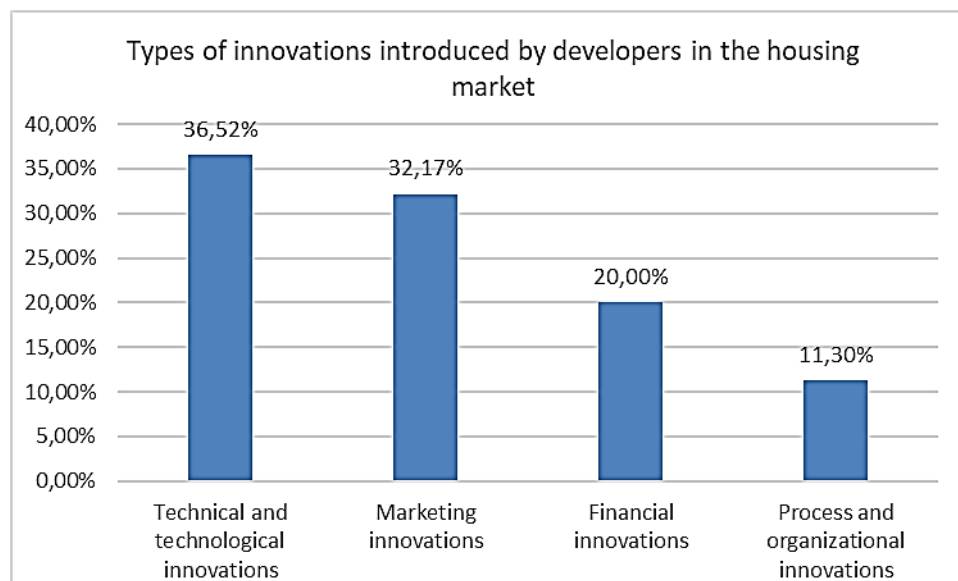


Figure 5. Types of innovations introduced by developers in the housing market.

Source: author`s elaboration.

Another important question answered by developers was the question about the type of innovation introduced by them (figure 5). They agreed that the most frequently introduced innovation belongs to the group of technical and technological innovation (36.52%), marketing (32.17%), financial (20%), and process and organizational innovation (11.3%). In 2020, the types of innovation applied were as follows: technical and technological - 39%, marketing - 25%, financial - 9%, and a surprising indication of process and organizational - 27%. Invariably, the most important and most frequently used innovation is technical and technological. It seems understandable due to the fact that this group includes renewable energy sources, specific materials and construction techniques. This group of innovation allows for a real reduction in the subsequent real estate operating costs, which is why customers pay attention to this. It can be concluded that in the event of the implementation of EU regulations related to the “Fit for 55”, the role of technical and technological innovation will increase even further. When comparing the results obtained from the respondents in two studies, it can be seen that the group of marketing innovation is invariably chosen by developers quite often, which may be related to progress in the product presentation by using drones or virtual presentations to achieve a better presentation of the object. Introducing marketing innovation is relatively low-cost and produces measurable effects. There is a clear difference in the implementation of financial, process and organizational innovation presented in both studies. In 2020, process and organizational innovation constituted a large group, obtaining 27% of responses, and financial innovation - 9%, which could be due to the fact that at that time the interest rates on loans were low and, therefore, access to conventional financing was wide and additionally, in 2022, as already mentioned, the respondents emphasized the difficult market situation, which was caused, among others, by the weak demand due to expensive credit. This situation could have been the reason for looking for alternative ways of funding real estate, starting from offering long-term rental with an option of later purchase of an apartment.

The respondents also indicated another aspect of innovative activity, namely whether they adopt innovation created by other entities or create it themselves. Both in 2020 and 2022, the majority of the respondents answered that they adopted innovation already introduced to the market. Despite similar results, it should be noted that in 2022, approximately 22% of the respondents declared that they were working on new innovation themselves, and in 2020, approximately 17%. The increase in 2022 compared to 2020 is very small, which allows for the conclusion that further activities related to the “production” of innovation are necessary not only in the real estate market but also in the entire economy.

The research also showed that developers, by introducing innovation in their projects, are able to obtain a higher sales price for apartments and even sell them faster. From the point of view of the real estate market, this is extremely important due to the low liquidity of real estate.

As indicated by the research results, developers see the advantages of implementing innovation, and what is more, they are aware of the need to implement it and the risk of bankruptcy if they do not implement innovation. Therefore, the vast majority of the respondents admitted that they introduced an aspect of implementing innovation into their strategies, thus emphasizing its importance in their activities (figure 6). In 2020, 85.4% declared including innovation in their strategy and in 2022 - 84.3%. According to the developers, the main factor determining this situation was the desire to achieve a leading position on the market among competitors, the need to adapt apartments to the level offered by competitors, and in 2020, they additionally indicated the desire to be characterized by above-average quality.

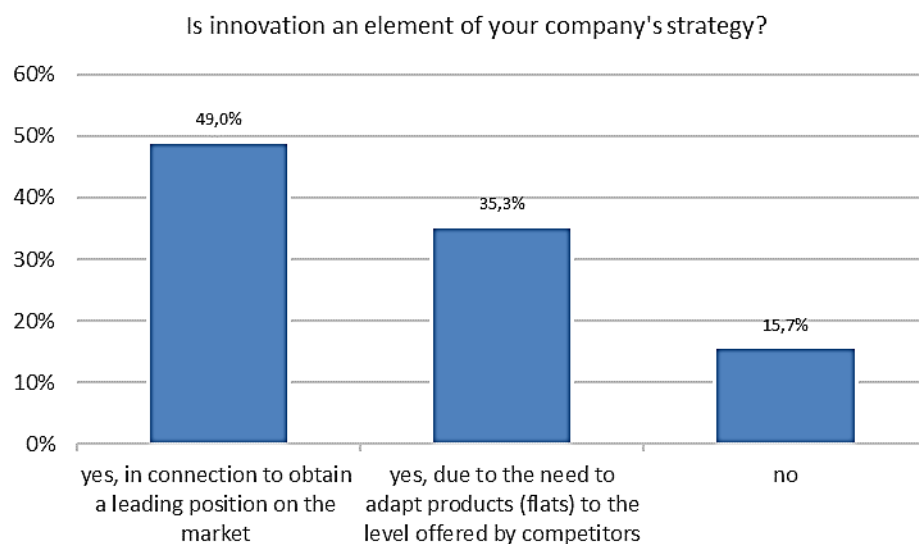


Figure 6. Is innovation an element of your company's strategy?

Source: author's elaboration.

Residential developers in Poland see the advantages of implementing innovation, they also see the risk of not implementing it, especially in the long term, which is reflected in the strategies. Therefore, why do about half of them admit that they do not implement

innovation? It seems probable that the broadly understood market did not exert adequate pressure on developers, encouraging them to compete more strongly using innovation. Despite the rapid development of the real estate market, we are still talking about a shortage of apartments in Poland, which may cause this situation. Additionally, the process of implementing innovation is not simple and often unknown to developers, making them not reach for new solutions. The respondents in both studies clearly confirmed that implementing innovation results in difficulties in managing such projects (figure 7).

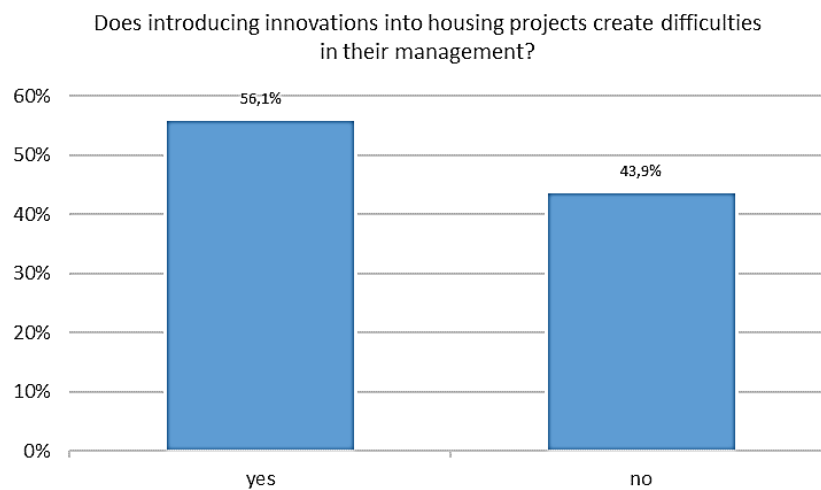


Figure 7. Does introducing innovations into housing projects create difficulties in their management?

Source: author`s elaboration.

These difficulties appear both at the stage of managing a single project and a portfolio of projects. Developers confirm that they gradually introduce innovation to their portfolio, much less often they implement all available innovation to all their projects and least often to one project.

More than half of the surveyed developers in 2022 declaring the introduction of innovation do this gradually and as part of various projects (figure 8). In 2020, it was declared respectively: 40.6% gradually introduced innovation as part of implemented projects, 31.2% introduced all possible/available innovation as part of implemented projects and 28.2% introduced all available/possible innovation within one implemented project. This approach to the implementation of innovation confirms that it is not an easy process and managers encounter problems in managing it. These problems often result from inadequate risk management of such innovation or even the lack thereof. The 2020 study showed that about half of the respondents (49%) did not measure risk as part of the implementation of innovation, 41.5% estimate risk intuitively and only about 10% use specialized tools for this purpose. In 2022 developers responded very similarly: 49% measured intuitively, 39% did not measure such risk at all, and only 12% used specialized tools for this purpose.

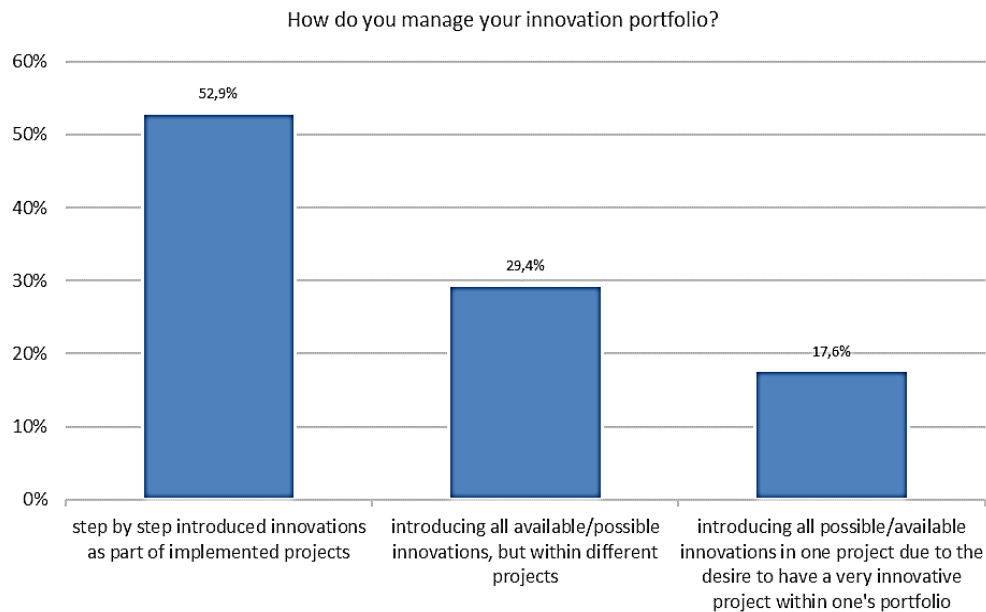


Figure 8. How do you manage your innovation portfolio.

Source: author`s elaboration.

As presented, developers in Poland point to clear problems in managing innovative projects. Over the two years separating both studies, this state of affairs practically did not change. This indicates that the process of achieving appropriate and comprehensive management of innovative projects on the residential market in Poland will be long-lasting. On the other hand, the legal changes initiated by the EU described in the literature review will confront developers with the fact of implementing innovation in their projects. This will not happen immediately, but within the next few years, which is not a long time in the real estate market. Therefore, developers should adapt as quickly as possible to future changes not only in terms of innovation project management but also in terms of the creation and implementation of innovation. Here, an important role can be seen in the assistance from the state and the EU, which develops tools, such as funding such activities. The developers themselves indicated that they need the support of other external entities, especially public ones, to develop innovative activities on the Polish market (figure 9).

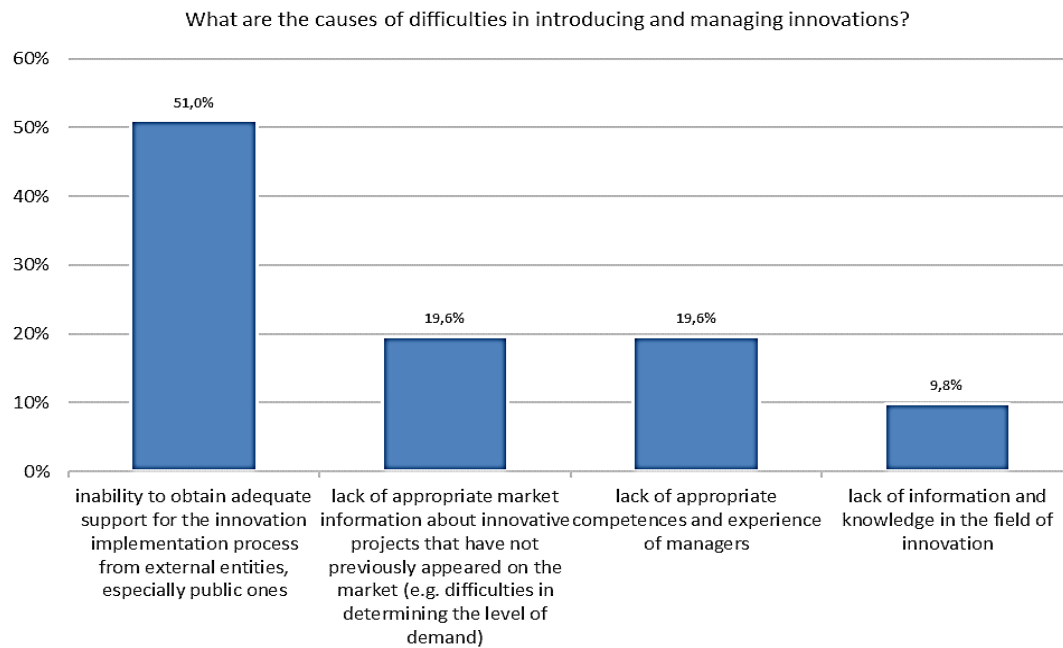


Figure 9. What are the causes of difficulties in introducing and managing innovations?

Source: author`s elaboration.

This suggests that assistance, especially in creating and developing innovation, should be directed to research centers and universities, which, in cooperation with enterprises, would create innovation aimed at business.

Conclusions

The interpretation of the primary research conducted in the work, concerning innovation in the activities of residential developers in Poland in 2020 and 2022 and the literature review presented in the work allowed for the accomplishment of the work's objective, which is to identify the role of innovation in the activities of residential developers in Poland in the context of changes caused by the geopolitical crisis, including RES. The survey described above, conducted before and after the outbreak of the war in Ukraine, allowed for the identification of changes in the perception of innovation. The paper also presents the directions of changes set out by EU directives, which will undoubtedly influence the perception of innovation by residential developers. It should be noted that the second study conducted in November 2022 does not fully capture the impact of EU legislative initiatives because, despite the existence of projects and outlined directions of change, one of the most important directives from the point of view of the real estate market, namely the Energy Efficiency Directive, was adopted in July 2023. The presented research allowed for formulating the following conclusions:

- Identification of the number of residential developers with adequate capital strength to implement projects for the construction of multi-family, multi-story residential properties showed that in 2022 there were fewer of these enterprises than in 2020 (44 entities less), which could be due to difficult market conditions, which was also emphasized by the respondents in the period after the outbreak of the war in Ukraine.
- Despite the decline in the number of selected entities in the general population, an increase in the number of developers declaring the introduction of innovation was observed. This shows the positive direction of development of the Polish housing market and the awareness of importance of innovation among developers. Moreover, the hypothesis can be formulated that due to market difficulties, enterprises that did not introduce innovation disappeared from the market, and therefore in 2022 the research sample was characterized by a higher share of entities introducing innovation.
- The persistently high percentage of developers not introducing innovation in their activities is determined primarily by the lack of demand/need to introduce innovation. In 2022, the respondents also indicated difficult market conditions as a reason for not implementing innovation. In the context of the described changes related to the "Fit for 55" package and the adopted directives, it can be freely stated that the basic determinant, i.e., the lack of need to introduce innovation, has taken a 180-degree turn. In the coming years, it is not even the need, but the necessity to introduce innovation that will drive their development and implementation.
- Invariably (in 2020 and 2022), the most important and most frequently applied innovation is that from the technical and technological group. This seems understandable due to the fact that this group includes renewable energy sources, specific materials and construction techniques. This group of innovation allows for a real reduction in the subsequent operating costs of real estate, which is why customers pay attention to it. It can be concluded that in the event of the implementation of EU regulations related to the "Fit for 55" and the experience of fluctuations in the prices of energy raw materials and the security of their supplies in connection with the conflict in Ukraine, the role of technical and technological innovation will increase even further.
- The respondents also point to the positive effects of involving innovation in their projects, such as higher prices of apartments and faster sales. They also declare that they understand that innovation may give them a competitive advantage and failure to implement it increases the risk of bankruptcy. Therefore, they introduce elements of innovation in their strategies. Obtaining a competitive advantage and thus a leading position on the market was considered the main factor for including innovation in strategies. It can therefore be concluded that stronger competition will increase developers' interest in innovation. In the current situation of a huge increase in the interest in apartments due to, among others, 2% mortgage loan with state subsidies, an increase in new investments and an increase in entrepreneurs' interest in development activities should be expected.

- The respondents declare that introducing innovation creates problems in managing development projects. Therefore, the development of knowledge, support, and transfer of know-how in the process of managing innovative projects seems important. Therefore, the respondents declare that they introduce innovation gradually in their projects, which allows them to better monitor the process of its implementation, and thus react in the event of unforeseen events.
- The respondents clearly indicate the need to obtain appropriate support in the process of implementing innovation from external entities, especially public ones. Although the EU is trying to create tools to support innovation, it is clearly visible that a systemic change is needed at the country level, i.e., Poland. This process will certainly be long-term, but properly prepared, involving Polish research units and universities, it would allow for the creation of innovation and not only its adaptation.

The analyzes undertaken also showed a possible direction for future research. It is worth deepening the study in the part regarding the role of renewable energy sources in future development projects and the modernization of the existing resource in the context of the “Fit for 55” package. Moreover, in the current situation, the most important thing is to identify the needs of developers in the process of implementing innovation in the context of providing them with appropriate support and preparation for the implementation of innovative projects that can meet the current and future requirements of sustainable development.

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