The impact of new technologies on facilitating the real estate purchase process

Wiktoria Serwin[1], Katarzyna Kania[2]

[1] Krakow University of Economics, Poland, s220888@student.uek.krakow.pl
[2] Krakow University of Economics, Poland, ORCID: https://orcid.org/0000-0003-4116-5971, kaniak@uek.krakow.pl

ABSTRACT

Objective: The purpose of this study is to identify the impact of new technological tools on the real estate purchase process.

Material and Methods: The tool of this research was a survey conducted among individuals who are part of the Krakow residential market. The survey allowed authors to analyse the impact of new technological tools in the process of buying a house.

Findings: Thanks to this research, it can be concluded that new technological tools have a great impact on the residential market. These tools increase the attractiveness of the presentation and help to better understand the layout of the property. Additionally, the presence of new technological tools makes it easier for customers to make the decision to buy the property faster.

Research limitations: The rapid development of technology means that the study should be continually updated. In addition, the results presented relate to the local residential market in Krakow. This means that the research was limited, as it did not include other cities in Poland.

Research implications: The results of this study can be used by developers operating in the primary market as a source of information on which new technological tools are preferred by potential clients. This insight can help developers improve the promotion of their offers in the primary market and, consequently, contribute to increasing property sales.

INTRODUCTION

Modern technologies are increasingly impacting the property market, particularly in how customers perceive offers and how they are presented by developers. Online information sources, such as developers' websites and property portals, are becoming crucial in the housing search process (Bartkowiak et al., 2023). More and more people are searching for properties online, reflecting the growing popularity of modern technological tools. As a result, developers' websites play a key role in attracting the attention of potential buyers.

Research into the impact of new technological tools on the property search process is essential, as it helps to understand how these tools support customers in their decision-making process. This knowledge enables developers to better adapt their marketing strategies, making them more competitive and effective in the marketplace.

This research aims to examine the impact of modern technological tools on the customer experience during the search and purchase process. For the study, the main hypothesis was established: the presence of modern technological tools facilitates potential buyers in making a property purchase decision. To support this main hypothesis, two specific hypotheses were identified:

- Modern technological tools are more prevalent in the primary market.
- The presence of modern technological tools increases the attractiveness of properties.

To thoroughly investigate the impact of modern technological tools on the property purchase process, the remainder of the paper is structured as follows: a literature review, a description of the research methodology, a presentation and analysis of the results. The literature review discusses key studies and theories on the application of modern technology in the property market. The methodological section details the research tools, methods of data collection, and the research group. The final section presents the research results and provides a discussion of the findings.

LITERATURE REVIEW

Nowadays, the Internet is an important source of information, providing easy access to a huge number of resources on a wide range of topics. It is typically the first place people turn to when seeking information on subjects of interest (Gorzeń-Mitka, 2016). According to a survey conducted (in 2021) by the National Association of Realtors, the Internet plays a crucial role in the property search process, with 97% of home buyers using it as a key resource to gather information (National Association of REALTORS Research Group, 2021). Furthermore, the most common place where buyers found the home they purchased was also the Internet (indicated by 52% of respondents), with the following less recognised: real estate agent, family/friends and magazines (National Association of Realtors, 2024). This dependence demonstrates that the Internet plays a significant role in the real estate market, serving as the most frequently chosen source of information for potential clients (Bartkowiak et al., 2023). The development of technology, especially computers and the Internet, has significantly facilitated the operations of real estate companies by enabling the rapid flow of information. The Internet has become a key marketing platform for these companies, as the quality and accuracy of the information provided directly influence the efficiency of the real estate market (Azlie & Hamzah, 2020).

According to the literature, the residential market is one of the most advanced sectors due to the standardisation of transaction processes. For this reason, both primary and secondary market activities are increasingly based on the Internet. Many processes, such as applications, valuations, and lending, are now conducted online (Vandell & Green, 2000).

Today, having a website is a fundamental element of developers' online strategies. These websites are increasingly adopting modern technologies, such as 3D models, chatbots, and virtual tours, to help customers better understand and visualise properties. This, in turn, significantly influences their purchasing decisions (Martyniak, 2015). Companies that implement such technologies gain a competitive advantage in the rapidly evolving property market (Lizam, 2019).

An important concept related to modern technology in the real estate sector is PropTech. This term encompasses advanced real estate technologies that streamline the processes involved in buying, selling, and financing properties (Siniak et al., 2020). The primary objective of PropTech is to increase the efficiency of the real estate market, which has historically been perceived as resistant to technological change (Górska, Mazurczak & Strączkowski, 2022). The

fourth industrial revolution, closely related to PropTech's development, is characterised by automated processes and the use of artificial intelligence, virtual reality, mobile applications, and more (Furmanek, 2018; Bartkowiak et al., 2023).

The COVID-19 pandemic further accelerated the digitisation of the real estate industry, compelling developers and real estate agents to adopt more sophisticated online tools (Moro, Souza Mendonça and Andrade, 2023). Studies indicate that more than 70% of agents and brokers reported a significant impact of the pandemic on the adoption of modern technologies in the real estate sector (Kania & Kmieć, 2022). These findings align with previous research that highlighted the critical role of technology in driving innovation and meeting customer expectations within the industry (Grant & Cherif, 2016). In response to these challenges, companies in the real estate sector have increasingly focused on digital solutions, upgrading their websites, and implementing advanced tools to better meet customer needs during the pandemic.

Thus, the use of modern technological tools has become essential for developers to remain competitive and adapt to the demands of the modern market (Maududy & Gamal, 2019). A detailed overview of these modern technological tools is presented below (Tab.1).

Table 1. New technological tools in property presentation

Modern technological tools	Description
VR glasses	Based on virtual reality, they allow potential customers to view properties that are not built yet. They give the opportunity to see visuals on the outside and inside of the building (Molga & Plachta, 2020).
AR projects	Computer-generated content (3D objects, images) in a real environment (Kołodziejczyk, 2013). Presentation via an electronic device (e.g. tablet).
3D models	A three-dimensional image showing the property using tools such as 3D scanning and computer modelling (Naeem, Rana, & Nasir, 2023).
Virtual walk	A collection made up of a series of high-quality photographs. It gives the ability to see the property by interactively clicking on the marked points in the photographs (Palonka & Sroka, 2013).
Visualisation of the flat	Presentation of the interior with images or computer graphics (PWN dictionary, 2024).

Virtual assistant to buy a flat	A computer program that interacts with potential clients. It learns the user's preferences to personalise the property offer. Present from the beginning of the search to the real estate transaction (Kuligowska & Lasek, 2007).
QR codes to navigate to selected parts of the offers	Square digital code, read by built-in cameras (Kuligowska & Lasek, 2007). It redirects, for example, to photo galleries, virtual walks, etc.
Chatbots	A computer program based on artificial intelligence (Jaskowska & Wójcik, 2017). It provides the necessary information about the offered properties.
Mobile application	A computer program for viewing offers, communicating with developers, and managing transactions (Bac, 2014).
Online meeting with the seller	Real- time interaction with a given communicator. Provides the ability to get information about real estate (Gackowska, 2013).
Flat search engine	A computer program that allows the search for a flat according to the client's preferences (PWN dictionary, 2024).

Source: own study

Technologies have a significant impact on the property sales process. Innovations such as VR, AR, and virtual tours enable interactive property viewings without the need for physical presence, saving time and resources for both parties involved in the transaction. Realistic visualisations allow customers to better assess property interiors and surroundings, increasing engagement and accelerating purchase decisions. Additionally, VR facilitates the presentation of properties under construction, reducing the likelihood of subsequent modifications (Miljkovic, Shlyakhetko and Fedushko, 2023). These technologies also shorten the property search process, leading to faster decision-making. Consequently, their implementation contributes to more efficient and automated transaction processes (Naeem, Rana and Nasir, 2023). Other technological tools, such as chatbots and virtual assistants, enhance communication and streamline transactions by providing instant access to information and assisting with the preselection of offers. They also collect data on customer preferences, enabling the creation of more tailored and personalised offers (Gackowska, 2023). Furthermore, mobile apps, property search engines, and QR codes facilitate the search process by helping customers quickly find properties that meet their requirements. These tools improve the efficiency of transactions, making it easier and faster for customers to complete their property purchases (Bac, 2014).

RESEARCH METHODOLOGY

The research on customer interaction with modern technological tools in the context of the real estate market involved gathering information from individuals (potential buyers) planning to purchase property in the future. The primary objectives of the study were the following:

- to identify the impact of modern technology on the property buying process;
- to determine in which market modern technological tools are most prevalent;
- to assess whether modern technological tools increase the attractiveness of the presented properties.

The study used a questionnaire composed of closed-ended questions. The purpose of these questions was to collect information about customers' preferences and opinions regarding modern technological tools used in property presentations and purchases. The questionnaire included topics such as sources of property information, frequency of tool use, and an evaluation of their usefulness and influence on the buying process.

The use of closed-ended questions made the survey easier to complete, thus increasing the number of respondents and improving the representativeness of the results. The survey was conducted in June 2024 using the Microsoft Forms platform and was distributed through social media.

The research focused on Krakow, chosen because the researcher was familiar with the local residential market and the city's growing importance as one of the fastest-developing property markets in Poland. A total of 100 respondents participated in the survey. A detailed analysis of the results concerning customer interaction with modern technologies is presented in the subsequent sections.

RESULTS & DISCUSSION

The study provided valuable information on the most common sources of information used by potential property buyers. This question allowed respondents to select up to three options, offering a clearer picture of their preferred sources of information (Figure 1). Websites were the most frequently chosen source of property information (selected by 88 respondents), followed by social media (44 respondents), real estate agencies (22 respondents), magazines (3 respondents), billboards (18 respondents), and family/friends (27 respondents).

The results suggest that developers should focus their marketing efforts on improving their online presence. While social media is less popular compared to websites, it should not be overlooked, as it provides unique opportunities, such as engaging with younger audiences.
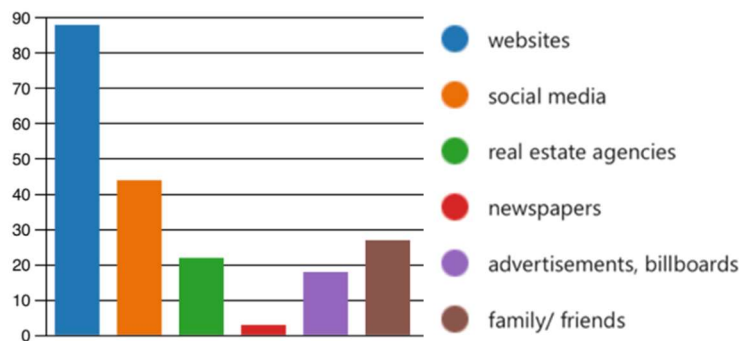

Figure 1. Sources of information on real estate offers
Source: own study.

In the question regarding the frequency of modern technological tools on websites (Figure 2), there was considerable diversity in their presence. The property search engine was the most common tool, with 94% of respondents stating that it appears 'very often' or 'often.' This indicates that the search engine is the most frequently used modern tool on developers' websites.
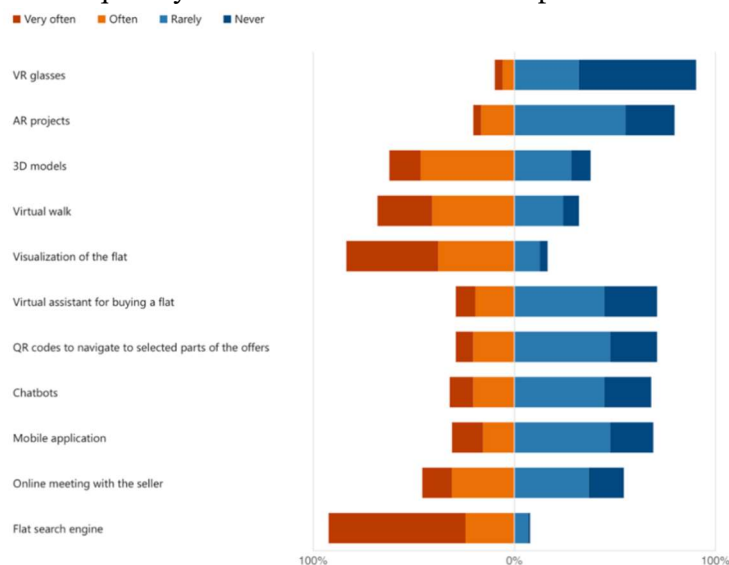

Figure 2. Frequency of modern technological tools in property presentations in the primary real estate market
Source: own study.

The next most common tools, according to respondents, are housing visualisations (86%), virtual tours (68%), and 3D models (64%). Among the less frequent tools are online meetings, mobile applications, chatbots, virtual assistants for property purchases, and QR codes. The survey found that tools such as augmented reality (AR) projects and VR glasses are the least common. The limited availability of VR glasses may be attributed to their novelty and mainly stationary use. Furthermore, augmented reality technologies are not yet widely adopted in the real estate sector (Bartkowiak et al., 2023).

Figure 3. Availability of modern technological tools as reported by respondents
Source: own study.

As stated by most respondents (62%), modern tools are most commonly found on websites offering primary market properties (Fig. 3). This suggests that developers dealing with newly built properties are more likely to invest in advanced digital tools to enhance the presentation of their offers. The second largest group (17%) found it difficult to determine where modern tools were the most prevalent. Another 14% of the respondents felt that modern tools were equally available in both markets. The smallest group (7%) indicated that modern tools are found more frequently on the secondary market.
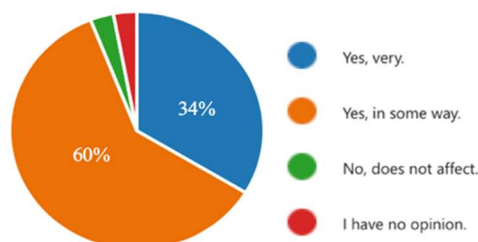

Figure 4. Assistance provided by modern solutions in the decision-making process for property purchase
Source: own study.

In response to the question about the impact of modern technological tools on property purchase decisions (Figure 4), many respondents (94%) felt that these tools influence the decision-making process. Tools such as virtual tours, 3D models, and augmented reality provide potential buyers with a more immersive and detailed understanding of a property. This can help them make a more informed decision, especially when a physical visit is not possible. Only 3% of the respondents felt that the presence of these tools does not affect real estate purchase decisions, while the remaining respondents had no opinion on the matter.
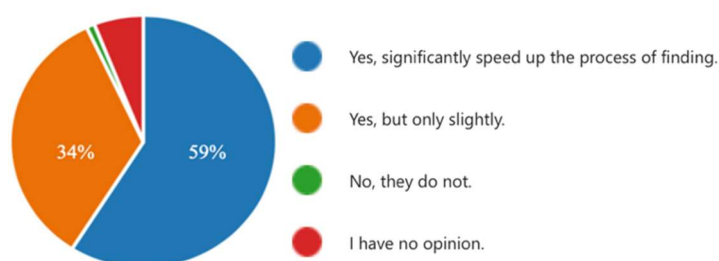

Figure 5. Do modern technological tools shorten the time needed to identify a suitable property?
Source: own study.

In a survey on the impact of modern tools on property search time (Figure 5), many respondents felt that these technologies effectively speed up the process. Up to 93% of the respondents believed that these tools accelerate the process of finding a suitable property. Only 1% of the respondents felt that modern tools had no impact, while 6% had no opinion on the matter.
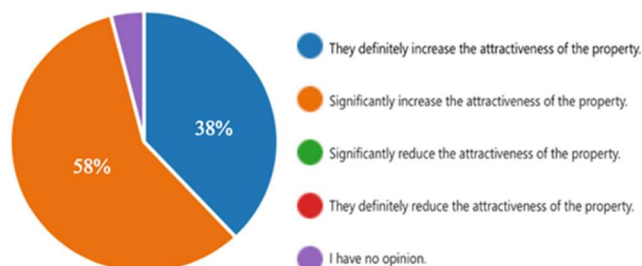

Figure 6. The impact of new technological tools on the attractiveness of presented properties, according to the opinions of the respondents
Source: own study.

The next part of the survey examined whether modern technological tools speed up the property search process (Figure 6). Many respondents, 96%, agreed that these tools improve the attractiveness of properties. The remaining 4% of the respondents had no opinion on the subject. It demonstrates that modern technological tools not only speed up the property search process but also play a crucial role in enhancing property attractiveness.

As can be seen (Figure 7), the dominant group of respondents (97%) felt that modern technological tools helped understand the layout and appearance of the property. A small percentage (2%) felt that these tools were not useful, and 1% of respondents stated that they had no opinion.
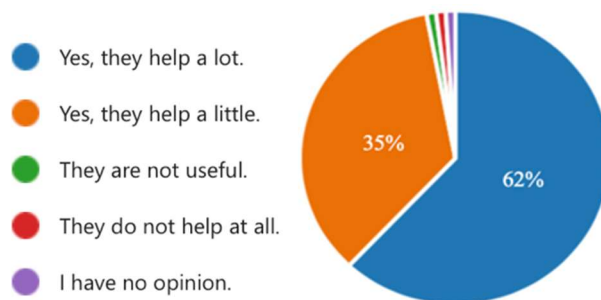

Figure 7. Perceptions of the respondents of modern technological tools to understand the layout and appearance of the property
Source: own study.

As shown in Figure 8, when asked about the usefulness of modern tools in property purchases, respondents indicated that the most valued tools were 3D models (99%), property visualizations (97%), virtual tours (96%), AR projects (96%), and property search engines (95%). Respondents also found online meetings (73%) and virtual assistants (67%) useful. QR codes (56%) and chatbots (54%) were rated less useful. This trend may be due to the fact that these tools are less frequently present on websites (see Figure 2).
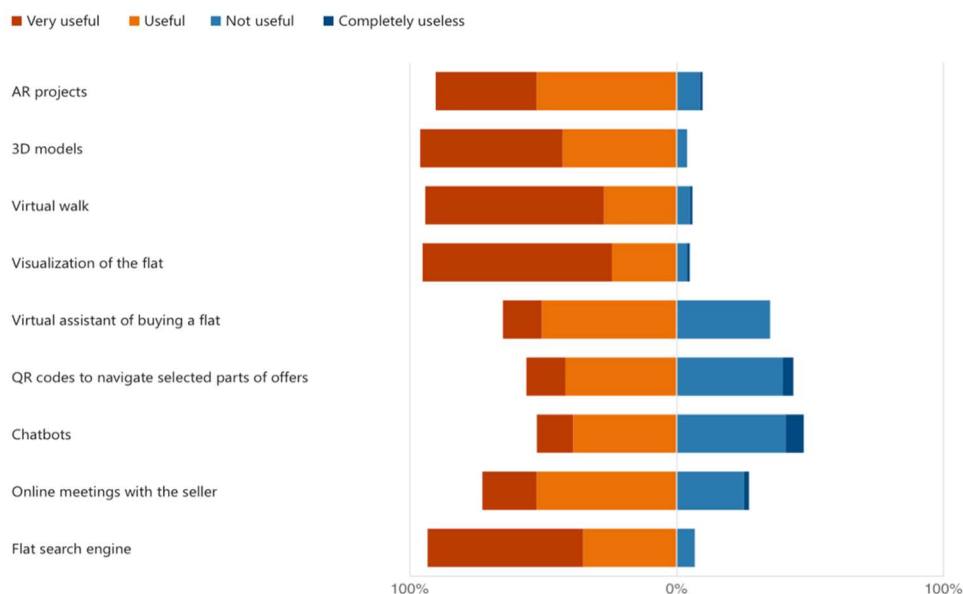
■ Very useful ■ Useful ■ Not useful ■ Completely useless

AR projects

3D models

Virtual walk

Visualization of the flat

Virtual assistant of buying a flat

QR codes to navigate selected parts of offers

Chatbots

Online meetings with the seller

Flat search engine

100%   0%   100%

Figure 8. Assessment of the usefulness of modern technological tools according to the respondents' opinions
Source: own study.

CONCLUSIONS

The analysis carried out in this study provides valuable information on the impact of modern technological tools on user experience in the property market. The results indicate that the Internet is the dominant source of property information, which is consistent with previous research (Bartkowiak et al., 2023). This finding highlights the need for developers to improve their efforts to develop and use modern technological tools online.

The research shows that modern tools significantly facilitate the property search process and accelerate the purchase decision. The respondents indicated that these tools improve their search efficiency and reduce the time required to select the right property. It has been confirmed that the availability of these technological tools greatly enhances the user experience and can attract potential buyers. Furthermore, the study revealed that the respondents identified key tools such as AR projects, property visualisations, property search engines, 3D models, and virtual tours as essential to enhance their experience. However, comparing these findings with Mazurczak's research, which focused on developers' perspectives, reveals a significant gap. Although highly valued by potential buyers in this study, virtual tours remain one of the least implemented tools, appearing

in only 25% of investments (Mazurczak, 2021). Another study found that only two out of four developers offer virtual tours on their websites, and only one in four provides apartment visualisations (Tomasik & Marona, 2023). This discrepancy emphasises the need for developers to adapt their strategies to meet client expectations, enhancing the appeal of their offers and improving the effectiveness of their marketing efforts.

The main hypothesis was confirmed, that the presence of modern technological tools facilitates potential buyers in making property purchase decisions. Respondents noted that modern technological tools are frequently used and significantly assist in property searches. Specific hypotheses about the more frequent use of modern tools in the primary market and their influence on the attractiveness of properties were also confirmed. Furthermore, research by Górska, Mazurczak, and Strączkowski highlights that over 90% of developers recognise the potential of using tools such as virtual tours, interactive location maps, 3D models, and QR codes in real estate marketing (Górska, Mazurczak & Strączkowski, 2022). This suggests an opportunity for increased adoption of these solutions by developers in the future. Such actions can not only enhance client satisfaction but also improve the overall customer experience and support decision-making.

Although this study provides valuable information, it also has some limitations. One of these is its pilot nature, which allows for the identification of key findings and serves as a foundation for future, more detailed research. Additionally, the rapid development of technology and shifting customer preferences may impact the results' validity, necessitating continuous updates to the study. The research was conducted with participants from the Krakow residential market, so future studies could focus on other real estate markets in Poland.

Furthermore, modern technologies are present not only in property presentations but also in other aspects of the property market, such as property management, market data analysis, and transaction processes. Future research could also analyse the impact of modern technologies in these areas of real estate as well.

In conclusion, modern technologies are crucial in shaping the real estate market, transforming how offers are presented and improving transaction processes. Future research, which is essential for future development, should focus on technological advances and their impact on various areas of the real estate market.

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