

THE IMPACT OF COVID-19 ON THE USE OF MODERN TECHNOLOGIES BY REAL ESTATE BROKERS

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Abstract

Real estate brokerage is the activity of matching parties to a real estate transaction. Due to the increasing ease of access to offers posted by sellers and landlords, various challenges in finding solutions that will attract potential customers have appeared before real estate brokers. Given the complexity of the processes in which brokers can participate, the use of modern technologies in real estate brokerage seems to be one way of maintaining and developing the broker industry. The COVID-19 pandemic has caused significant changes in the way brokers operate, forcing them to implement or accelerate the use of modern technologies in customer service.

Therefore, the main goal of this article is an attempt to diagnose the use of modern technologies and the types of technologies used in customer service by real estate brokers as a result of the COVID-19 pandemic.

The research was conducted in the form of a survey among representatives of the real estate brokerage industry. The answers obtained from the respondents have allowed us to state that real estate agencies use new technologies to a large extent. Over 40% of the interviewees stated that the real estate market has enormous potential for the application of modern technologies. Furthermore, over 70% of the respondents indicated a large or rather large impact of the COVID-19 on the application of modern technologies in the real estate industry. The restrictions related to the epidemic have forced companies to use modern technologies to replace direct contact between the seller and the customer.

The research was conducted among real estate brokers in the period between June and October 2020.

Key words: *real estate, modern technologies, real estate broker, real estate transaction.*

JEL Classification: *B41, L85, R00.*

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1. Introduction

Since March 2020, the events caused by the coronavirus pandemic have accelerated the use of modern technologies in many areas of socio-economic life including the real estate brokerage sector (Lizam, 2019; Miller, 2017; Tomal, 2020). Specifically, the pandemic has forced the real estate industry to adapt

quickly to market changes and needs (Marona & Tomal, 2020; Tomal, 2020; Akpan et al., 2020; Augustyniak et al., 2021; Belej, 2021; Trojanek, 2021; Trojanek et al., 2021; Najbar, 2021; Stankowska & Stankowska-Mazur, 2022; Tomal & Helbich, 2022). While the problem of using modern technologies is present in scientific research (Starr et al., 2020; Baum 2017; Ullah et al., 2018), the manner in which they are applied in the work of brokers under the influence of the COVID-19 pandemic is under-researched. Hence, the main goal of this article is an attempt to diagnose the use of modern technologies and the types of modern technologies used in customer service by real estate agents and brokers as a result of the COVID-19 pandemic. The research was aimed at checking the degree to which modern technologies are used and the impact of the pandemic on their application by real estate agents. Considering the above goals and assumptions, the following research questions arise:

RQ1: Does the real estate agency market create potential for applying modern solutions? What types of modern technologies are used in real estate brokerage? In what areas of real estate brokerage are modern technologies used?

RQ2: Was the implementation of modern technologies by real estate agencies accelerated as a result of the COVID-19 pandemic? What modern solutions are real estate brokers implementing due to the pandemic?

Based on the research questions formulated, we adopted 2 hypotheses:

H1: The vast majority of real estate brokerage companies use modern customer service solutions.

H2: The possibility of implementing modern technologies is a consequence of the COVID-19 pandemic.

The article reviews the literature on: the impact of the industrial revolution on the real estate industry; the use of modern technologies by agents and brokers; and the impact of the COVID-19 pandemic on the activities of real estate agents. In order to verify the hypotheses set forth, the results of a survey of real estate agents were used and discussed. Finally, the conclusions and limitations of the study were presented.

2. Literature review

The issue of the impact of modern technologies on the real estate industry, from various perspectives, is of interest to many researchers (Lizam, 2019; Miller, 2017; Tomal, 2020; Małkowska, 2020). The areas where modern technologies may affect individual areas of socio-economic life have had a wide impact in the context of trends that can be observed in the transformation of the traditional economy into a digital one (Kania et al., 2020). As Schwab (Schwab, 2016) observes, we are dealing with the fourth industrial revolution (the following terms are also used: Revolution 4.0, Industry 4.0), which is based on intelligent, connected technology, not only inside organizations, but also in everyday life. Its essence is the transfer of most decisions from the hands of people to the competence of machines, and the blurring of the boundaries between what is biological and what is digital. Industry 4.0 recognizes a broad set of technologies that rapidly redefine industry, including real estate (Starr et al., 2020). In the literature on the subject, various terms can be found to describe modern technologies used in real estate. Baum (Baum, 2017) distinguished four pillars defining the technological development of the real estate industry. These are ConTech (construction technology), Smart Real Estate, Shared Economy, and Real Estate FinTech (a technological platform supporting real estate trading) (Kania et al., 2020). PropTech is an acronym that combines the words property and technology. RICS (the Royal Institution of Chartered Surveyors) defines PropTech as a “term that refers to all aspects of innovation and how this affects the built environment”. This broad definition includes software, hardware, material, or manufacturing that is produced by small start-up companies. These start-up companies create innovation using available technology to solve limitations in the real estate industry as has been discussed in the preceding section (Lizam, 2019).

Real estate technology is also defined as the hardware gadgets, online platforms and software tools used by different participants in the real estate industry, including real estate-focused lenders, brokers, property owners, investors, and managers, as well as the consumers to collect and distribute data related to the real estate industry (CB-Insights, 2016). Ullah, Sepasgozar and Wang (Ullah et al., 2018) have presented the adoption of disruptive technologies in real estate to move from traditional to smart real estate (SRE). This covers the applications of nine such technologies, hereby referred to as the Big9, to address the key regrets of real estate stakeholders. These are: drones, the internet of things

(IoT), clouds, software as a service (SaaS), big data, 3D scanning, wearable technologies, virtual and augmented realities (VR and AR), and artificial intelligence (AI) and robotics (Miller, 2017). The range of communication methods are as diverse as the service types that employ them. The methods and channels used depend on the type of industry as well as the number of messages communicated and the tools used (Dejnaka, 2015).

In the era of globalization and the development of modern information technologies, technological support of the means of communication between the client and the entrepreneur in the service industry plays an increasingly important role. The innovativeness of a business contributes to the intensification of the internationalization process of the firm operating in high technology industries (Wach, 2016). Research conducted in recent years shows that, apart from proactivity and risk-taking, innovation is one of the key elements leading to the internationalization of enterprises (Wach & Głodowska, 2018). Technology is the element that has disrupted almost every facet of the industry and has changed the traditional business model. The real estate industry is no exception to this new element, and it is starting to change the conduct of how the business process is being implemented in the entire supply chain of the industry. Such trends also apply to enterprises related to the real estate market, in particular real estate brokerage (Lizam 2019; Zalewska-Turzyńska & Miklaszewska, 2019). The real estate industry has always been an “information business” with high transaction costs and considerable inefficiency due to the difficulties in assessing what to do in markets where assets are heterogeneous and trading infrequent (Ullah & Sepasgozar, 2020; Kummerowa & Lumb, 2005). Real estate brokerage is an activity aimed at concluding transactions on the real estate market. It consists of reconciling the interests of the property buyer and seller. It is to ensure the safety of the client, who is often not a real estate specialist, and therefore to guide the client through legal, technical, financial, etc., conditions most often related to the process of buying, selling, renting, or leasing real estate (Kucharska-Stasiak, 2016; Baryla & Zumpano, 1995; Kania & Kmiec, 2018; Xiong & Cheung, 2021). The existence of the real estate brokerage industry is generally attributed to high transaction costs in real estate markets. Brokers are typically expected to market sellers' properties, assist in contract negotiations, and coordinate the post-contract tasks necessary to close transactions (Allen, 2015). In the context of the future of the real estate profession, many researchers have raised questions about the factors that will preserve the profession (Filstad & Gottschalk, 2009; Sun & Ifeanyi, 2014; Koch & Maier, 2015). Furthermore, there are voices full of concern about the replacement of real estate agents with modern technologies (Wimmer et al., 2000; Syama & Sharma, 2018).

The impact of the COVID-19 pandemic on various sectors of the economy, including real estate, has become a new thread in the work of many researchers. The literature on the subject includes works related to the impact of the pandemic on the real estate market (Marona & Tomal, 2020; Nicol et al., 2018; Koszel, 2020; Tomal & Marona, 2021).

Another problem in research has become the challenges of the technological revolution that accelerated rapidly as a result of the COVID-19 pandemic. Previous publications focused on determining the types of modern technologies that have a chance of adaptation in the real estate industry, or barriers and consequences of their implementation for real estate agents and brokers (Baen & Guttery, 1997). Hence, the attempt to diagnose the use of modern technologies as a result of the COVID-19 pandemic, as well as its assessment by real estate agents and brokers, has become a new research problem that requires recognition.

3. Data and Methods

This study presents the results of a survey conducted on the Polish real estate brokerage market in the period from June to October 2020. An electronic questionnaire was prepared, the link to which was sent by e-mail to 1,400 employees of real estate agencies operating in voivodeship capital cities in Poland. Eighty-five replies were received, which makes up 6.1% of all sent enquiries. Despite the relatively low level of feedback, the study should be considered reliable. Research among entrepreneurs is characterized by a lower response rate. Moreover, an analysis by Holbrook (Holbrook et al., 2008) shows that surveys with a low response rate are slightly less accurate than those with a high percentage of responses. The questionnaire consisted of 24 questions, some of which were used to develop the presented research problem. The questions referred to:

- 1) Data characterizing the respondents and the company in which they work or are the owners of.
- 2) Types and areas of using modern technologies by agents and brokers.

- 3) The respondents' assessment of the potential of the real estate brokerage market and preparation of companies to implement modern technologies.
- 4) Assessment of the impact of the pandemic on the use of modern technologies.

Based on the literature on the subject, the following technologies have been selected that can be used in real estate brokerage:

- 1) Virtual Walk: a series of panoramas connected in a way that allows the client to move between rooms and buildings, and also allows a given area to be viewed in a 360-degree range. It is widely used, for example, for virtual apartment tours (Sepasgozar et al., 2016).
- 2) Artificial Intelligence: intelligence displayed by artificial devices was defined by Haenlein and Kaplan (Haenlein & Kaplan, 2019) as: "the ability of a system to correctly interpret data from external sources, learn from them and use this knowledge to perform specific tasks and achieve goals through flexible adaptation."
- 3) Big Data analysis: large data sets, the processing of which requires the use of advanced algorithms by means of which information is obtained in the analyzed field. Winson-Geideman and Krause (Winson-Geideman & Krause, 2016) have identified three general types of data used in real estate, including traditional and technology-based data sources: **core info** financial, transactional and physical (sale transactions, lease transactions, mortgage information); **spatial information**, extra-locational information, spatial phenomena outside the boundaries of the property and in its surroundings, available from GIS – Geographic Information Systems (census information, road network data, geographic information, spatial economic indicator and others); **peripheral data** focused on people, collected automatically, which allows behavioral aspects to be included in real estate analysis (Internet search, live traffic information, geo-located tweets, pedestrian food counts and others).
- 4) IT systems: information processing methods using computer methods. In the context of real estate brokerages' activities, they are mainly used to create CRM (Customer Relationship Management) systems. Their major advantages for investors and property managers include the integration of huge, multifamily organizations across portfolios, through the networking of different software. It also makes the integration of multiple solutions easier by accommodating different property management services under one umbrella, along with the potential to scale a changing portfolio up or down (Rentlytics, 2020).
- 5) Mobile apps: software and information systems running on mobile devices such as mobile phones or tablets (Ullah et al., 2018).

Table 1

Characteristics of the research group

Study parameters	Result characteristics			
Employment	Broker (owner) 79.5%	Employee 20.5%		
Position	Managing person 48%	Real estate agent 41%	Marketing specialist 7%	Other 4%
Experience in the real estate brokerage industry	>10 years 41.2%	5-9 years 27.1%	1-4 years 27.1%	< 1 year 2.4%
Sex	Female 48.2%	Male 51.8%		
Size of the company	Sole proprietorship 28.9%	2-9 employees 51.8%	10-49 employees 13.3%	50-249 employees 6.0%

Source: own study based on the conducted survey.

The survey made use of the Likert scale, which clearly shows the level of advancement of individual phenomena and processes by assigning scores by respondents to the statements given in

the survey. On the scale from 1 to 5, 5 meaning “definitely agree”, 4 “rather agree”, 3 “hard to say”, 2 “probably not”, and 1 “definitely not”. Table 1 summarizes the data characterizing the studied group. The vast majority of the respondents (79.5%) were brokerage owners, while employees of real estate agencies constituted just over 20% of the respondents. The highest percentage of the respondents were people dealing with real estate management and real estate agents, who constituted almost 86% of the respondents.

A significant group of respondents (41.2%) were people with more than ten years of experience in the real estate industry, and 27.1% of respondents indicated 5 to 9 years of experience. When it comes to the age of the respondents, the most numerous group were those aged 35 to 44 (37.3%). People between 25 and 34 were a slightly less numerous group (25.3%). The structure of the respondents in terms of sex was almost symmetrical: men constituted 51.8% of the respondents and women 48.2%. The vast majority of respondents, as many as 51.8%, worked in a company with 2-9 employees; 28.9% of the respondents ran a sole proprietorship. Companies employing 10-49 employees accounted for 13.3% of all respondents. The lowest percentage (6%) were companies with 50-249 employees.

4. Empirical results

The expectations among real estate brokers regarding the possibility of applying new technologies in the real estate industry are high. Over 40% of the respondents stated that the real estate market has enormous potential to apply modern technologies. Slightly less, 32.93%, indicated that the real estate market may possibly create potential. Doubts as to the possibility of implementing modern technologies were expressed by 19.51% of the respondents. Only 3.66% of the respondents did not see the potential for the development of new technologies in the real estate industry. Figure 1 presents the results of the research in a graphic form. The Chi-square test also examined whether the profession of the respondents (office owner/employee) or professional experience influenced the assessment of the potential for using modern technologies on the real estate agency market. The null hypothesis that the variables are independent was adopted. In the first case, on the basis of the obtained results at a significance level of 95% ($p=0.47$), it was found that there are no grounds to reject the above hypothesis, i.e. the professional position of respondents did not affect the results significantly. Work experience also had no significant effect ($p=0.99$), which means that the null hypothesis was not rejected in this case as well.

Another area of the respondents' assessment was the level of preparation of real estate agencies in terms of the use of new technologies. The obtained answers allow one to state that respondents assess it as being relatively advanced. However, it should be emphasized that only 3.66% of the respondents considered their companies to be fully prepared, but as many as 42.68% assessed the state of preparation as rather good. Over 1/3 of the respondents had a problem with indicating an unambiguous answer, whereas 14.63% and 3.66% of the respondents respectively indicated moderate and definite unpreparedness (Figure 1).

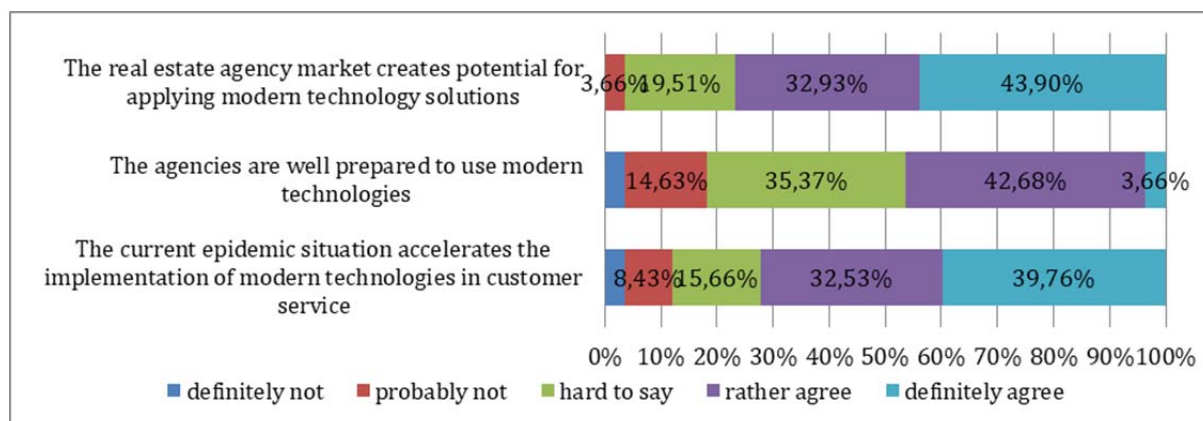


Fig. 1. Respondents' assessment of the potential and the preparation level in the context of modern technology usage. *Source:* own study.

In order to investigate whether the size of the company in which real estate agents work had a significant impact on the answers provided, the chi-square method was used once again. The obtained

research results indicate that the variables are independent, i.e. there are no grounds to reject the null hypothesis ($p = 0.52$). The answers provided did not differ significantly in the case of employees of smaller or larger agencies.

Respondents were asked about the impact of the COVID-19 pandemic on the approach of real estate companies on the use of new technologies. Over 70% of respondents indicated a large or rather large impact. Only 3.61% of respondents saw no relationship between the pandemic and the use of modern technologies (Figure 1).

From the point of view of further analyses, it is crucial to indicate the main areas of applying modern technologies in the real estate industry. The figure below shows that the nature of their application is varied, and the most innovative solutions have been implemented in the field of contact with the customer, i.e. sale/rental, customer acquisition. Real estate marketing is also at the forefront of the application of modern technologies (Figure 2).

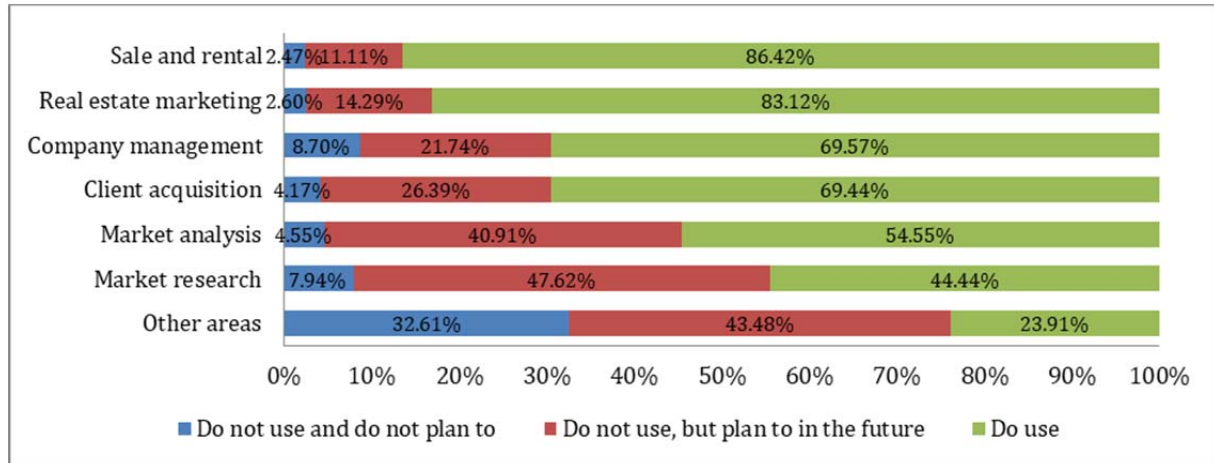


Fig. 2. Areas of application of modern technologies in the real estate industry. Source: own study.

Real estate agencies in Poland use elements of modern technologies, the most common of which are IT systems, i.e. CRM (72.15%) and mobile apps (65.82%). A virtual walk (55.42%) is also popular, which makes it possible to present real estate remotely. Big data analysis is already being used by almost 1/3 of the respondents, a large part of the respondents plan to use this technology in the future (37.66%). During the survey period, artificial intelligence was used by only 4.23% of respondents; however, as many as 47.89% intend to use it in the future (Figure 3).

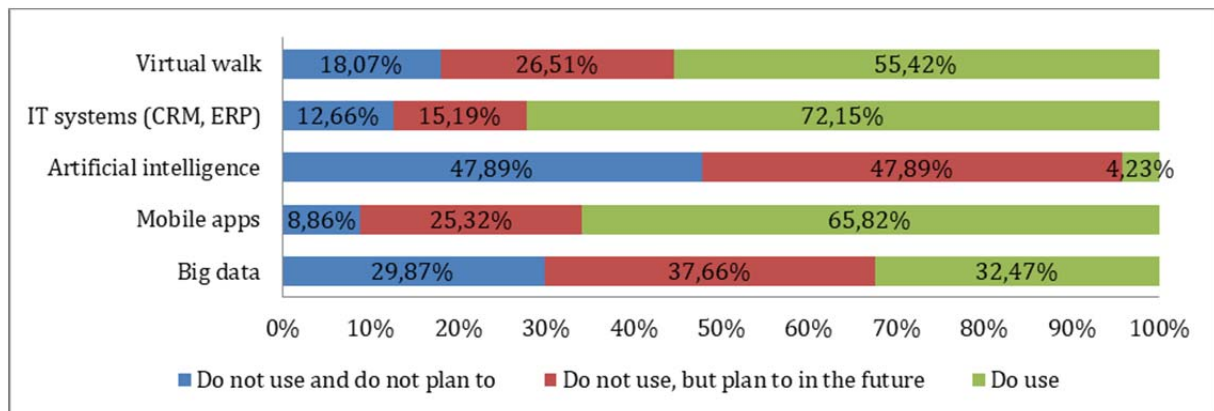


Fig. 3. The degree of use of modern technologies. Source: own study.

The restrictions related to the epidemic have forced companies to use modern technologies to replace direct contact between the seller and the customer. Respondents indicated the virtual walk technology as the most applicable in the context of a pandemic situation (35.57%), Mobile apps (28.35%) came second, followed by IT systems (19.59%), Big Data (12.37%), and artificial intelligence (4.12%), as presented in Figure 4.

There was no significant difference in responses of men and women. The arithmetic average of answers to the question regarding the potential for using new technologies on the real estate agency

market was 4.17 for both women and men. A similar result was obtained when we asked about the necessity to implement new technologies as a necessary condition for surviving on the real estate agency market. The arithmetic average of the responses of men was 3.88, and of women 3.90.

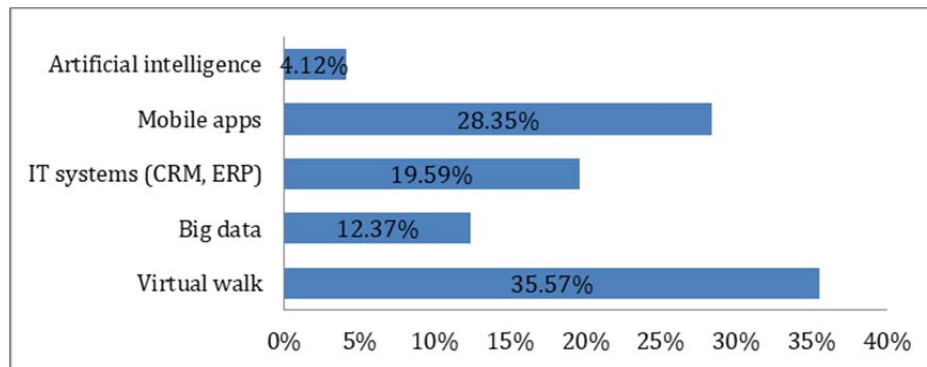


Fig. 4. Areas of application of modern technologies in a pandemic situation. *Source:* own study.

5. Discussion and conclusions

Summarizing the above considerations, it should be recognized that the real estate brokerage industry uses the available technology mainly in the customer service, but there is still potential to use modern technologies on a larger scale (Seiler et al., 2001). Considering the specific features of properties, in particular their immobility, means that a potential client must visit a few or a dozen properties before choosing the one that meets their expectations and needs. That is why technologies related to customer service, i.e. a virtual walk, which can replace a traditional real estate presentation, are the most popular. Accordingly, the study, which involved a survey of online real estate platforms, concluded that by using these advanced visualization tools, real estate agents could communicate more easily with consumers, and consumers could examine properties more easily from the point of view of their requirements without a physical inspection (Ullah et al., 2018).

The most commonly used modern technologies, in addition to the aforementioned virtual walk, include IT systems, mainly creating innovative CRM systems for real estate brokers. Mobile applications are also an important element of the activities of real estate agencies during a pandemic. They enable fast data transfer to the client, access to advanced statistics, and improve the process of searching for offers. Their development will continue.

The survey results on the use of Big Data by real estate agencies (12.37%) do not deviate significantly from the EU average. In the UE, only 9% of real estate companies with at least 10 employees reported analyzing Big Data in 2018. However, the statistics for the analyzed countries considerably differ. We can assume that a larger (or similar) number of these companies analyze Big data from mobile device geolocation (e.g. portable devices using mobile telephone networks, wireless connections or GPS). The lowest share of real estate companies analyze their own big data from enterprise smart devices or sensors (Małkowska, 2020). The National Association of Realtors (NAR) has provided additional insights into the adoption of technology and big data by brokerage firms (Nar Report, 2020). The report noted advances in technology and competition from nontraditional market participants, including virtual firms, were among the biggest challenges cited by firms in the next two years (DeLisle et al., 2020).

Research results indicate that the COVID-19 pandemic significantly influenced the scope of application of modern technologies by real estate agencies. It can certainly be said that the effect of the COVID-19 pandemic has been to accelerate the digitization of the business conducted by real estate agents, meaning that the traditional way of running a residential brokerage is beginning to be transformed by using more advanced technology (Tomal, 2020). The COVID-19 pandemic has accelerated the digitalization of businesses run by real estate brokers, which means that traditional business models in the housing market have begun to be transformed into models in which advanced technologies are being used to a greater extent. Real estate agents and brokers were put in a position of having almost no possibility of meeting their clients. This forced a wider use of innovative solutions aimed at enabling remote operations. Moreover, the greater use of modern technologies by small companies, such as real estate offices, has made it possible for them to avoid a complete economic

shutdown. On the one hand, these technologies have become a survival strategy for small companies during lockdown (Akpan et al., 2020), while on the other hand - an opportunity for development. In this context, it is worth emphasizing one more aspect, which is also indicated by Kuc-Czarnecka (Kuc-Czarnecka, 2020): digital deprivation affects about 14% of Poles, which was revealed during the lockdowns, forcing the development of information and communication technologies used by modern companies.

The study allowed us to confirm our hypotheses and answer the research questions as follows:

- 1) RQ1: over 40% of the respondents stated enormous potential and over 30% of the respondents indicated possible potential for applying modern solutions by the real estate agency market. Real estate agencies in Poland use elements of modern technologies, the most common of which are IT systems, i.e. CRM (72.15%) and mobile apps (65.82%), a virtual walk (55.42%), Big data analysis (about 30%). Artificial intelligence was used by only 4.23% of respondents; the research conducted showed that the most innovative solutions have been implemented in the field of contact with the customer, i.e. sale/rental, customer acquisition (86.24% of the respondents), real estate marketing (83.12%).
- 2) RQ2: over 70% of respondents indicated a large or rather large impact of the COVID-19 pandemic; the virtual walk technology (35.57%) and mobile apps (28.35%) were indicated to be the most applicable in the context of a pandemic situation.

Like all research, this research also has its limitations. First of all, the research sample is dominated by companies with up to 9 employees and is relatively too small to draw conclusions about the entire population of real estate agents. This may result in further research that examines small real estate firms. Hence, modern technologies help in the sale, rental, and marketing of real estate. Plans for the use of artificial intelligence in the future prove that real estate agencies expect further automation of the broker profession, especially in terms of contact with the client. This raises questions about the future of the agent and brokerage profession in the era of progressive automation, which may constitute the seed for further research. The real estate brokerage industry is slowly being redefined by changing market conditions and changes in consumer behavior. As Peter Williams, CEO of Deloitte Digital observed: "Real estate agents will not be replaced by technology, but by agents with technology." Therefore, it can be assumed that the implementation of innovative solutions, which will largely be software solutions, apps, and platforms, will allow real estate agents and brokers to adapt to the needs of the market.

Meeting the needs of future and current customers and appropriate adjustment of the product to their expectations will be significant not only in the case of maintaining the position in the market, but mainly in the case of further functioning in a competitive industry. It can be assumed that more and more real estate agencies will opt for systematic and reliable implementation of modern technologies. On the whole, this process will accelerate due to the limitations of traditional forms of contact with customers resulting from the Covid-19 pandemic.

To sum up, it should be remembered that the basis for applying all modern solutions is keeping in mind the essence of activities carried out by real estate agents, consisting of the knowledge of the specificity of these goods and the functioning of real estate market rules. If the technical solutions outweigh the benefits of working with real estate brokers, then, indeed, the future of this profession may be endangered.

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