
Adoption of Modern Technologies in Seniors' Households: Post-Pandemic Behavioral Shifts

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Abstract:

Purpose: The aim of this article is to determine to what extent the changes that have taken place in the functioning of societies as a result of the pandemic through the introduction of lock-down and the transfer of many activities to the virtual world are, at present, evident in the functioning of households of seniors.

Design/Methodology/Approach: The article is theoretical and empirical in nature. The theoretical part was developed on the basis of the literature on the subject. The empirical part uses the results of a survey conducted in January 2023 on a group of 320 people representing households of seniors in the West Pomeranian Voivodship.

Findings: The results of the study made it possible, to define the characteristic attitudes of older people towards the use of modern technologies, as well as to draw new conclusions or supplement data on the behaviour of seniors in an age of constant technological progress.

Practical Implications: The behaviour of seniors in their households as a result of the pandemic changes taking place around them and the use of modern technologies has also been transformed. At present, it is difficult to predict in which direction they will evolve.

Originality/Value: The study can therefore supplement the existing knowledge on the presented topic, while at the same time it allows us to identify further research directions.

Keywords: Technology adoption, senior households, post-pandemic behavior, digital divide, behavioral economics.

JEL codes: D12, O33, J14, I12, R20.

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1. Introduction

In late 2019, news broke of the SARS-CoV-2 coronavirus, and in January 2020, the World Health Organization (WHO) announced the COVID-19 pandemic resulting in a lockdown. Society had to adapt its actions to the new reality (Moore, 2021; WHO 2020a; 2020b; Accenture 2020b; Ozili and Arun, 2020; Singh and Singh, 2020; Hatałska, 2021; Grima *et al.*, 2020; Khan *et al.*, 2020).

For households, adaptation to new living conditions was the only option for continued existence. Household members in the new conditions were forced to change their previous habits and market behaviours, and thus faced new choices and dilemmas regarding the organisation of daily activities (Sheth 2020; Cruz-Cardenas *et al.*, 2021; Długosz, 2021; Zwanka and Buff, 2021).

As a result of the lockdown dictated by pandemic containment considerations, many activities shifted to the virtual world, and thus the increased use of technological amenities in households became widespread (Lăzăroiu *et al.*, 2020; Moon *et al.*, 2021; Petcharat and Leelasantitham 2021; Sarfraz *et al.*, 2021).

The pandemic has affected all groups of households, regardless of economic, demographic or social characteristics. The article pays particular attention to households of the older people. It was assumed (WHO, Ustawa, 2015; Długofalowa Polityka Senioralna w Polsce na lata 2014-2020) that the age of an elderly person is 60 years and older. The segment of elderly households (also referred to as seniors in the article) appears to be an interesting subject of market analyses.

Indeed, its dynamic growth in the population structure can be clearly observed (Amatulli, 2018; Bae *et al.*, 2018). The increasing share of older people in the population structure has already persisted for many years in almost all European countries (Ageing Europe, 2020; Eurostat, 2020). The numerically increasing segment of seniors impinges on their market potential and, at the same time, may mean that they will influence the creation of new trends in market behaviour (Guido *et al.*, 2020; Jakość życia osób starszych w Polsce, 2021; Abouzahra and Ghasemaghahi, 2021; Berg and Liljedal, 2022).

The aim of this article is to determine to what extent the changes that have taken place in the functioning of societies as a result of the pandemic through the introduction of lock-down and the transfer of many activities to the virtual world are, at present, evident in the functioning of households of seniors.

Therefore, an attempt will be made to answer the questions: has the use of modern technology become widespread in older people's households? What household activities do older people use modern technologies for? What are older people's opinions on the use of modern technologies in the functioning of their households?

The article is theoretical and empirical in nature. The theoretical part was developed on the basis of the literature on the subject. The rapid review method was used in the article, which allowed for a more efficient collection of information. The empirical part uses the results of a survey conducted in January 2023 on a group of 320 people representing households of seniors in the West Pomeranian Voivodeship.

2. The Seniors' Household Segment and the Use of Modern Technologies – A Theoretical Background

The research and identification of different household segments is done on the basis of various economic and non-economic characteristics (Sheth 2021; Mariani *et al.*, 2022). One of these is age, which belongs to a group of demographic factors that are important in shaping needs, market opinions and market behaviour (Solomon *et al.*, 2014; Slabá, 2019; Qazzafi, 2020).

Older people and their households are an interesting subject of research because, on the one hand, their behaviour can show the socioeconomic changes taking place and the consequent change in the criteria necessary for decision-making in the market, while, on the other hand, they are often people who are attached to traditional market behaviour and established habits (Guido *et al.*, 2018; Mikut 2022; Guido *et al.*, 2022).

All political, economic, social and cultural changes and their consequences result in a transformation of the mentality of society, expressed in the adoption of a new set of values. It seems that the slowest to adapt to any changes are the elderly, who, because of their age, have certain habits. It can even be assumed that the group of households represented by the elderly represents a very inflexible and vulnerable part of any society to external change (Berg and Liljedal, 2022; Pannhorst and Dost 2022).

The significant and important role of seniors in shaping the market is currently determined by demographic changes in the population. Over the past three decades, Europe as a whole has clearly seen a slowdown in demographic growth and significant changes in the age structure of its population (Eurostat, 2020). The process of population ageing is, on the one hand, a result of the favourable phenomenon of increasing life expectancy and, on the other hand, is exacerbated by low fertility rates (The impact of demographic change, 2023; Thalassinos *et al.*, 2019).

One of the contemporary challenges facing all households, including seniors, is the use of modern technologies. Technology is an indispensable part of a society's culture, as well as a determinant of the development of the economy and its entities. The importance of technology in shaping the modern economy stems from the fact that it is regarded as a major factor of change and increase in the level of innovation, which in turn determines further directions of economic development.

Technology is a method of preparing and conducting the process of producing or processing some good or information, technology can also mean a certain process. Considered as one of the factors of production, technology determines the volume that can be obtained with a given amount of capital and labour. Moreover, technology can also be understood as a combination of knowledge, skills, experience and organisational arrangements used to produce and use goods and services to satisfy human needs (Lowe, 1909; Kolterman, 2013; Klincewicz, 2016).

Technological development constantly accompanies economic development and growth. It is a process of invention, innovation and dissemination of technology. The invention of a technology requires not only its commercialisation, or sharing, but also the refinement and dissemination of these effects in industry and society (Mateusiak and Stoma, 2020; Zakrzewska and Jarosz, 2022).

A huge force driving the modern economy is modern technologies. They make it possible to produce goods and services much faster, as well as cheaper and of better quality, compared to production in previous technological eras. The development of modern technologies and the related process of digitalisation of the economy and society is one of the most visible and dynamic changes of modern times (Łaszek, 2018; Boratyńska *et al.*, 2021; Chądzyński, 2021). A watershed moment in the popularisation of modern technologies was the emergence of the Internet (Leszczyńska, 2019).

The Internet has improved communication processes and made it possible to transmit accurate and reliable information. On the one hand, modern technologies provide companies with the right tools with which to improve their products and services. On the other hand, modern technologies make it easier for people to function in their daily lives and provide wider access to knowledge (Ratnicyn, 2016; Bartnik, 2016; DuVall, 2019).

The most recent new technologies that affect the functioning of markets and companies, and which may also affect the functioning of households, are identified as the development of the mobile internet, artificial intelligence (AI), the internet of things, virtual (VR) and augmented reality (AR), cloud solutions for information storage and processing, robotisation and automation, the merging of the digital and physical worlds (e.g., digital twins and 3D printing), development of genomics and biometric technologies, blockchain, development of quantum computers, advances in green and sustainable technology (Stone *et al.*, 2020; Pruslecki, 2021; Marr, 2023; Future of Jobs Report, 2023).

In the presented article, attention was focused on the following aspects of the use of modern technologies in the households of older people: communicating with new technologies, consuming services via the Internet, spending leisure time in the virtual world, increasing household equipment with information transmission

equipment, transferring various forms of activity to the area of the home, deepening knowledge and obtaining information for improving well-being and health.

The analysis looked at the changes in the use of modern technologies that seniors themselves had noticed. The results of a survey of representatives of older people's households will therefore be presented next, in which the extent to which these households use selected modern technologies will be recognised.

3. Methodology and Analysis of Research Results

In order to answer the research questions posed (set out in the introduction to the article), secondary sources of information were analysed first, such as: the literature on the development of modern technologies and their use in the economy, companies and households. Studies and reports on research carried out by Polish and foreign scientific and research institutions and academic centres were also used. The literature studies made it possible to develop a concept for conducting own research.

Therefore, an in-house empirical study was conducted using a survey questionnaire. The survey was conducted among 356 people who represented households of elderly people (i.e. those inhabited by people aged 60 or over). 320 correctly completed questionnaires were received and the research material was analysed on the basis of these. The survey was conducted in January 2023 on the territory of the West Pomeranian Voivodeship. The research sample was not representative and the survey itself had a pilot character.

In the course of the study, particular attention was paid to the habits of those representing elderly households with regard to the ways and activities of using modern technologies in the functioning of the household, which became widespread after the pandemic and lock-down.

The results of the study made it possible, in effect, to define the characteristic attitudes of older people towards the use of modern technologies, as well as to draw new conclusions or supplement data on the behaviour of seniors in an age of constant technological progress. The study can therefore supplement the existing knowledge on the presented topic, while at the same time it allows us to identify further research directions.

The extent to which the latest technological advances are being disseminated in older people's households can be seen in their provision of durable goods of this type. In the survey, more than half of the respondents (52%) declared that they had a desktop computer, and one in three declared that they had a laptop or tablet computer (31%). Both types of equipment (desktop or laptop) were reported in 24% of cases. Almost a third of seniors owning a computer did not become computer owners until 2020 or 2021 and the main reason that led to this, according to 63 respondents' declarations, was the need to adapt to lock-down conditions.

In the next question, 62% declared that they had Internet access and were using it. Here, too, there were responses from respondents that household Internet contracts were signed during 2020 (19% of such responses were given). The degree of technologicalisation can also be evidenced by the ownership of a mobile phone, which 95% of respondents declared they owned.

Mobile phones proved to be the most popular technological goods in seniors' households both before and during the pandemic. Based on the seniors' declarations in the survey, there was no significant change in mobile phone ownership in both periods (pre-pandemic and post-pandemic).

The number of mobile phones per household is 1.5. An additional information is that the process of technical and technological innovation means that the better quality of new products appearing on the market forces people to replace the equipment they own with new ones. Half of the surveyed mobile phone owners have replaced their mobile phones in the last two years.

The increased importance of modern technologies in everyday life has resulted in a change in the pace and lifestyle of society, and this situation also applies to older people. When asked whether they had noticed changes in their lifestyles over the past two years, seniors responded that they had observed an acceleration of household activities through the purchase and use of modern household appliances (54% declared this), the constant rush and lack of time not only in their loved ones, but also in their households (44% positive responses), but also noticed that the use of computers, tablets, mobile phones, external disks, etc. for storing information, photos, videos, music, etc. had increased.

The use of high-tech durable goods has become a daily occurrence for seniors, and owning these goods is also the result of their needs becoming elementary during the pandemic period.

Without leaving home, modern people can carry out professional activities, bank operations, purchase goods and services, improve their qualifications, enhance their knowledge, broaden their cultural interests or communicate with other people. This phenomenon is referred to as cocooning, and it is developing thanks to modern technologies, mainly the Internet. Societies are becoming increasingly skilled at using technology and navigating the web.

This phenomenon is also visible among older people. The survey found that the Internet was used by 59% of the seniors surveyed. The respondents also stated that the frequency of their Internet use has definitely increased. On average, they now spend between 1.5 and 3 hours a day on the Internet, whereas in the years preceding the pandemic it seems to have been much less time.

Some respondents (19%) admitted that, prior to the pandemic, their knowledge of the opportunities offered by the web was negligible or even nonexistent, and they also felt that they did not have the right skills to use the internet.

The same respondents stated that the pandemic and lock-down had forced them to change these behaviours and they were now unwilling to give up their new habits that made their daily lives easier. In general, the majority of Internet users surveyed acknowledged that during the last two years not only had the frequency of Internet use increased, but also the range of activities, and they had also acquired new digital skills. At the time of the survey, seniors indicated as the main activities when using the Internet:

- 73% of internet users communicated with other people (using not only emails but also communication platforms); before the pandemic, this was done far less often (48%);
- 66% regularly visited and communicated via social media (before the pandemic only 36%);
- 61% looked for information about products and services (before the pandemic - 31%);
- 57% used the internet for banking operations (before the pandemic - 41%);
- 53% watched movies or listened to music (before the pandemic - 31%);
- 46% made purchases of goods (before the pandemic - 29%);
- 32% met new people online (before the pandemic - 21%);
- 22% worked from home thanks to computers (before the pandemic - 7%);
- 20% read books and newspapers (before the pandemic - 15%);
- 18% educated themselves (before the pandemic - 10%);
- 15% used online services (mainly banking, medical) (before the pandemic - 9%);
- 12% played online (before the pandemic - 5%).

The survey shows that Internet use in senior citizen households has increased significantly over the past two years. Nowadays, the Internet is primarily used for communication, entertainment, obtaining information about goods and services and dealing with banking matters.

According to the data obtained, only one third of Internet users bought goods via the Internet, and one in ten decided to use this form to purchase services. Seniors who made purchases over the Internet were most often guided by: time savings (76% of positive responses) and lower prices (70%) than in traditional shops. Nearly half valued the greater choice of product offerings (48%). Some of the respondents believed that unique products can be found online (28%) or second-hand items that are not damaged but are much cheaper than new (18%).

Only one in ten shared the view that the products available online were of higher quality. Clothing and footwear were most often purchased via the Internet, as well as cultural services and household equipment. On the other hand, purchases of FMCG goods, i.e. food, beverages, sweets, cleaning and hygiene products, were negligible via this channel.

Trends noticed by seniors in their everyday life, which can be specifically attributed to pandemics and changes in the organisation of social life, were the growing role of the Internet and the use of the latest technological advances (noted by 71% of respondents). Those surveyed also stated that, in addition, these activities were accompanied by the use of modern technologies to communicate with others (59%), the use of company offers on Internet portals (60%), and the use of opinions posted on the Internet by others to learn about a good, service, manufacturer or contractor (50%).

It should be added that the survey showed that there was still a group of consumers who tried to "catch up" on their skills in using modern technologies by asking younger people from their immediate environment for help. Such declarations were made by as many as 54% of respondents. It can be seen from the research that the Internet has become a common communication tool among seniors, which influences their further market behaviour.

An important part of the activity of modern households is the consumption of services. In the case of services, households use, on the one hand, those that have been available on the market for several decades, and on the other hand, as a result of technological progress and the development of communication systems, modern services, i.e. purchasing via the Internet, are becoming more and more common.

According to the declarations of the elderly surveyed, only 10% of households opted for this form when purchasing services. Seniors also admitted that only two years earlier they had been very sceptical about this form of purchasing services. At the time of the survey, they declared that they most frequently used the following services: banking, cultural services (such as watching films, concerts, reading books and newspapers) and medical advice.

At the same time, the surveyed seniors also expressed their openness to using virtual services to protect their health and well-being. They cited circumstances (pandemic), but also increased confidence in new practices as the main reasons for their change in attitude. In the survey, there was a 56% positive response to the question "If you had the opportunity to receive qualified medical care online, would you opt for such practices?". Seniors, however, opted for a dual form of health care.

Although, on the one hand, they showed openness to using technological advances in health care, they also emphasised the importance of face-to-face and traditional

contacts with health care facilities (more than 65% of indications of the entire surveyed group).

The survey showed that the activities of seniors in the use of modern technologies focus only on those technologies that are already common in society. It is not new for seniors to use the Internet, to communicate through it, to buy goods and services through online channels or to seek product reviews.

However, there is definitely more concern about more modern forms. Almost 90% of those surveyed said that they were not or are still not aware of having dealt with artificial intelligence. Only 10% confirmed, for example, that they had tried to contact companies and talked to virtual advisors, but these activities did not have the expected effect and respondents gave up on this form. In general, the majority, of the seniors strongly denied using automated forms of contact, purchasing or dealing with issues.

Seniors were even more doubtful when asked about virtual reality. In this case, almost 100% of the respondents declared that they had not encountered such practices and were not inclined to undertake such activities either (98% answered "definitely not" or "no"). They mainly blamed their fears on age, insufficient IT skills and knowledge, and gave the answer that they were simply not that interested in new technological solutions.

The older people surveyed were also asked about other issues related to the introduction of modern technologies into everyday life during the pandemic. In the case of the use of cloud solutions for data storage, only 10% of the respondents indicated that they practise this and at the same time stressed that this is a necessity and the result of their work or the influence of younger people (e.g., children, grandchildren), rather than a pandemic and lock-down.

When asked about 3D printing, as many as 54% said that they were not fully familiar with the technique (of which 34% had no idea at all), 28% knew that such a technique existed and what possibilities it offered, and only 10% had a good understanding of the issue. The seniors surveyed also overwhelmingly (80%) did not show any practice or knowledge of biometric technology or blockchain.

When asked to give reasons for their interest in using modern technologies in everyday life, only one in 12 respondents answered that they were interested in it (8% of respondents). In the remaining cases, the reasons for using the latest technological developments were: necessity (forced actions by companies, family, friends, lock down etc. - 78%) or work (25% of indications).

It can therefore be seen from the survey that the pandemic period has necessitated the use of selected modern technologies by senior households. Certainly, the habits of communicating via platforms and social media have become apparent among

seniors, purchases of goods via online channels have increased, and the purchase and range of services purchased via this channel is slowly growing. The external changes have, in a way, forced older people to change their previous habits and to be flexible towards their environment. It can therefore be assumed that modern technologies are spreading in the functioning of senior' households, but this is happening much more slowly than in the case of younger generations.

4. Conclusions

The COVID-19 pandemic was certainly an important factor that determined the behaviour of society both directly and indirectly. A particular determinant of adaptation skills to new challenges was the use of modern technologies in daily life. Adapting to new living conditions in the pandemic and post-pandemic period through increased use of technological advances was, for many, the only option for continued social existence (Svajdova, 2021; Hesham *et al.*, 2021; Bae *et al.*, 2021; Morgan, 2020).

Numerous studies in the field demonstrate that, among adaptation measures, irrespective of age, there has been an increasing trend of communication through the use of modern technologies (Yapez-Reyes *et al.*, 2023; Hatalaska, 2021) and the popularisation of the online channel as the most frequently used shopping channel during the pandemic period (Accenture, 2020a; Petcharat and Leelasantitham, 2021; Bytyci *et al.*, 2021; Cruz-Cardenas *et al.*, 2021).

Consequently, this state of affairs automatically implied a weaker position for traditional stationary purchases (Moon *et al.*, 2021). Furthermore, some distinctive activities were also noticeable in social behaviour, which included virtual health-related activities (Accenture, 2020b).

The behaviour of seniors in their households as a result of the pandemic changes taking place around them and the use of modern technologies has also been transformed. At present, it is difficult to predict in which direction they will evolve.

Based on the literature cited and the results of the survey, it can be seen that, the use of modern technologies in market decision-making is evident in the households of seniors, they have a particularly high awareness of the protection of their own health and to this end are willing to use technological developments (both in acquiring information and in acting to improve their own well-being), but at the same time it is possible to observe prudence in the use of modern technologies and limited trust in these solutions.

Thanks to modern technologies, seniors strive for self-realisation, take responsibility for their decisions, try to be independent in forming their opinions and decisions, but also benefit from online opinions. From the emergence of the COVID-19 pandemic to the present, therefore, a picture is being drawn of a senior with an increasingly

high level of technological literacy. Although some aspects of the use of modern technologies (such as, for example, artificial intelligence) in their activities are consciously or unconsciously completely overlooked by seniors, it can be assumed that the future will also open up to them as a result of market developments.

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