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Consumers of different generations towards innovative technologies in customer service in retail

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Abstract

The aim of the paper is to identify the importance of innovative technologies used in retail during the pandemic for consumers and the willingness of different generations of consumers to use these solutions in the future. The article was prepared on the basis of the literature on the subject, research reports, websites of companies preparing or implementing modern technologies in retail, and the results of direct research conducted in 2022 using the online survey technique among 1,100 consumers.

The paper presents the issues related to the possibility of using modern technologies in the customer service process, specifically those that allow for even greater customer involvement in the purchasing process and increase their independence and self-service. A special emphasis was given to the self-service store, currently considered one of the greatest achievements (“milestones”) in brick-and-mortar retail trade, which is crucial for the issues presented. The paper shows the results of direct research on selected elements of purchasing behavior of different generations of consumers that are related to the use of innovative solutions in retail trade and intentions to use these solutions in the future.

1. Introduction

The customer service process in retail enterprises posed a significant challenge during the pandemic. Legal regulations introduced during the epidemic threat and customers’ concerns about their health (Dąbrowska, Janoś-Kresło, 2022) as

well as the safety of the shopping environment forced the introduction of solutions aimed at reducing the time spent by customers in commercial spaces or even enabling shopping without the involvement of staff. The introduction of changes in retail was dictated not only by the need to improve the safety of consumers and store staff, but also by the need to reduce the problem of lack of employees to serve customers and by the desire to reduce the company's commercial costs. Activities undertaken by retailers during the pandemic were aimed at ensuring high quality service and efficient communication with the client.

Innovative technologies in retail are the technologies aimed at increasing efficiency, reducing costs, and enhancing the customer shopping experience (Cervantes, Franco, 2020, 356). Modern technologies in retail allow for the seamless creation of specific, integrated physical and digital consumer experiences (known as “phygital consumption experience”) in the customer service process (Johnson, Barlow, 2021, 2365–2385; Moravcikova, Kliestikova, 2017, 148–153). The key moments (the so-called milestones) in the use of modern technologies in retail trade include the introduction of e-commerce, self-checkouts, solutions for scanning products and making payments (scan as you shop), q-commerce and unmanned stores.

Taking up the issue of the paper was due to the desire to understand the causes and changes in customer service introduced by retailers during the COVID-19 pandemic and to know their present and future effects on the customer and retail. The purpose of the article is to identify the importance of innovative technologies used in retail during the pandemic for consumers and the willingness of different generations of consumers to use these solutions in the future.

The paper was prepared based on the literature on the subject, industry reports, and websites of companies designing or implementing innovative technologies in brick-and-mortar retail, as well as the results of direct research conducted in 2022 using the online survey technique among 1,100 consumers. The research concerned selected elements of consumer behavior related to the use of modern technologies while shopping, among others. The study included an equal representation of the BB, X, Y, and Z generations. The research proposed a thesis that consumers highly rate the usefulness of the examined solutions in improving the quality of customer service during the pandemic and will also use these solutions in the future, regardless of age. Consumers from Generation Z and Generation Y were found to have a higher tendency than Generation X and Generation BB to declare current use of these solutions and a willingness to use them in the future.

2. Innovative technologies in customer service

Customer service in retail encompasses a wide range of activities aimed at identifying and then fulfilling customer needs and meeting their expectations regarding

the availability of a suitable commercial offer in the right place and time at a price reflecting the relationship between the benefits offered and the costs of purchasing products. Customer service refers to providing appropriate sales methods and creating a system of communication with the customer. It relates to the tangible or intangible value-increasing activities which are related to products or services directly or indirectly to meet customer expectations (Kursunluoglu, 2011). The researchers are increasingly focusing on two dimensions of customer service from the consumer perspective – purchase convenience and social presence (Grevall et al., 2019, 97). Forecasted and already observed changes in customer service, including those consisting of integrating sales and customer service in a brick-and-mortar store with an online store, contribute to increasing consumer independence when doing shopping and personalizing the commercial offer.

Modern technologies in customer service in retail should enable the creation of frictionless shopping experiences (Kotler, Stigliano, 2022) also in brick-and-mortar stores saturated with innovative solutions (Domański, 2020, 179). In accordance with consumer expectations, the service process should be smooth, dynamic, and uninterrupted (PwC, 2022; *Nowoczesne technologie...*, 2021), whereas the cost of learning to use modern solutions by the customer must be proportional to the benefits they derive from using them. Technologies can also enhance the personal involvement of the staff and the customer in the service process, i.e., support building a unique personalized shopping experience (“high-touch” reinforcement through “high tech”).

From the perspective of restrictions caused by the pandemic, this was especially significant that by using modern technologies, time spent by the customer in the store could be reduced – especially the time needed to finalize the transaction. This is also important due to the fact that queuing to the checkout is perceived by buyers as one of the least satisfying, but at the same time, the most and longest remembered elements of the service process (Caballero et al., 1985; Bouraoui et al., 2019). The need to develop a solution to eliminate or reduce the waiting time and discomfort of the customer queuing to the checkout contributed to the popularization and continuous improvement of self-service checkouts and the self-service store (PwC, 2022). Activities undertaken by the retailers have been intensified during the pandemic. The most often mentioned key store technologies that increase the level of digitization of brick-and-mortar stores and improve the customer service during the pandemic include¹:

– Contactless payments – the payment transaction does not require physical contact of the consumer’s payment device with a physical terminal and physical

¹ A series of solutions utilizing modern technologies that improve the efficiency of store operations, including smart shelves (analysis of product display methods, real-time data transmission, reduction of costs related to shelf management, data source for analytical model, optimization of customer service processes) or electronic labels (reduction of informational errors regarding price, facilitating the work of the store personnel) (The TOP5..., 2018; Eksperci..., 2019).

client contact with banknotes, coins and other people's hands. This method of payment recommended by WHO allowed for the reduction of the risk of COVID-19 transmission. Because of COVID-19, contactless payment technologies have become a more favoured payment method in countries where these methods were not previously prevalent (Puriwat, Tripopsakul, 2021), also in Poland (Huterska et al., 2021).

– Self-checkout (SCO) is a system that “enables customers to place their merchandise on the counter and scan the items on their own, at the end of their shopping trip and after waiting in a checkout line” (Djelassi et al., 2018, 41). The importance of this solution has especially increased during the pandemic (Lorente-Martínez et al., 2022) (Wygoda..., 2022). According to the Global Market Insights study, by 2027 the value of the global self-service checkout market will be over 6.5 billion USD (Najpierw..., 2023).

– Virtual fitting rooms (smart mirrors) are solutions that use augmented reality in the customer service process (Scholz and Duffly, 2018, 11–23; Wedel et al., 2020, 443–465). They allow for simplifying and accelerating the process of buying clothes by scanning the customer's dimensions and appearance, and thus creating their virtual reflection. The customers create their own stylizations without having to try them on, and they receive information about the location of the selected product in the store. Smart mirrors also enable the testing of some cosmetics (Javornik et al., 2016). They can be located not only inside the store but also in the corridor of the shopping center.

– Smart carts – carts equipped with a camera, a barcode reader integrated with a mobile application, a touch screen, and scales – equivalents of online shopping carts, allowing for quick payment at the cash register or via the application.

From a pandemic perspective, unmanned store that allow for eliminating customer waiting time and create frictionless retail shopping experiences without the involvement of staff is a particularly important solution. It is an innovative convenience retail format that combines the brick-and-mortar store space with modern Internet technologies (mobile applications, payment systems, customer presence monitoring systems inside the store) (Kucharska, 2023, 25–42).

In the self-service store, the checkout zone employees have been replaced by solutions based on modern information technologies and purchases are made by the customer without the involvement of staff. Using a self-service store may require the customer to be involved at every stage of the purchase process, i.e., pre-transaction (installation of the application as part of the existing or new account/customer account, use of the customer's card, in the most innovative mobile stores also the possibility of recalling the store), transaction (barcode scanning with a smartphone) and post-transaction (manual completion of the transaction in the application). Most of the tasks taken over from the staff are conducted using artificial intelligence, i.e., an innovative method of authorization and payment for

purchases (e.g., customer face recognition, automatic product scanning, corridor scanning) (Schögel, Lienhard, 2020).

Self-service stores allow for more effective time management of purchases, which is a measure of evaluation of the level and scope of commercial services and a verifier of the organizational efficiency of the sales process. The solutions applied in the store are meant to accelerate the consumer's purchasing path (Kotler, Stigliano, 2022). However, the use of unmanned stores may be limited by consumer concerns resulting from the inability to use the assistance of the store staff (especially in the context of potential system or technology failure) and low trust in new, "unknown", technologies.

3. Research methodology

In order to identify selected changes observed in consumer behavior in retail during the pandemic, direct research was conducted using the online survey technique. The research technique was selected also considering its limitations, such as the declarative nature of the respondents' statements (Pacana et al., 2015). The research was performed in November 2022 among 1,100 registered users of the Ariadna National Research Panel. The socio-demographic profile of the people registered in the panel corresponds to the profile of Polish Internet users. The obtained data was analyzed using descriptive statistics with the use of IBM SPSS Statistics. The research was performed as part of the research project of the Department of Market and Consumption "The COVID-19 Pandemic as a Catalyst for Change – Enterprise and Consumer Perspectives".

As part of direct research, the following aspects were recognized:

- consumer opinions regarding changes in the use of modern technologies in retail during the pandemic;
- consumer opinions regarding the significance of selected solutions in retail based on modern information technologies in the context of improving the quality of customer service during the pandemic;
- consumer willingness to use solutions such as unmanned stores, self-service checkouts, virtual fitting rooms, online shopping, shopping on the phone, and cashless payments also in the future.

The particular context for the conducted research refers to the difference in technological experiences related to the Internet and the varying level of virtualization of consumer behavior among different generations. The conducted direct research included the statements of representatives of four generations of respondents (Baby Boomers, X, Y, Z). Considering the age criterion, they were equally represented in the surveyed sample. In the literature on the subject, the adopted age limits between generations are conventional and are a certain simplification (Katza, 2017, 170). There is no consensus on the precise dating of the generation and slight

differences exist in indicating border years (Berkup, 2014, 218). Nonetheless, age is one of the main factors that differentiates consumer behavior (Dąbrowska, 2006). People belonging to the same generation experience similar events, as well as they grew up in similar conditions and times (Deal et al., 2013). Identifying a generation may result from a shared historical and socio-cultural context in which a group of people functions (Lyons, Kuron, 2014).

Baby boomers (BB) are a generation of people born in the years 1946–1964, who used devices such as radio, television, and tape recorders for most of their lives. The modern technologies that emerged with the spread of the Internet were introduced to representatives of this generation when they were already experienced workers or after they retired (Frąckiewicz, 2018, 121).

Generation X (born in the years 1965–1979) includes people who have experienced technological transformation in their lives and grew up in times of rapid development of advanced technologies. They are generally comfortable with using innovative technologies, but they do not like to change the solutions they know from their youth. They are not as often engaged in social media as younger generations Y and Z (Gruchoła, 2020, 49).

Generation Y (born in the years 1980–1995) is a digital generation for whom IT technologies are natural and essential. They perceive it as an indispensable tool, a necessary link with the surrounding world for real and/or virtual participation in it. For representatives of the Y generation, the Internet is a space for sharing experiences and information (Zhang et al., 2017, 736; Bolton et al., 2013). They utilize modern technologies in every aspect of life.

For Generation Z (born after 1995), the virtual world is closer than the real one. Its representatives have been raised in conditions of almost unlimited access to technology, including the Internet, social media, smartphones, and applications. They do not know the world without access to the Internet – they are “immersed” in modern technologies, constantly being online, and using numerous functions of mobile devices (Frąckiewicz, 2018, Kall, 2015; Levickaite, 2010; Turner, 2015). The specificity of the purchasing behavior of the Y and Z generations is largely determined, among others, by the multi-channel access and unlimited availability of retail outlets, the availability of sources of financing purchases (interest-free instalment sales, credit cards, short-term loans) as well as a huge amount of information received through various media (Barska, 2018, 254–255; Bakewell, Mitchell 2003, 96–98).

The research proposed a thesis that consumers highly rate the usefulness of the examined solutions in improving the quality of customer service during the pandemic and will also use these solutions in the future, regardless of age. Consumers from Generation Z and Generation Y were found to have a higher tendency than Generation X and Generation BB to declare current use of these solutions and a willingness to use them in the future.

The research involved almost the same number of women and men. The respondents equally represented the age groups of 18–24, 25–39, 40–59, and 60–80 (25% in each age group). 46% of the respondents had a secondary education. Detailed characteristics of the respondents are included in Table 1.

Table 1. Demographic analysis

Characteristics of the respondents		Frequency	Percentage
Gender	Male	531	48.3
	Female	569	51.7
	Total	1,100	100.0
Age	18–24	275	25.0
	25–39	275	25.0
	40–59	275	25.0
	60–80	275	25.0
	Total	1,100	100.0
Subjective assessment of the financial situation of own household	Bad	26	2.4
	Very bad	121	11.0
	Average	628	57.0
	Good	289	26.3
	Very good	36	3.3
	Total	1,100	100.0
Education	Basic	45	4.1
	Basic vocational	115	10.5
	Secondary	506	46.0
	Higher	434	39.4
	Total	1,100	100.0
Number of persons in household	1	144	13.1
	2	368	33.4
	3	239	21.7
	4	223	20.3
	5 persons and more	126	11.5
	Total	1,100	100.0
Place of residence by number of inhabitants	Rural area	280	25.5
	City up to 50 K	275	25.0
	City from 51 to 200 K	265	24.0
	City over 200 K	280	25.5
	Total	1,100	100.0

Source: own study.

4. Consumers towards innovative solutions in retail – results of direct research

The limitation of interpersonal contacts enforced by the pandemic resulted in the search for ways to eliminate the need for customers to be present in the physical space. The availability of information about the offer, consultancy, the possibility of resolving complaints, and gathering customer feedback in the Internet space gained special importance. For many retail enterprises, this had been an underdeveloped or even neglected area of activity in the field of customer service.

During the research, almost three-quarters of consumers agreed with the statement that the pandemic contributed to the introduction of innovative solutions in retail (71.3%, with over 20% of the respondents strongly agreeing with it) and that it accelerated the introduction of solutions based on modern information technologies (71% and 22% respectively) (Table 2).

Table 2. Consumer opinions on the changes that have taken place in retail as a result of the pandemic (in %)*

Specification	1*	2	3	4	5	6	7
The pandemic has contributed to the introduction of innovative solutions in trade	1.6	2.4	4.0	20.7	24.2	25.0	22.1
The pandemic has accelerated the introduction of solutions based on modern information technologies in retail and services	2.1	1.9	4.5	20.5	23.1	25.9	22.0
The pandemic has increased the abilities of enterprises in the field of online sales and customer service	2.0	1.7	4.5	19.3	24.7	25.6	22.2

*Ratings were made on a scale from 1 – I completely disagree to 7 – I completely agree.

Source: own study.

The opinions of surveyed consumers from different generations are similar. Generation Y is the generation that least notices the introduction of changes by retailers as a result of the pandemic (Table 3).

Respondents believe that the pandemic has contributed to consumers using modern solutions in retail and services (70%, with 22% strongly agreeing). They also share the opinion that the pandemic has increased the online skills of consumers in terms of shopping, searching for information, or settling matters online (72.5%, with 23.6% strongly agreeing) (Table 4).

In the opinion of 72% of the respondents, consumers will continue to use the solutions in retail that emerged or developed during the pandemic. Additionally, 25.5% have no doubts about it, and declare full confidence in utilizing these solutions in the future.

Table 3. Different generations' consumer opinions on the changes that have taken place in retail as a result of the pandemic (average score)*

Specification	18–24	25–40	41–60	61–80	Total
The pandemic has contributed to the introduction of innovative solutions in trade	5.27	5.13	5.32	5.35	5.27
The pandemic has accelerated the introduction of solutions based on modern information technologies in retail and services	5.30	5.20	5.24	5.31	5.26
The pandemic has increased the abilities of enterprises in the field of online sales and customer service	5.29	5.22	5.32	5.31	5.29

*Ratings were made on a scale from 1 – I completely disagree to 7 – I completely agree.

Source: own study.

Table 4. Consumer opinions on changes in shopping behavior resulting from the introduction of modern retail solutions (in %)*

Specification	1*	2	3	4	5	6	7
The pandemic has contributed to the use of modern solutions in trade and services by consumers	1.6	2.2	4.3	22.1	22.9	25.4	21.5
The pandemic resulted in an increase in consumers' online skills (shopping, searching for information, handling matters)	1.3	2.0	3.5	20.7	22.2	26.7	23.6
Consumers will continue to use the solutions that emerged/developed during the pandemic	1.4	1.5	4.3	20.3	21.5	25.4	25.6
The pandemic has made the consumers not need face-to-face contact with the seller/service provider	4.5	3.5	8.2	23.4	21.9	19.9	18.6

*Ratings were made on a scale from 1 – I completely disagree, 7 – I completely agree

Source: own study.

Although 60% of the respondents agree with the statement that the pandemic made the consumers not need face-to-face contact with the sellers/service providers, these opinions are rather moderate. At the same time, in the opinion of 16% of respondents, the pandemic has not eliminated the need for direct contact between customers and sales staff.

The opinions of surveyed consumers from different generations are similar (Table 5). However, respondents from the Baby Boomer generation agree slightly more with the opinion that the pandemic has contributed to the increase in consumers' online skills and their use of modern solutions in retail and services. On the other hand, the respondents from younger generations are more likely than others to believe that consumers do not need face-to-face contact with the sellers/service providers.

Table 5. Opinions of different generations of consumers on changes in shopping behavior resulting from the introduction of modern retail solutions (average score)*

Specification	18–24	25–40	41–60	61–80	Total
The pandemic has contributed to the use of modern solutions in trade and services by consumers	5.28	5.14	5.24	5.32	5.24
The pandemic resulted in an increase in consumers' online skills (shopping, searching for information, handling matters)	5.37	5.30	5.27	5.47	5.35
Consumers will continue to use the solutions that emerged/developed during the pandemic	5.40	5.34	5.35	5.41	5.38
The pandemic has made the consumers not need face-to-face contact with the seller/service provider	5.04	4.92	4.82	4.78	4.89

*Ratings were made on a scale from 1 – I completely disagree to 7 – I completely agree.

Source: own study.

Consumers were asked to assess the significance of the selected solutions in improving the quality of customer service during the pandemic, including solutions that shorten the time spent in a retail outlet and reduce or even eliminate the need to contact the facility's staff, such as self-service checkouts, cashless payments, unmanned stores, or virtual fitting rooms.

Among the surveyed solutions, delivery to parcel lockers was most appreciated by consumers, with 41% of respondents strongly agreeing with the opinion that such deliveries helped mitigate the effects of the pandemic. Over two-thirds of the respondents believe that making purchases during the pandemic was especially facilitated by the possibility of making contactless payments (with over 27% strongly agreeing) and the use of self-service checkouts (almost 24% strongly agreeing) (Table 6). It should also be noted that the assessment of the importance of the examined solutions is also related to their availability in Poland. In the case of the least accessible ones (an unmanned store or a virtual fitting room), respondents most frequently expressed a neutral opinion.

All respondents, regardless of age, appreciated the significance of the presented solutions in mitigating the effects of the pandemic. However, it was primarily Generation Z and Generation Y consumers who rated them most highly (Table 7). Higher scores of younger respondents concerned all solutions, including shopping on the phone. The only solution that, according to the respondents, was not helpful in mitigating the effects of the pandemic were virtual fitting rooms, which resulted from the low availability of this solution.

The respondents were asked about their plans regarding the use of selected solutions. Three-quarters of the surveyed consumers declare that they will continue to use parcel lockers for deliveries and contactless payments in the future (respectively with 49% and 47% of respondents stating this decisively) (Table 8). They also expressed their intention to continue shopping online (with 40.5% de-

Table 6. The significance of selected solutions in the field of customer service in the context of mitigating the effects of the pandemic – consumers' opinions (in %)*

Specification	1	2	3	4	5	6	7
Delivery to parcel lockers	0.7	1.5	2.9	16.7	15.6	21.1	41.5
Online shopping	3.4	2.2	4.3	20.5	18.9	23.8	27.0
Contactless payments	4.5	2.8	3.3	20.5	18.6	22.8	27.5
Self-service checkouts	5.1	3.4	4.7	22.5	19.8	20.7	23.7
Touchless use of parcel lockers	4.0	1.1	6.2	24.7	18.5	21.1	24.4
Shopping on the phone	12.0	4.0	8.4	27.3	17.9	15.1	15.4
Unmanned stores	11.5	5.1	6.2	32.4	18.5	13.6	12.7
Virtual fitting rooms	21.6	11.4	10.3	31.9	12.1	6.9	5.8

* Ratings were made on a scale from 1 – definitely did not help to 7 – definitely helped.

Source: own study.

Table 7. Opinions of consumers of different generations concerning the significance of selected customer service solutions in the context of mitigating the effects of the pandemic (average score)*

Specification	18–24	25–40	41–60	61–80	Total
Delivery to parcel lockers	5.74	5.45	5.37	5.09	5.41
Online shopping	5.52	5.28	5.24	5.12	5.29
Contactless payments	5.44	5.13	5.21	5.19	5.24
Self-service checkouts	5.43	5.07	4.89	4.84	5.06
Touchless use of parcel lockers	5.13	4.94	4.89	4.76	4.93
Shopping on the phone	4.80	4.24	4.29	4.34	4.42
Unmanned stores	4.70	4.20	4.19	4.24	4.33
Virtual fitting rooms	3.64	3.34	3.32	3.15	3.45

*Ratings were made on a scale from 1 – definitely did not help to 7 – definitely helped.

Source: own study.

claring this decisively). Two-thirds of the respondents plan to use self-service checkouts, with 38% of consumers definitely declaring such plans. The low level of declarations regarding shopping on the phone and virtual fitting rooms may result from the limited availability of these solutions in retail in Poland.

Regardless of their age, the respondents intend to use the solutions included in the research (with the exception of virtual fitting rooms). However, this was more often declared by the respondents up to 60 years of age, especially the youngest. The interest in the possibility of shopping on the phone is expressed only by consumers aged 18–24.

Table 8. Consumers' willingness to use selected solutions in the field of customer service in the future – consumers' declarations (in %)*

Specification	1	2	3	4	5	6	7
Delivery to parcel lockers	3.4	2.0	3.4	14.4	12.2	16.1	48.6
Contactless payments	3.8	1.7	5.0	14.1	10.2	17.7	47.5
Online shopping	3.0	2.2	4.3	16.5	13.6	19.8	40.5
Self-service checkouts	5.2	2.4	4.7	17.0	13.5	18.8	38.2
Touchless use of parcel lockers	7.4	3.7	5.4	19.7	12.8	16.0	35.0
Unmanned stores	13.9	7.2	6.9	26.5	15.5	13.2	16.9
Shopping on the phone	17.6	9.2	8.7	22.6	15.7	11.3	14.8
Virtual fitting rooms	37.2	12.9	9.1	21.5	8.8	5.9	4.6

* Ratings were made on a scale from 1 – I have no intention of using them at all to 7 – I will definitely use them.

Source: own study.

5. Conclusions

The period of the COVID-19 pandemic has been difficult for retailers and consumers due to restrictions in the purchasing process. The advancement of modern technologies facilitated the development of innovative solutions designed to improve customer service, while the pandemic has accelerated the pace of implementing these solutions in brick-and-mortar retail spaces (Dębowska et al., 2020). Some of them modified the finalization of the transaction (e.g., a self-service checkout), and some radically changed the terms of purchase and the customer service process (e.g., unmanned store). The advanced technologies have increased the independence and autonomy of the customer when shopping.

Especially important for retail companies is that consumers of all generations also declare their intention to continue using the studied solutions in the future. The end of the pandemic does not mean a return to pre-pandemic customer behavior in the retail space. Changes in purchasing behaviors seem to be irreversible. This is a real challenge for retail businesses, taking into account the necessity of implementing innovative solutions in retail outlets to increase the convenience of shopping and reduce the time spent on shopping – especially contactless payments and self-service checkouts. Convenient shopping conditions created with the use of solutions based on modern information technologies are crucial for customers (KPMG, 2017), being at the same time a source of competitive advantage for retail enterprises. In the future, solutions related to online shopping will continue to be important for customers, such as delivery to parcel lockers and touchless use of parcel lockers as well as in stationary trade. Stores that implement modern technologies achieve better financial results and increase the sales of their prod-

ucts (<https://managerplus.pl/digitalizacja>). The research also shows that although consumers appreciate the use of modern technologies in retail, they moderately believe that it is possible to limit or eliminate contact with staff in the customer service process in retail.

The factors that may favor the use of modern technologies in the customer service process include the further processes of trade concentration and globalization, increasing competition in the way commercial services are provided, consumer innovation, and their desire to be independent of the staff in the commercial space. Most of the surveyed consumers also believe that the pandemic has contributed to the implementation of innovative solutions in retail. In particular, generations Y and Z appreciated the possibility of making contactless payments and finalizing transactions at self-service checkouts during the pandemic. The pandemic had the greatest impact on the development of the BB generation's skills.

The research covered only adult generations of consumers with relatively extensive shopping experience before the pandemic; therefore, the Alpha generation was omitted. However, it should be emphasized that the Alpha generation is an active market participant, has significant purchasing power, and is a potential recipient of many marketing and technological activities, also in retail. The behaviour of this generation related to the use of modern technologies in retail should also be the subject of further research.

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