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DETERMINANTS OF INNOVATION IN THE BANKING SECTOR – CUSTOMER'S PERSPECTIVE

The article focuses on innovation and its importance for customers in the banking sector. The literature review and the results of own research prove that innovations in banking representing a technical, organizational and product form, and achieve varying degrees of interest and acceptance from customers. This aspect is important because, apart from technical feasibility and process suitability, customer opinions are crucial. Especially if, through innovation, managers strive to improve their market position and attract customers. The collected data indicate that innovations so far have limited importance in the decision to choose a bank, although it is a noticeable factor. Also resolute rejection of some innovations is disputable as to the causes and possibilities of changing the client's approach.

Keywords: innovations, bank services, customer, competitiveness

1. INTRODUCTION

The issue of activities conducted by enterprises in their strategies focused on improving their competitive position is important both in economic theory and practice. While it is possible to assess the competitive position of each company as better or worse, the challenge for managers is to take actions to gain a competitive advantage. However this is the result of specific actions. In different industries, branches of industry, or different size of enterprises, these activities can and should be different (Christiana, 2020).

The type of action may results from the resources available or possible to obtain, while the actions that should be taken are often determined by other conditions. Striving for effectiveness and efficiency in business it is actually to search for optimal solutions that meet three dimensions. These activities should be technically viable for a company, affordable from a cost perspective and, finally, appreciated by customers whose opinions may be varied such as rejection, acceptance and appreciation of the company's efforts.

In this article, attention will be focused on the financial services sector, and in particular on the assessment of innovative solutions implemented by banks. The aim of the paper is

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to determine the directions and scope of innovations expected by bank customers. Additionally, the impact of various types of innovations on the assessment of bank customer expectations and satisfaction will be assessed. Innovative solutions require large investments and, on the other hand, may result in lack of customer acceptance. Hence, there is a need for research that verifies customer opinions and expectations regarding innovations implemented in the banking system.

2. METHODOLOGY

The article is an empirical study, and the source of the presented data is the author's own research. The survey was conducted in the 3rd quarter of 2023 on a sample of 260 customers. Purpose sampling was used within the criterion of actively using a bank account. Due to the research costs and the desire to reach older respondents, the study was conducted in the form of a CAWI (Sułkowski, Lenart-Gansiniec, Kolańska-Morawska, 2021) and CAPI/PAPI (30% of respondents) (Such-Prygiel, 2018). The combination of these methods makes it possible to reach different age groups of respondents, younger ones prefer Internet tools, while some older respondents declares inconvenience with the e-survey. In order to avoid losing the opinions of these respondents, the measurement was made using a paper form.

In the course of the research, an attempt was made to verify the hypotheses:

H1. Customers mainly notice innovative technologies rather than innovation products in the banking sector.

H2. Greater use of Artificial Intelligence is an expected innovative solution in the banking sector.

H3. The level of innovation is a key factor creating a competitive position in the banking sector.

3. INNOVATIONS IN THE CONTEXT OF COMPETITIVENESS IN THE BANKING SECTOR

Innovations in the banking sector are, as in any other, sources of competitive advantage, which enable banks to stay on the market and improve their functioning. So these are internal benefits. In addition, they allow to adapt to market changes and follow new customer needs, or even create them, which together may assume that banking innovations are a significant source of higher profitability (Bednarczyk, 2020).

Schumpeter defined the specific determinants of economic development caused by innovations that could occur in one of the five proposed combinations:

- launch of a new product (or an already known, but modified product),
- opening of a new market,
- application of new methods of product manufacture,
- acquiring new sources or materials for the production or more efficient use of existing ones,
- introduction of new organizational structures in the sector (Schumpeter, 1960).

In the context of this spectrum of the innovation types, attention should be focused to the visible key innovations related to e-banking and mobile banking but it shouldn't be limited only into this 2 most popular areas. Nevertheless, banking institutions declare to implement mobile solutions to improve the convenience of using banking services, and through new distribution channels reach customers who are unbanked or have not decided

to use online banking. At the same time, they admit that in this way managers want to fight with their competitors, and for example incidentally they also strive to replace the call center with mobile banking services (Zalewska-Bochenko, 2021). These innovations meet not only the expectations of bank managers but also some customers. The question is which customers applies to and why not all of them.

Banking customers are increasingly willing to use mobile banking applications widely available on the market. This may be evidenced by the frequency of access to the bank account via the mobile application. Mobile banking customers use the functions offered in these applications mostly during bank transfers, online payments in stores or online auctions. The vast majority of customers are satisfied with the offered level of mobile banking services, but they also notice some disadvantages. An important area influencing customer satisfaction is the functionality of the services offered in mobile banking applications, scope of offered bank products and intuitive operations (Kowańska, 2022).

When appreciating online or mobile banking in relation to the natural dynamics of innovation in the banking sector, it is impossible not to notice the exceptional circumstances of recent years. As a result of the COVID-19 pandemic, remote access channels to banking services began to be used by a wider group of customers. In addition to online banking, mobile banking and mobile payments have also become more important. Providing banking services that are particularly specific using the Internet has become a standard for all banks. Customers indicate that mobile access to financial institution products is increasingly a decisive element during decisions about cooperation. Remote access channels to funds accumulated in the bank make it possible to meet regular customer expectations, such as: saving time and money, as the online offer often turns out to be more advantageous than the offered directly at a bank branch (more favorable deposit conditions, products available online only, rewards for setting up selfie accounts) (Rybacka, 2023).

In the context of these innovations, it should be noticed that it is natural for young customers, but also other (older) customers exist. An important premise for the virtualization of consumption is the dynamic increase in the role of mobile applications in the purchasing process, which applies in particular to generations Y and Z (Ciechomski, 2023). On the other hand, when thinking about the future of young clients, a manager cannot forget about the profitability of older generations today.

In the context of the discussed innovations, attention should be paid to older customers and the level of acceptance of innovations in banking in this group in order to understand the reasons. The oldest retirees and pensioners who were professionally active in the period before 1989 (the specificity of Poland and Central and Eastern Europe and the centrally planned economy of the communist system) did not have the opportunity to educate themselves on financial market issues. For these reasons, their economic education from that period could not cover many currently available instruments and distribution channels, and therefore they are specific clients. Further specificity results from seniors' demand for financial products depends primarily on their income and assets accumulated during active professional life, on their economic awareness and knowledge, as well as attitudes and their lifestyle, including readiness to make decisions, but also on limitations health, including disabilities (Wierzbicka, 2022).

Gaining such an advantage is strongly correlated with another factor determining the development of innovations in banking, which is demography. For the years to come, it is the next generation entering the financial services market that will become one of the most profitable segments of bank customers, i.e. the millennials. This generation is raised in the age of technology. The change of customer expectations today is already a powerful factor

which year to year will significantly gain importance. It is therefore important to further strengthen this trust through safe innovations and by providing clients with access to the appropriate financial education from an early age. Access to the latest technologies is not only a matter of price, although it is the most important issue, but also a matter of adapting traditional organizations, including their management, to skillfully implement and manage them in new conditions characterized by higher dynamics, agility, but also risk (Zaleska, Kondraciuk, 2022).

The most important other technologies that may affect the balance of competitive forces in the financial sector are Artificial Intelligence, machine learning, or APIs (a solution that allows applications to communicate with each other automatically and to exchange data immediately, which in turn allows for improved process of providing many financial services, in particular to accelerate payments), cloud computing (enables storing and sharing large amounts of data and ensures significant flexibility in providing services, high cost efficiency, as well as achieving economies of scale), mobile technologies and DLT. Currently, every transaction concluded by a commercial bank, resulting in the transfer of ownership of e.g. money or financial assets, must go through a centralized system – the operators of such systems are often central banks. Commercial banks maintain a list of the operations they handle in a local database, updated after the transaction is completed in the central system. A distributed ledger, on the other hand, is a transaction database that is not located in one place, but is distributed among many computers connected in a network. The potential of the mentioned technologies is exploited to the greatest extent not by traditional financial institutions, but by technological companies belonging to the FinTech sector, which can be divided into two groups: large technology companies, the so-called BigTechs, and small companies (often startups), called FinTechs (Harasim, 2020).

In the context of innovation in banking, further aspects should be noticed. The efforts of banks that ensure the security of their clients' bank accounts should be appreciated through: internal security of the IT infrastructure. Additionally, banks are constantly analyzing and adapting their activities to legal regulations, which resulted in measures to secure customer login to electronic banking (unique Customer ID, login images, password, PIN, login using biometrics) and transaction authorization (token, list of one-time passwords, SMS codes, mobile applications enabling the use of biometrics). In order to gain acceptance of these innovations and increase customer awareness, financial institutions also use a number of information campaigns warning against fraudster attacks using various channels: social media, TV, SMS messages, e-mails, PUSH messages in the application, information on bank websites (Popik, Gryglicka, 2022).

Finally, in the discussion about the issues of innovation in the financial sector, not only technological innovations should be noticed. In addition to the previously mentioned Fintechs and BigTechs, the idea of "Banking as a Service" (BaaS) should be considered. It involves making the banking back-office available to external operators who can offer financial services to customers without a license or appropriate technologies. This is an additional source of revenue for banks. The concept of open banking in Europe results from the PSD2³ directive and assumes access to information about the customer and his transactions and their execution by other entities, not only banks. Some of them treat it as a threat, others as an opportunity to provide new services. (Keser, 2021)

In the discussion about innovations in banking, different reports offer valuable insights. The report "Top trends in retail banking 2023 – drivers, opportunities, and risks shaping

³ The Revised Payment Services Directive (PSD2, Directive (EU) 2015/2366)

the retail banking industry in 2023” identifies current trends in retail banking in the following directions. Firstly, attention is paid to the transformation of traditional branches into intelligent ones that offer experimental banking, convenience and extended service to deepen and broaden contact with the customer (going beyond financial services – wifi, cafe, self-service, work space and video conferencing). Then there is the sense of cooperation, observation and takeover of FinTechs (cooperation/competition/investments, faster implementation of innovations proven in banks). The report noted that more banks are committing to circular economy sustainability by promoting green business practices, processes and digital finance. As we have already indicated, banks are also stepping into the role of BaaS providers. An interesting suggestion is to engage in financial advices that can help customers - banks help customers achieve short and long-term goals, offer debt management, foreclosure prevention, loan repayment advices, provide customers with mortgage and loan calculators, retirement planners, and savings calculators. This pro-educational approach gives the opportunity to build relationships and provide a better formula for the future offer. Among other undoubted trends, researchers noticed the sense of development digital customer – resident ID, who favors banking services, or the challenge of transferring basic workloads from older systems to multi-cloud infrastructure (Capegemini, 2023). The questionable is assumption that AI could be used more widely to generate synthetic data in the context of data security and privacy regulation issues. The assumption that data generated in this way allows banks to test and develop products and services and that these data are statistically identical to real data is exaggerated. AI needs real data, even historical, in the absence of such data, the generated suggestions may be distant from the changing decisions of real customers. This does not deny for opportunities to use AI in management, analysis or interpretation of data, but many ideas regarding this element of innovation are too optimistic.

4. ASSESSMENT AND CONDITIONS OF INNOVATION IN THE BANKING SECTOR – RESEARCH RESULTS

The priority for understanding the conditions for the development of innovation in the banking sector is to identify and describe the perception of innovation by customers. Even though the literature describes the conditions and methods of defining innovation, there is a high probability that the consumer uses his or her own, often specific, criteria of identifying innovations. As a result of this approach, various activities and products offered by banks may be described by some customers as innovations, while for others constitute nothing new (Figure 1).

Respondents refer to the innovative features of the presented services in different ways. They consider solutions used every day as the most innovative (such as contactless payments), and functions that may increase the convenience of using bank products, including applications that facilitate operation and innovative payment cards. Another frequently mentioned innovation was a mobile cash deposit machine, the ability to take out loans at an ATM, or the voice account login function

The presented analysis proves that the main factors determining the qualification of a product as an innovative solution are technical aspects related to performing banking operations and opportunities offered by the bank in terms of customer service. Among those most frequently mentioned by respondents (Figure 1), there is no reference to innovative products that could complement customers' ability to invest, save and multiply their financial resources.

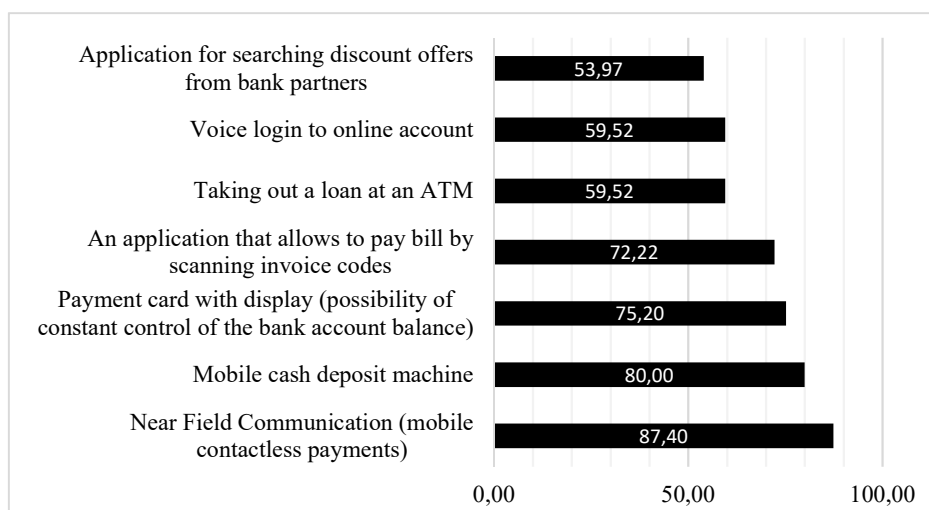


Figure 1. The most important innovative banking products and services in the opinion of respondents [%]

Source: own study.

In order to verify, it was analyzed which products should be developed in the future, considering innovative products related to the management of accumulated financial resources and technical service (Table 1).

Table 1. Products that should be developed by the banking sector in the opinion of selected customer groups (%)

No.	Specification	Age		Gender	
		18–25	26 and more	Female	Male
1	Transfers and payments	62,0	25,0	56,7	27,0
2	Hybrid savings products	29,1	37,5	33,3	29,7
3	Retirement plans	27,8	25,0	28,9	21,6
4	Currency Exchange	40,5	50,0	44,4	43,2
5	Service virtualization (virtual payment and credit cards)	40,5	43,8	42,2	40,5
6	Biometrics (biometric cards, biometric authorization)	45,6	62,5	47,8	62,2
7	Virtualization of stock exchange operations	25,3	31,3	25,6	32,4
8	Changes of stationary branches (express points, online appointments)	26,6	25,0	22,2	43,2
9	Development of products for business (e.g. e-factoring)]	29,1	12,5	24,4	18,9

Source: own study.

The data in the table presents that customer expectations regarding product development continue to indicate the need to develop technical capabilities for handling bank accounts and access to services that customers use every day. Within banking

products, the greatest demand is for currency exchange, as indicated by half of customers in the older age group, which may be related to the need for access to accounts and cards enabling favorable settlement of payments in different currencies. Respondents express much less interest in the development of savings and pension products as well as financial products for business.

The association of innovation within technical solutions is confirmed by the expectations expressed by bank customers regarding the development of innovative features of banking technology (Figure 2).

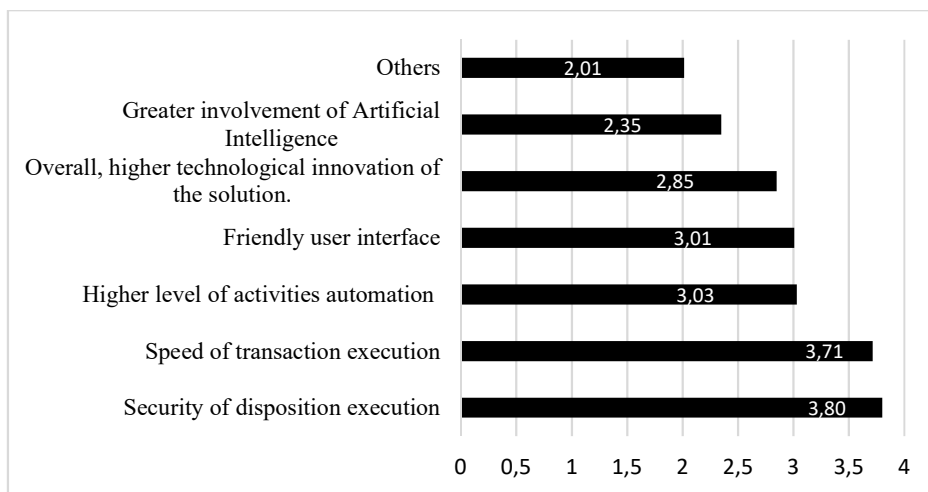


Figure 2. Customer’s expectations regarding the features of innovative banking technologies respondents used a scale from 0 – no expectation – 4 – huge expectations

Source: own study.

The expectations expressed by customers regarding the development of banking technology indicate the need to develop many areas of banks' operation, starting from system and customer security, ending with the involvement of artificial intelligence to facilitate customer service. The most important expectations focused on the above-mentioned security and then the speed of transaction execution. Further expectations are also related to the convenience of use and focus on the need to increase the automation of activities and improve the interface of bank applications and websites towards increasing transparency and intuitiveness of service for users. As mentioned above, one of the areas of the banking system in which emerging innovations can be particularly noticed is the customer authorization process and transaction security during performing payment operations.

The aim of the introduced solutions is to make the process of logging into the banking systems easy and to simplify the procedures related to banking operations as much as possible, and on the other hand, it is necessary to guarantee security for both the customer and the banking system. Another factor that influences this case is the level of customer acceptance of the proposed solutions.

Modern technical solutions create great opportunities in this regard. Some of the solutions that can be implemented may turn out to be unacceptable and, as a result, may

never be used in banking. Opinions on the acceptability of selected, innovative solutions are presented in Figure 3.

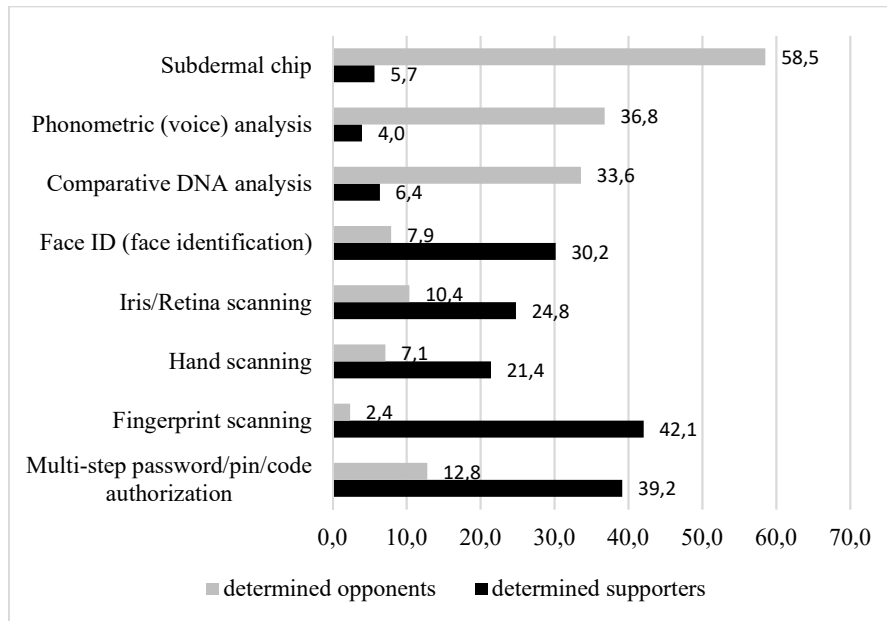


Figure 3. Supporters and opponents selected methods of logging into the banking systems

Source: own study.

The research indicates that large differences regarding the acceptability of selected customer authorization methods in the banking system. The most desired method of confirming a customer's identity by respondents was fingerprint scanning, which was confirmed by over 42% of respondents. In the case of this solution, we observe the smallest percentage of respondents who are strong opponents of the discussed solutions. Multi-stage authorization is slightly less popular, although in this case there are many voices against this solution. A large share of opponents of this solution may result from the difficulties associated with multi-stage login, often using several devices. The group of least acceptable solutions includes methods that directly or indirectly interfere with the human body or require the identification of specific features.

An example of identification that may cause rejection is DNA and phonometric analysis, which, if not properly protected, may lead to abuse and problems, for example related to the possibility of uncontrolled use by Artificial Intelligence. The most determined opponents of the proposed solutions are in the case of the subcutaneous chip.

Despite visible trends in assessing the acceptability of the proposed methods of verifying the customer's identity, differences can be noticed between the separate groups of respondents concerning age and gender (Table 2).

Table 2. Supporters and opponents of selected methods of logging into the banking system with consideration selected customer characteristics.

No.	Specification	Age				Gender			
		18-25		26 and more		Female		Male	
		determined supporters	determined opponents	determined supporters	determined opponents	determined supporters	determined opponents	determined supporters	determined opponents
1	Multi-step password/pin/code authorization	1,3	50,6	18,8	31,3	45,6	11,1	21,6	16,2
2	Fingerprint scanning	40,5	3,8	43,8	2,1	40,0	1,1	45,9	5,4
3	Hand scanning	19,0	7,6	25,0	6,3	22,2	6,7	18,9	8,1
4	Iris/Retina scanning	20,3	19,0	25,0	6,3	25,6	11,1	21,6	8,1
5	Face ID (face identification)	32,9	8,9	25,0	6,3	30,0	10,0	29,7	24,3
6	Comparative DNA analysis	6,3	19,0	6,3	56,3	5,6	26,7	8,1	48,6
7	Phonometric (voice) analysis	6,3	27,8	2,1	50,0	5,6	27,8	2,7	56,8
8	Subdermal chip	5,1	45,6	6,3	75,0	4,4	53,3	8,1	64,9

Source: own study.

The data contained in the table results large differences in the acceptance of the discussed login systems to banking systems. Traditional solutions such as multi-step login find the most supporters among women, while the largest group of opponents is represented by young people (up to 25 years of age). There is also a great diversity of opinions regarding the most controversial method, which is the subcutaneous chip, which finds the most support among men (8.1% of those declared), at half smaller participation of women willing to accept this solution. In the analyzed age groups, older respondents were more accepting of the solution, while being the highest participation of strong opponents of the proposed solution. In the youngest analyzed age group, approximately 5% are willing to accept identification using a chip, with the smallest share of strong opponents of this solution. The development of innovations in the banking sector in addition to unquestionable benefits entails worries, which create uncertainty among users they can generate barriers to the development of new products and services.

Recognizing these concerns becomes a very important argument for taking actions related to the broadly understood education of bank customers regarding the principles and security of the functioning banking system. The most important concerns regarding the development of innovations in the banking system as indicated by the surveyed bank customers are presented in Figure 4.

The conducted research proves that the development of innovations in banking encounters a number of barriers, which defeat becomes a necessary condition for customers to accept the proposed solutions. Greatest fears among users of innovative banking systems concern technical issues and system failures, leading to prevent the use of the services or threat to the security of funds in the accounts. The lack of control over the processes accompanying the implementation of service-related tasks and the uncertainty surrounding the effectiveness of the operations performed also raise uncertainty. Another limitation concerns the costs of innovative solutions and the possible translation of these

costs into an increase in fees for banking services, which is contrary to the assumptions of implementing innovations - enables to improve processes, increase their security and reduce customer service costs.

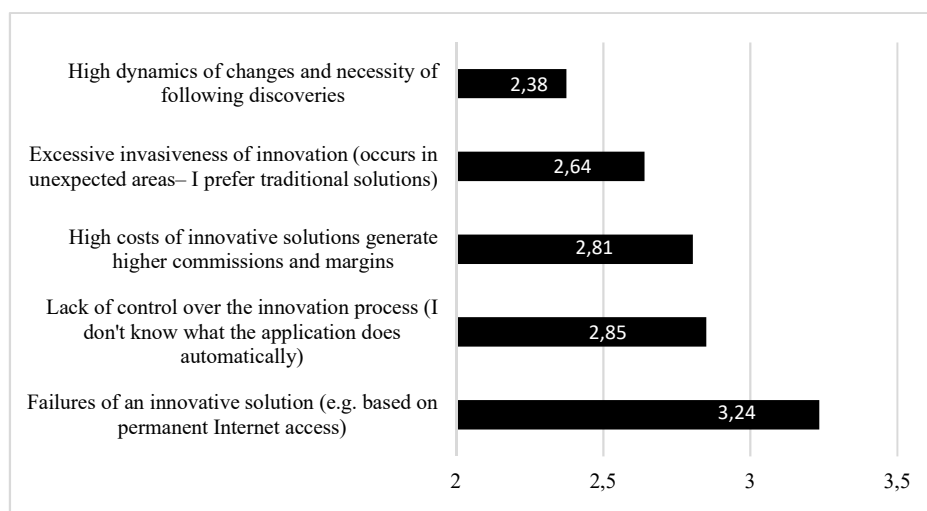


Figure 4. Limitations to the development of innovations in the banking sector from the customer's perspective

Source: own study.

Slightly less important in limiting development of innovations are those that require overcoming the mental characteristics of customers, including preferences for using traditional forms of customer service or reluctance to constantly learn new opportunities offered by innovative solutions.

Innovations beyond basic functions associated with process improvement and improve operational efficiency may be an important element of building competitive advantage. An innovative advantage can be used as an incentive to use the specific bank services.

In order to verify the impact of innovation of the proposed solutions for bank selection decisions, customers who started cooperation with a new bank or changed bank accounts by moving to another bank in the last three years were asked about the importance of selected factors of their decision (Figure 5).

The results of studies on the determinants of bank customers' preferences show some variation, depending on the specificity of the methodology, the adopted research perspective and the objectives (Srinivas, 2021; Adefulu, 2016; Dehnert, 2022; Dehnert, 2022).

The data collected during our research proves that economic factors related to the costs of maintaining an account and using services play the greatest importance. The broadly understood convenience offered by the bank, including mobile applications operations and the extensive locations of ATMs also has a significant impact on the choice of bank. Noteworthy is the assessment of the importance of innovation as a factor determining the discussed selection decisions, which shows that although innovations are taken into account, they are not of key importance (except for the mobile application which can also

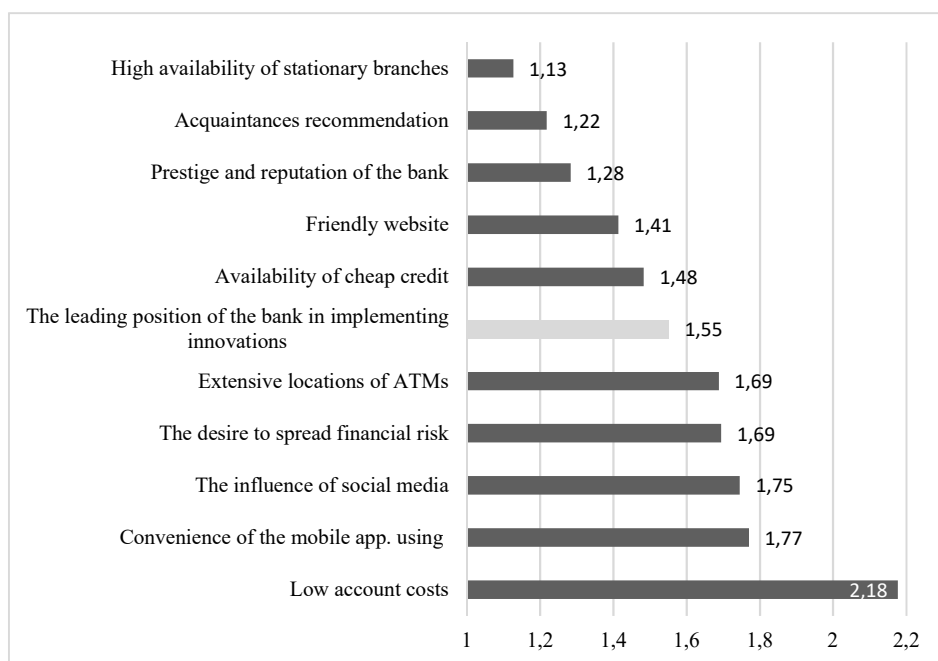


Figure 5. The importance of selected factors in the bank choice decision by customer's

Source: own study.

be classified as an innovation). Interestingly, innovations implemented in a bank are less important when choosing a bank than opinions and messages appearing in social media. In conclusion the importance of innovative solutions offered by banks has little impact on the decisions to choose banks when customers start cooperation. Economic benefits and the convenience of using banking services are more important in this respect, which is conditioned by the implementation of innovative solutions that enable high efficiency and effectiveness of operations. Ultimately, the customer receives a high-quality service at a lower price, and this is the main argument when choosing a banking service provider.

5. CONCLUSION

Based on the conducted research it can be concluded that the development of innovations in the banking system is determined by many factors. Firstly, noticed factors related to striving to streamline processes and improve the quality of services provided, while expecting the possible lowest service costs. On the other hand, there are some concerns related to the implementation of innovative solutions related to high dependence on technical devices, their failures or too deep interference into the human body, as in the case with the subcutaneous chip. In both cases, the subject of the innovation is associated with technical solutions regarding verification and confirmation of the customer's identity, or technical improvements related to account management and payment processing. Within the group of innovative solutions little importance of the product innovations was requested by the surveyed respondents (confirm hypothesis 1). Contrary to the observed trends regarding finding opportunities for use Artificial Intelligence on a large scale, the

interviewed respondents do not indicate the need to use this solution to a wider extent than previously (reject hypothesis 2). In the respondents' opinions innovative solutions offered by banks do not directly generate a key factor determining their competitive position (reject hypothesis 3). However, it should be remembered that the main goal of innovation in banking is to optimize processes by automatization and improving security, which becomes possible as a result of the implementation of technological and organizational innovations. As a final result, these activities lead to a reduction in operating costs and contribute to offering low account maintenance costs, and turns out to be the most important from the point of view of assessing the competitive position. Overall implementing innovations in the banking sector is becoming a desirable and necessary phenomenon to meet the growing needs reported by customers. The conducted research indicates that a necessary condition for the effective implementation of innovations in banking is not only to facilitate the service process and increase security, but also adjustment the pace of changes to customer capabilities. Acceptance of new innovative services and technological solutions requires parallel information and educational activities among customers regarding the proposed solutions. This problem is particularly important in relation to older bank customers who limits the usage of innovations and this should be the subject of next in-depth research. Bank analysts must recognize that the key factor in the success of implementing innovative solutions is also the ongoing monitoring of the needs and expectations of bank customers.

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