HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE SCIENCES

DOCTORAL (PHD) THESES

THE IMPACT OF DIGITALIZATION ON THE USEAGE OF CORPORATE BANKING PRODUCTS

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GÖDÖLLŐ
2025

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BACKGROUND OF THE RESEARCH, OBJECTIVES

Digitalization has fundamentally transformed the financial sector over the past decade, particularly the banking system. Emerging technologies such as online banking services, mobile applications, artificial intelligence, and the rise of FinTech companies have significantly influenced banking operations and customer relations. For corporate clients, digital banking is no longer merely a matter of convenience, but a strategic consideration that may offer a competitive edge when choosing a financial institution. Companies increasingly seek fast, secure, and easily accessible digital banking solutions that streamline their financial operations and reduce administrative burdens.

The role of digitalization became especially prominent during the COVID-19 pandemic, when opportunities for in-person contact significantly diminished. Banking clients, including companies, began to rely more heavily on digital solutions, accelerating the digital transformation of the banking sector. In recent years, it has become clear that the quality of digital services not only shapes the customer experience but also strongly influences the reputation of banks.

The dissertation comprehensively explores the relationship between banking digitalization and corporate bank selection. A key focus of the research is the segmentation of corporate clients based on banking preferences (H1), which enables the identification of distinct segments and a deeper understanding of their needs. Additionally, the study investigates how the quality of digital banking services affects the reputation of financial institutions (H2), and how the level of digital maturity influences corporate bank selection decisions and banking habits (H3).

Special attention is given to the transformation of corporate preferences regarding personal banking relationships in the post-pandemic period (H4), as well as to the level of awareness of corporate clients in addressing cyber risks (H5). As digitalization progresses, security concerns gain increasing importance: companies must rely on trustworthy banking services that are robust from a cybersecurity standpoint.

Based on empirical findings, the dissertation seeks to identify the main factors that influence corporate bank selection and banking habits in the age of digitalization, and to assess the direction in which the banking sector is evolving in this domain. The results may contribute to the strategic decision-making of banks and enhance relationships between financial institutions and their corporate clients. Furthermore, the study sheds light on the growing cybersecurity risks and formulates recommendations to improve corporate awareness in this area, highlighting the significant role banks can play.

The aim of the dissertation is to explore how corporate banking clients can be grouped based on their preferences and to examine how the quality of digital banking services affects the reputation of financial institutions. Digital banking is becoming an increasingly important factor in the bank selection decisions of the corporate sector, making it essential to understand how the advancement of digitalization influences their banking choices and habits.

The pandemic has further accelerated digitalization and brought significant changes to the communication practices between companies and banks. This research sets out to analyze how COVID-19 impacted preferences for personal banking relationships, with a particular focus on whether the role of the dedicated relationship manager has changed in corporate decision-making.

The evolution of digitalization has also introduced new challenges, especially in the field of cybersecurity. For companies, protecting financial transactions and data is crucial, yet evidence suggests that their awareness of cyber risks varies. Therefore, the study examines the extent to which corporate clients understand digital threats, what cybersecurity practices they implement to mitigate risks, and what factors influence their level of awareness in this area.

O1: Segmenting corporate banking clients based on their banking preferences to identify distinct client segments and better understand their diverse expectations and needs toward banking services.

O2: Examining how the quality of digital banking services influences the reputation of financial institutions, with the aim of determining to what extent digital service quality contributes to customer retention and the strengthening of market position.

O3: Exploring the impact of the development of digital banking on the bank selection decisions and banking habits of the corporate sector, with special attention to service availability and quality.

O4: Investigating the changes in personal banking relationship preferences due to the COVID-19 pandemic, aiming to understand how the pandemic reshaped clients' interaction preferences and increased demand for instant and online solutions.

O4a: Analyzing how the importance of the relationship manager's role changed as a result of the pandemic. This is particularly important, as the shift toward digitalization—accelerated by the pandemic—may have fundamentally altered the dynamics of corporate-bank communication. Understanding this shift can reveal the extent to which corporate clients still value personal contact, and how it influences their use of banking services and loyalty. Additionally, this subtopic is of personal interest, given my own professional experience as a corporate relationship manager since 2014.

O5: Assessing the level of awareness among corporate clients regarding cyber risks. The objective is to determine how well-prepared companies are for the challenges of the digital landscape, and what factors influence their knowledge and attitudes. The ultimate goal is to provide recommendations for improving cyber risk awareness, where banks may also play a key role.

For better clarity, the research process is illustrated with a flow chart (Figure 1).

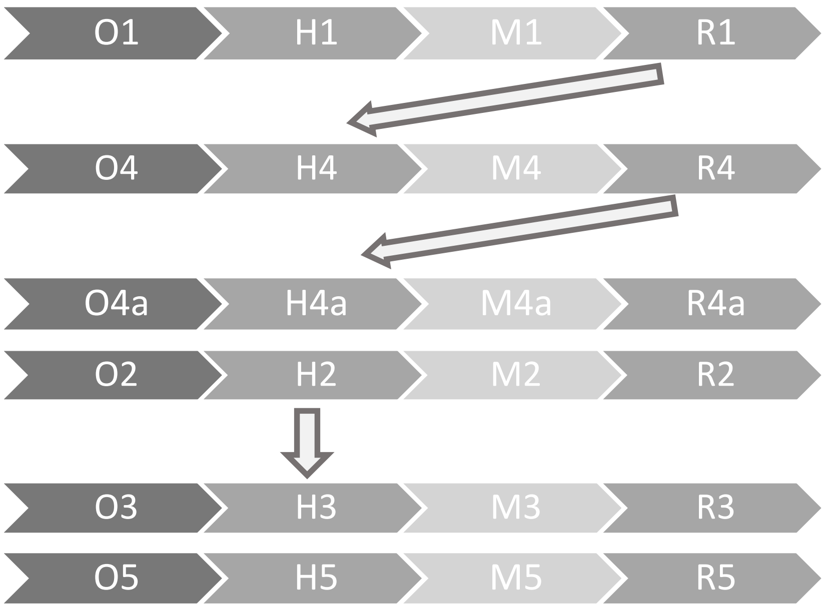

Figure 1: Research Process (Flowchart)[1]

Source: Own research (2024)

[1] O=objectives, H=hypothesis, M=method, R=result

MATERIAL AND METHOD

In the quantitative phase of the research, a questionnaire-based survey was conducted to examine corporate clients' banking habits, the impact of digitalization in banking, and the level of cybersecurity awareness. The questionnaire was structured to enable statistical analysis of the collected data, allowing for the segmentation of corporate clients, the identification of different banking preferences, and the assessment of cybersecurity awareness.

Data collection was carried out via online platform (Google Forms). The questionnaire was available to Hungarian companies from 2. March 2024 to 31. May 2024. It comprised 103 questions, featuring a variety of question types:

- Nominal variables: Captured demographic and corporate background data such as company size, main activity, and the number of banking relationships.
- Likert scale questions: Used to assess the perceived quality of digital banking services, evaluate banking reputation, and measure satisfaction with digital offerings (e.g., "How satisfied are you with the quality of your bank's digital services?" rated on a 1–4 scale). The scale was intentionally designed without a neutral midpoint to encourage respondents to clearly express their opinions, thereby avoiding neutral, middle-ground responses. This approach ensured that the data better reflected corporate perspectives and allowed for more precise analysis.
- Dichotomous variables: Yes/No type questions, e.g., regarding cybersecurity awareness and the implementation of security measures by companies.
- Frequency-based questions: Used to assess the frequency of banking interactions (e.g., "How often did you interact with your bank through the following channels?" – daily, weekly, monthly, etc.), enabling comparisons between pre- and post-COVID-19 practices.
- Multiple-choice questions: Used to identify bank selection criteria, allowing respondents to indicate which factors are important when choosing a financial institution (e.g., reputation, service quality, availability of digital platforms, etc.).

In total, 462 Hungarian enterprises participated in the survey. Among respondents, 67% were women and 33% men. Age distribution was as follows: 21% were under 30, 39% were aged 31–40, 24% were aged 41–50, and 16% were over 50. Regarding organizational roles, 69% were company owners, 14% top executives, 4% financial managers, and 13% held other positions. In terms of education, 16% have completed secondary education, 15% hold a vocational secondary qualification, 20% possess a higher-level vocational qualification, 21% hold a BA/BSc degree, and 28% hold an MA/MSc degree.

Based on company size, 87% of respondents represented microenterprises, 9% small enterprises, 2% medium-sized businesses, and 1% large enterprises. In terms of employee numbers, 87% operated as sole proprietorships, 23% had 2–9 employees, 4% employed 10–49 people, 2% had 50–249 employees, and 0.5% employed more than 250. Geographically, the majority of firms (83%) were based in Budapest. As for banking practices, 77% of companies held accounts with a single bank, 18% with two institutions, 5% with three, and 1% with more than three banks.

The survey data were analyzed using MS Office and SPSS software.

To examine the factors influencing bank selection criteria and banking preferences of corporate clients (H1), factor analysis was applied. This identified three main factors: service quality, banking appeal, and financial conditions. Based on the factors extracted, a cluster analysis was conducted, resulting in the identification of four client segments. To test for significant differences between the groups, ANOVA and post hoc tests were employed.

The relationship between the quality of digital platforms and banking reputation (H2) was examined using Spearman's rank-order correlation. The analysis included factors related to reputation, satisfaction, and the quality of the digital platforms used. Special attention was paid to the link between satisfaction with digital services and clients' willingness to recommend their bank, thereby identifying the most reputation-defining factors.

The connection between the quality of digital services and the intention to switch banks (H3) was investigated using decision tree analysis, Spearman's rank correlation, and crosstabulation. The analysis focused on factors most influencing switching intentions and how the quality of online platforms affects satisfaction and customer loyalty. Particular emphasis was placed on how bank selection criteria (e.g., reputation, financial conditions, service quality) relate to switching behavior.

Changes in banking communication patterns before and after COVID-19 (H4) were examined through descriptive statistics. The frequency of different contact methods (e.g., in-branch visits, phone, or online interactions) was evaluated through cluster analysis, identifying five customer segments: digital focused, digitally committed, limited-contact clients, balanced-contact clients, and personal-interaction-oriented clients. Crosstabulation was used to explore links between communication preferences and digital attitudes. The correlation between reduced personal contact needs and the use of online financial services was tested with Spearman's rank correlation.

Changes in contact preferences and the role of relationship managers (H4a) were also explored using crosstabulation. The analysis examined how the frequency of personal contact and satisfaction with digital services influenced the perceived importance of personal banking contacts. It also assessed how attitudes toward digital platforms shaped the significance of relationship managers.

To measure corporate cybersecurity awareness (H5), a Cybersecurity Index was developed as a composite variable. This index included the use of information sources, security measures, and knowledge of cyber risks. Based on the index, companies were categorized into three levels of awareness: low (below 44 points), medium (45–54 points), and high (above 55 points). The relationship between cybersecurity awareness and actual cyberattack experience was examined using crosstabulation. Additionally, Spearman’s rank correlation was applied to investigate the link between cybersecurity awareness and the severity of online attack-related damage.

Table 1 summarizes the applicability of the statistical methods used.

1. Table: Applied methods

Statistical method	Usage of statistical method
Factor Analysis	Factor analysis is a data reduction technique that can be used to reduce an initially large number of variables to a smaller number of hidden dimensions (factors). The aim of the method is to reveal the common structure behind the correlations between variables. Of the two main types of factor analysis, I used Exploratory Factor Analysis (EFA) to identify the structure behind the data (H1, H4). During the analysis, I used principal component analysis (PCA) with varimax rotation for easier interpretation.
Cluster Analysis	The purpose of cluster analysis is to group data based on similarities or differences. The method allows the formation of homogeneous groups based on a set of variables. The cluster analysis was used to group corporate customers based on bank selection criteria (H1) and contact preferences (H4). During the procedure, I used both hierarchical and non-hierarchical (K-means) methods to determine the appropriate customer segments.
Analysis of variance	ANOVA can be used to explore differences between groups. The method analyzes whether the data belonging to the different categories of an independent variable differ significantly with respect to a dependent variable. The methodology made it possible to determine whether the values of a given variable differ significantly in clusters determined on the basis of different bank selection criteria (H1).
Post Hoc Test	Because ANOVA alone only shows whether there is a significant difference between the groups but does not indicate which groups differ from each other. I used the post hoc tests to identify the specific differences between the groups (H1).
Spearman's rank correlation	Spearman correlation is a non-parametric method that measures the monotonic relationship between variables. It is used when the data is not normally distributed, or when the data is prioritizable but not measured on a continuous scale. The Spearman rank correlation coefficient (ρ) ranges from -1 to +1, where +1 indicates a perfect positive relationship and -1 indicates a perfect negative relationship. The method provided an opportunity to examine the relationships between variables in the case of ordinal or non-normal distribution data (H2, H3, H4, H5).
Decision tree	A decision tree is a predictive modeling technique that can be used to categorize and predict data. The method presents the decision-making rules in a tree-shaped structure. The advantage of a decision tree is that it is easy to interpret and helps identify important predictor variables. The decision tree analysis was used to examine the bank selection patterns of corporate customers. During the procedure, I used the CART (Classification and Regression Tree) algorithm, which helped to define the customer segments and their decision-making criteria (H3).

Crosstab analysis, Chi^2 test	Crosstab analysis can be used to examine the relationship between category variables. The Chi^2 test measures whether there is a statistically significant relationship between two nominal or ordinal variables. The method is often used in questionnaire research to examine the correlations between demographic data and attitude variables. To examine the relationship between the category variables, I created cross tables and checked the significance of the relationships with a Chi^2 test (H3, H4, H4a, H5).
Descriptive statistics	Descriptive statistical methods are designed to summarize and visualize the characteristics of data. These include mean indicators (mean, median, mode), dispersion indicators (standard deviation, variance, interquartile range), and frequency distributions. The method was used to summarize the frequency of the use of bank contact methods, which included the calculation of the mean, mode, standard deviation, and frequency distributions (H4).
Composite Variable Creation	A composite variable is a new variable that contains the combined information of several original variables. The purpose of the creation is to simplify the measurement of complex phenomena. Composite variables can be created using different methods, such as simple averaging, factor analysis, or calculation of weighted indices. During the analysis, I created a single composite index (Cyber Security Index) from several variables (source of information, applied cybersecurity methods, knowledge about cyber-attack techniques). The aggregation of the variables was done by simple mathematical addition, so it can be easily algorithmized and further developed (H5).

Source: Tabachnick and Fidell (2019), own editing (2024)

To complement the quantitative research, qualitative data collection was also conducted. In the form of online and in-person discussions, interviews with professionals were held with 10 corporate banking relationship experts. These professionals are employed at various financial institutions operating in Hungary, both with domestic and foreign ownership background. Each of them has more than seven years of professional experience. The interviews were conducted either in person or via video calls.

The analysis of the interviews was carried out using qualitative content analysis, with a focus on identifying recurring themes and narratives. The insights gained from the interviews supplemented the quantitative findings and helped interpret statistical relationships.

The application of a mixed-methods approach enabled a deeper understanding of corporate banking clients' digital preferences and decision-making patterns, as well as the assessment of corporate cybersecurity awareness from the banks' perspective. The combination of quantitative and qualitative methodologies ensured a comprehensive view of the impact of banking digitalization and the dynamics of the relationship between financial institutions and their clients.

The results of the questionnaire-based research contributed to a more profound understanding of corporate banking habits and the effects of digitalization in the banking sector. At the same time, they provided a statistical foundation for interpreting the phenomena revealed through the qualitative interviews.

The relevance of the research is further strengthened by the representativeness of the sample in two key respects. Firstly, in terms of the number of banks used by the surveyed companies, based on data from the ORBIS database (2022). This ensured that companies of different sizes and with varying banking strategies were all represented in the study. Secondly, in terms of the number of employees, as categorized according to data from the Hungarian Central Statistical Office (KSH, 2020).

The representativeness of the sample enhances the credibility and generalizability of the findings, as they are applicable not only to individual firms or narrow segments, but to the entire corporate banking client base. Therefore, the conclusions drawn from the research provide a solid foundation for understanding the business implications of banking digitalization and corporate bank selection decisions.

RESULTS

H1: Corporate banking clients can be clearly segmented based on their banking preferences.

The factor analysis conducted identified three well-defined dimensions of client preferences: the quality of banking services, the attractiveness of the bank, and the terms of financial products offered. These factors provide a clear structure for understanding the motivations underlying customer decisions. All methodological assumptions of the factor analysis were fully met, ensuring the validity and reliability of the results. The analysis yielded statistically significant results, offering accurate insights into the clients' decision-making criteria.

Based on these factors, cluster analysis confirmed that corporate clients can be grouped into distinct segments. The statistical analysis supported the creation of four clusters: Uninfluenced, Attractiveness-driven, Quality-oriented, and Price-sensitive clients. ANOVA and post hoc tests further confirmed the significance of the differences between the groups, reinforcing the relevance of the research hypothesis and validating the distinct nature of the clusters.

H2: The quality of digital banking services significantly influences the reputation of financial institutions among clients.

The correlation analyses clearly indicated that digital banking channels, especially internet banking, mobile applications, and installed terminals, play a key role in shaping banking reputation. The usability of internet banking and mobile apps showed a moderately strong positive correlation with perceptions of the bank ($r = 0.665$ and $r = 0.695$, respectively), while the correlation was even stronger for installed terminals ($r = 0.794$). These findings suggest that the level of digital development affects not only the quality of customer experience but also influences long-term market position and reputation.

The research further confirmed a strong relationship between customer satisfaction and the bank’s reputation. Perceived reliability ($r = 0.753$) and customer orientation ($r = 0.696$) were major contributors to favorable perceptions. The quality of digital services indirectly influences these perceptions—fast, reliable operation and user-friendly interfaces foster client trust. This effect is particularly relevant for corporate clients, for whom continuity and reliability of service are crucial.

Internet banking and mobile apps are especially important for corporate clients' digital experience. In-depth interviews confirmed that these platforms have become essential tools for day-to-day banking. Respondents noted that the COVID-19 pandemic significantly accelerated demand for online channels. Although satisfaction with mobile apps has a smaller impact on overall satisfaction ($r = 0.442$) than internet banking, its widespread adoption makes it a key tool in maintaining long-term customer relationships.

The qualitative research also provided a detailed picture of the current state and strategic role of digital developments. The interviews revealed significant differences between banks in terms of digital transformation, which clearly affect competitiveness. According to client experiences, high-quality digital services increase trust and enhance reputation. Bank executives unanimously emphasized the strategic importance of digital development as essential for maintaining strong customer relationships and reinforcing institutional reputation.

H3: The level of digitalization in banking affects corporate clients' bank selection. Clients dissatisfied with digital services are more likely to switch banks.

Decision tree models and correlation analyses revealed a significant gap between corporate clients' expectations of digital channels and the actual service experience. The findings indicate that dissatisfaction with digital services is moderately or strongly associated with the intention to switch banks—particularly among clients who frequently use internet banking or mobile apps. As these platforms are integral to daily banking operations, their quality directly impacts satisfaction and loyalty.

The results show that the quality of internet and mobile banking systems plays a crucial role in shaping client satisfaction and loyalty. Digitally active clients are more sensitive to technical issues and usability problems. When these persist, they significantly increase the likelihood of switching banks. Interviews confirmed that poor digital service quality may result in client attrition over time. This trend is especially visible among SMEs, which tend to respond more quickly and flexibly to dissatisfaction than large corporations.

According to decision tree analysis, the most influential factors in switching decisions are the availability and quality of digital services, the bank's reputation, and pricing conditions. The data show that clients who prioritize digital channel quality are more likely to remain loyal to banks that meet these expectations. In contrast, dissatisfied clients are more strongly motivated to switch. The findings underscore that digital service quality not only affects customer retention but also plays a strategic role in maintaining competitiveness.

H4: After the COVID-19 pandemic, corporate clients show decreased demand for personal contact and prefer instant online services.

The results clearly demonstrate that the availability and effectiveness of digital banking services increased significantly during and after the pandemic. Restrictions introduced during COVID-19, and the expansion of online communication transformed client interaction habits. In-person banking declined, as confirmed by empirical data. Traditional branch visits were gradually replaced by online solutions, especially internet banking and mobile apps. For digitally engaged clients, accessibility, speed, and ease of use became key priorities. These developments confirmed the hypothesis particularly among client segments favoring digital services.

However, the analysis also showed that some client groups—primarily those who prefer personal contact—still strongly value human interaction. For these clients, trust and face-to-face communication remain essential, especially in complex financial decision-making. Cluster analysis revealed that although usage of online channels has increased across these groups, offline presence remains important. Conversely, demand for personal interaction significantly declined among digitally committed clients, while traditional-minded groups displayed mixed tendencies.

H4 Sub-hypothesis: The importance of dedicated relationship managers decreased after the pandemic.

The research found that, for some client groups, the role of dedicated personal banking contacts has indeed diminished. Clients who favor digital platforms tend to manage their finances independently and increasingly through online channels, reducing their reliance on dedicated contacts. In contrast, those who continue to value personal interaction still consider relationship managers essential. For them, human interaction provides a trust foundation that shapes their overall customer experience.

H5: Most companies have experienced cyber-attacks, but their awareness of cyber risks remains low.

The Cybersecurity Index revealed that a large portion of Hungarian companies demonstrate low to medium levels of cybersecurity awareness. The Index assessed three dimensions: use of information sources, implementation of security technologies, and knowledge of cyberattack methods. Findings indicate that over half of the companies do not use basic security measures, which are essential for adequate defense—particularly critical for companies that heavily rely on digital services and are therefore more exposed to online threats.

Among SMEs, especially micro-enterprises, basic security solutions such as strong passwords, two-factor authentication, firewalls, VPN usage, and regular data backups are often missing. These companies frequently underestimate cyber risks and fail to allocate sufficient resources to prevention. In contrast, larger firms tend to have more advanced cybersecurity strategies and often employ dedicated expert teams. Still, even highly protected corporations are not immune to targeted attacks, as their valuable data makes them attractive targets for cybercriminals.

The analysis also revealed that companies often overestimate their awareness. Many firms with objectively low awareness rated themselves as moderately informed, indicating that they do not recognize their vulnerabilities. This overconfidence is dangerous, as such companies are less likely to take security measures. While general threats such as spam or smishing are widespread, targeted attacks—like ransomware or spear phishing—pose serious financial and data security risks, especially for large, digitally active organizations. Companies with low awareness levels often struggle even to recognize basic threats, increasing their overall vulnerability.

CONCLUSIONS AND RECOMMENDATIONS

H1: Corporate banking clients can be clearly segmented based on their banking preferences.

Based on the available data, the hypothesis that corporate banking clients can be segmented into well-defined groups based on their banking preferences is fully acceptable. The results of the analysis clearly show that identifiable and structured patterns underlie the different client preferences, making group segmentation possible. This is also consistent with the relevant literature, which suggests that bank selection decisions are influenced by numerous factors, such as pricing, service quality, and usability of digital platforms.

The factor analysis conducted revealed three key components: the quality of banking services, the attractiveness of the bank, and the terms and conditions of the financial services offered. These factors represent the underlying dimensions of customer preferences and provide a logical and well-distinguished basis for segmentation. All methodological preconditions for factor analysis were fulfilled, ensuring the reliability of the method and the significance of the results.

The subsequent cluster analysis confirmed that clients can be grouped into distinct clusters. The formation of four separate segments was statistically justified. These four groups – Uninfluenced, Attractiveness-driven, Quality-oriented, and Price-sensitive – differ significantly in their preferences, which was confirmed by ANOVA and post hoc tests. The significance of these differences supports the validity of the hypothesis.

The practical relevance of the research is also noteworthy. The distinct preferences of clients enable banks to offer tailored services. For instance, premium services could be developed for quality-oriented clients, while favorable pricing models may attract price-sensitive clients. For attractiveness-driven clients, marketing campaigns focusing on reputation and personal interaction may be most effective. These insights provide clear guidelines for product development and customer relationship optimization.

Further research is recommended to enable even deeper segmentation, for example, by region or company size. It is also advisable to develop communication strategies tailored to each segment, as different clients may prefer different communication channels and types of messaging.

The results offer a solid empirical foundation to support the hypothesis. Therefore, H1 is fully accepted, and the findings of the research clearly demonstrate that corporate banking clients can be segmented into distinguishable groups based on their banking preferences.

H2: The quality of digital banking services significantly influences the reputation of financial institutions among clients.

The hypothesis that the quality of digital banking services has a significant impact on the reputation of financial institutions is accepted, as supported by both the research findings and expert interviews. The results clearly show that the quality of digital platforms is closely related to how the bank's reputation is perceived, and it plays a major role in shaping a positive customer experience.

Correlation analysis confirms that the quality of internet banking, mobile applications, and installed terminals plays a key role in reputation building. Internet banking and mobile apps showed moderately strong positive correlations with the bank's reputation (0.665 and 0.695), while installed terminals showed an even stronger relationship (0.794). These results indicate that the level of digital development affects not only customer relationships but also the long-term market perception of the bank.

The study also demonstrated a strong link between customer satisfaction and bank reputation. Perceived reliability (0.753) and customer focus (0.696) significantly contribute to a positive reputation. The quality of digital services directly influences these factors. For example, speed, seamless operation, and user-friendly interfaces all enhance clients' perceptions of the bank as trustworthy and customer oriented. This is especially important for corporate clients, for whom reliability and efficiency are essential expectations.

Internet banking and mobile apps are key elements of the digital experience for corporate clients. The interviews confirmed that these platforms serve as the foundation for daily banking. According to respondents, the COVID-19 pandemic significantly increased demand for online services. Although satisfaction with mobile apps has a somewhat smaller effect on overall satisfaction (0.442) than internet banking, their wide usage still makes them strategically important, especially for maintaining long-term client relationships.

The interviews provided additional insights into the current status and importance of digital development. They revealed that the level of digital progress varies significantly among banks, directly impacting their competitiveness. Feedback from clients shows that high-quality digital services substantially enhance a bank's credibility and positive perception. Bank managers also recognized the strategic importance of digital platforms, emphasizing that they are essential for maintaining customer relationships and building a strong reputation.

Based on the findings, several recommendations can be made for banks. Prioritizing digital development is essential, especially ongoing improvements to internet banking and mobile apps. Enhancing user experience, ensuring seamless functionality, and addressing customer needs can significantly increase satisfaction and reputation. Regularly collecting customer feedback is also recommended to ensure that developments meet user expectations. Accelerating innovation, particularly in banks lagging behind their competitors, is crucial for improving competitiveness. Additionally, sustainability and corporate social responsibility initiatives can enhance banks' credibility and appeal.

In conclusion, the research clearly supports the hypothesis that the quality of digital banking services is a critical factor in shaping bank reputation. Therefore, H2 is fully accepted. Digital platform development not only improves customer relationships but also serves as a strategic tool for maintaining competitiveness and client retention.

H3: The level of digitalization in banking affects corporate clients' bank selection. Clients dissatisfied with digital services are more likely to switch banks.

The hypothesis that the level of digitalization influences corporate clients' bank selection and that dissatisfaction with digital services increases the likelihood of switching banks is fully supported. Both the research data and interviews confirm that digital service quality significantly impacts client loyalty and switching decisions.

Decision tree models and correlation analyses clearly showed significant differences in how clients perceive and respond to digital platforms. Dissatisfaction with digital services showed a moderate to strong correlation with switching intentions, especially among clients who frequently use services such as internet banking or mobile applications. These platforms are not just convenient tools but essential components of daily banking, and any deficiencies directly affect satisfaction.

According to the research, the quality of internet banking and mobile apps has a particularly strong impact on client satisfaction and loyalty. Clients using these platforms daily are more sensitive to technical problems. If these issues persist, the likelihood of switching banks increases significantly. Interviews confirmed that poor digital service quality may lead to customer attrition over time. This trend is especially prevalent among small and medium-sized enterprises (SMEs), which are generally more flexible and quicker to switch banks than large corporations.

The decision tree analyses indicated that switching decisions are primarily driven by the availability and quality of digital platforms, bank reputation, and pricing conditions. The data show that clients who prioritize digital service quality tend to remain loyal to banks that meet these expectations. In contrast, dissatisfied clients are more likely to switch banks. Therefore, the quality of digital services not only affects satisfaction but also serves as a strategic factor in maintaining competitiveness.

Several practical recommendations can be made for banks based on these findings: Continuous development of digital platforms, with a focus on improving user experience, simplifying navigation, and ensuring error-free performance. Regular collection and analysis of client feedback to identify improvement areas and take targeted actions to enhance satisfaction. A segmented customer management strategy that accounts for the differing needs and expectations of large corporations versus SMEs.

The research clearly shows that digital service quality plays a central role in client loyalty and bank selection. Therefore, H3 is fully accepted. To minimize client attrition, banks must continuously develop their digital platforms and proactively respond to client feedback. Digital innovation is not only a means to retain current clients but also an effective strategy for attracting new ones and sustaining long-term competitiveness.

H4: *After the COVID-19 pandemic, corporate clients show decreased demand for personal contact and prefer instant online services.*

The fourth hypothesis, which states that corporate clients are less reliant on personal contact and prefer instantly accessible online services after the COVID-19 pandemic, is partially accepted, as is the related sub-hypothesis that the importance of relationship managers has declined. The findings show that while the pandemic indeed triggered major shifts in client interaction patterns, the decline in demand for personal contact is not uniform across all client segments.

The research revealed that the availability and efficiency of digital services increased significantly during and after the pandemic. Restrictions and the widespread adoption of online communication substantially transformed how clients interact with their banks. In-person branch visits declined considerably, a trend supported by the data. These were largely replaced by online platforms such as internet banking and mobile applications. Clients, especially those digitally committed, now prioritize instant access, speed, and ease of use. These developments support the hypothesis, particularly for digital-first client groups.

However, the research also showed that certain client segments—particularly those who prefer personal interaction—continue to value face-to-face contact. These clients emphasize trust and human relationships, especially when dealing with more complex financial matters. Cluster analysis confirmed that offline interactions remain vital for these groups, although their use of online channels has also increased in some areas. The need for personal contact has most clearly declined among digital-priority clients, while clients favoring personal interaction showed more mixed tendencies.

H4 Sub-hypothesis: The importance of dedicated relationship managers decreased after the pandemic.

The importance of dedicated banking contacts has indeed diminished in some client groups. Clients who favor online platforms are less reliant on assigned relationship managers and prefer to manage their affairs through digital channels. Nevertheless, relationship strategies remain essential for clients who prefer personal contact, as these interactions continue to shape trust and overall customer experience.

Literature sources confirm that while the COVID-19 pandemic accelerated digital service adoption, personal interaction remains important for specific customer segments.

Several practical recommendations can be made for banks. It is essential to continuously improve online channels such as internet banking and mobile apps. Enhancing user experience, ensuring quick performance, and delivering error-free services are vital for customer retention. At the same time, banks must tailor their relationship strategies to different client needs. Digital focused clients should be offered automated and efficient communication tools, while clients who value personal contact should continue to have access to dedicated relationship managers.

Further research is needed to explore the extent to which digital services can substitute for personal contact among different client segments. It is also important to examine the factors influencing changes in the demand for personal interaction, particularly trust and the complexity of financial transactions.

The results confirm that digital services gained prominence in the post-pandemic period, and the importance of personal contact has decreased. However, since the extent of this shift varies across client types, both H4 and its sub-hypothesis can only be partially accepted. Banks must continue to consider client-specific preferences to remain competitive and strike the right balance between digital and personal services.

H5: Most companies have experienced cyber-attacks, but their awareness of cyber risks remains low.

The hypothesis that most companies have experienced cyberattacks, yet exhibit low awareness for cyber risks, is fully supported. The research results, expert interviews, and literature all confirm that cyberattack incidents are on the rise, while many companies still lack sufficient protection. This is particularly true for microenterprises, where low cybersecurity awareness and the absence of basic defense tools pose a serious issue.

The Cybersecurity Index developed in the study revealed that most companies fall into the low or medium awareness category regarding cybersecurity. The index evaluated three key aspects: use of information sources, application of cybersecurity measures, and knowledge of cyberattack techniques. The findings show that over half of companies do not use essential security measures necessary for proper protection. This is especially dangerous for firms that rely heavily on digital services, as they face higher exposure to online threats.

The study also found that basic security practices such as strong passwords, two-factor authentication, firewalls, VPN usage, and regular data backups are often lacking among microenterprises. These companies tend to underestimate cyber risks and devote insufficient attention to prevention. In contrast, larger companies apply more advanced strategies and often employ dedicated cybersecurity experts. Still, even large corporations are not immune to targeted attacks, as their valuable data and systems are attractive to cybercriminals.

The analysis also revealed that companies frequently overestimate their cybersecurity capabilities. Many low-awareness firms classified themselves as moderately prepared, suggesting they do not recognize their own vulnerabilities. This overconfidence is dangerous, as it can prevent proactive action. While general threats like spam and smishing are widespread, targeted attacks such as ransomware and spear phishing can cause major financial damage, especially among larger, digitally active firms. Companies with low awareness levels often struggle to detect even basic threats, increasing their overall vulnerability.

Based on the results, several recommendations can be made. It is crucial that companies regularly participate in targeted cybersecurity training to improve threat identification, prevention, and response capabilities. Microenterprises in particular must develop a preventive mindset and implement basic protective tools such as strong passwords, two-factor authentication, firewalls, and routine data backups. Additionally, banks, large companies, and government bodies can support smaller clients through customized advisory services and training initiatives.

Further development and application of the Cybersecurity Index can help companies objectively assess their awareness and adjust their strategies accordingly. Knowledge sharing and collaboration across industries can also promote the spread of best practices and risk reduction.

The findings confirm that most companies have already experienced cyberattacks, but their awareness levels vary greatly. This is supported by the literature, which highlights increasing cybersecurity risks alongside inconsistent preparedness. While basic protection is often missing among microenterprises, larger companies are more frequently targeted by sophisticated attacks. The results clearly show that improving awareness and implementing preventive measures are essential for enhancing corporate cybersecurity. Therefore, H5 is fully accepted and provides clear guidance on steps needed to strengthen cybersecurity in the corporate sector.

NEW SCIENTIFIC RESULTS

In my dissertation, I examined the relationship between banking digitalization and corporate bank selection, with particular focus on how digital banking services influence corporate clients’ habits, preferences, and decision-making mechanisms. I employed a multidimensional research approach and conducted empirical analyses through which I identified several new scientific findings regarding the impact of digitalization on the banking sector.

As a result of my empirical research, corporate banking clients can be clearly clustered based on their banking preferences and digital attitudes. The cluster analysis identified three main client segments. The first group consists of digitally committed companies that primarily use online banking services, prefer self-service digital solutions, and minimize personal interactions with the bank. The second group includes hybrid banking companies that use both digital and personal banking services, and whose preferences for communication channels depend on the type of transaction. The third group comprises companies that continue to prefer personal contact and consider the personal availability of a bank relationship manager important. This segmentation allows banking services to be better tailored to the specific needs of different corporate client segments.

Thesis 1: Corporate clients can be clearly categorized into defined groups based on their banking preferences. Factor analysis revealed three key dimensions (quality of banking services, attractiveness of the bank, and banking conditions), which reflect structured preference patterns. Cluster analysis identified four distinct client groups, which were found to be statistically significant by ANOVA and post hoc tests. The practical significance of the results is considerable, as they allow banks to develop targeted, customer-focused service strategies.

My statistical analysis showed that the quality of digital banking services has a significant impact on the reputation of financial institutions. The quality of digital customer experience, including the functionality of internet and mobile banking platforms, the simplicity of online administration, and the level of security, significantly influences corporate clients’ loyalty and their perceptions of the bank. User experience and service quality are key to reputation, as easy-to-use and reliable digital platforms enhance customer satisfaction and strengthen the bank’s image. In addition, cybersecurity measures and data protection play a critical role, as corporate clients consider financial and data security essential. Another decisive factor for reputation is a bank's capacity for innovation, which provides competitive advantage and strengthens client retention.

Thesis 2: The quality of digital banking platforms strongly correlates with bank reputation. Perceived reliability and customer orientation are directly related to the quality of digital services. Both interviews and quantitative analyses confirm that advanced digital solutions play a strategic role in shaping the bank's market image and retaining clients.

My research results confirmed that the level of digital maturity directly influences corporate clients' bank selection decisions. Based on the analyses, I concluded that companies dissatisfied with their digital banking services are more likely to switch banks, while high-quality digital services contribute to customer retention. The digital maturity of banks has become especially important for small and medium-sized enterprises (SMEs), which often operate with limited resources and demand fast, efficient online solutions. Digital innovation plays an increasingly decisive role in bank competition and serves as a key differentiator in service selection.

Thesis 3: The quality of digital services directly influences bank selection. Decision tree models and correlation analyses revealed that dissatisfaction with digital platforms significantly increases the likelihood of switching banks, especially among clients who intensively use digital services. Expert interviews confirm that banks offering advanced digital services have stronger client retention, whereas those with outdated digital offerings face greater customer attrition.

My empirical analysis also showed that corporate clients' communication preferences changed significantly due to the pandemic. Many companies that previously preferred personal administration partially shifted to digital channels during the pandemic, and the demand for online banking services has remained high even after. However, I also found that the role of the relationship manager has not lost its importance entirely. Large enterprises still consider dedicated bank contact person important, especially for complex financial transactions, while SMEs increasingly favor self-service digital options and express less need for personal assistance.

Thesis 4: Following the COVID-19 pandemic, online banking services became more prominent, and the role of personal contact decreased among digitally committed clients. However, cluster analysis and expert interviews indicate that certain client

segments still require personal interaction, especially in the case of complex financial decisions.

In examining cybersecurity awareness, I developed a proprietary Cybersecurity Index that measures the preparedness of companies against cyber risks. In creating the Index, I considered the range of cybersecurity measures implemented by companies, their experiences with cyber threats, and their sources of information. The Index helped reveal the extent to which companies perceive cyber risks and the types of security solutions they apply in a digital environment. It is flexibly applicable in the business sector, offering a comprehensive overview of cyber risk factors, security protocols, and essential sources for deepening knowledge in this area. Thanks to its modular structure, it is easily extendable to align with ongoing technological developments.

My research also found that while corporate clients are increasingly aware of cybersecurity threats, there are significant differences in their level of preparedness. The analysis revealed that large corporations are generally better prepared for cyberattacks and often have dedicated IT security strategies. In contrast, SMEs—especially microenterprises—tend to underestimate cyber risks and often lack even basic protective mechanisms. Banks have a key role in raising corporate clients' cybersecurity awareness through educational programs and strengthened data protection measures.

Thesis 5: A significant proportion of companies have already experienced cyberattacks, while their awareness—as measured by the Cybersecurity Index—remains low. SMEs, and especially microenterprises, are particularly vulnerable due to missing basic safeguards. Large corporations apply more advanced strategies but face targeted attacks. The research underlines the need to improve cybersecurity awareness, implement preventive measures, and promote banks' active role in client education.

The new scientific results of my research highlight the profound impact of digitalization on the banking sector and corporate decision-making. The customer segmentation model I developed and the exploration of the relationship between digitalization and bank reputation can support the development of the banking sector and provide a foundation for strategic decision-making by financial institutions. My findings clearly demonstrate that digital transformation is not only a technological challenge but also a strategic one, which is essential for maintaining competitiveness and ensuring client retention in the corporate banking domain.

The credibility and generalizability of the findings are further strengthened by the fact that the sample is representative in two aspects: (1) the number of banks used by the participating companies, based on the ORBIS database (2022), ensuring proportional representation of firms of varying sizes and banking strategies, and (2) the number of employees per company, according to the Hungarian Central Statistical Office (KSH, 2020).

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