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Factors influencing and moderating the satisfaction with banking services: A case study in Hungary

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Abstract: The ongoing dissemination of globalization and digitalization may suggest that personal relationships are becoming less crucial in the context of retail banking and financial services. In Hungary, in addition to private banking, which is associated with high income levels, personal banking also plays an important role. The objective of this study is to develop a model that can identify the factors that determine customer satisfaction and their relative importance. Furthermore, the aim is to incorporate gender and age as moderator variables to identify demographic differences in satisfaction. The analysis was conducted via a questionnaire survey in October to November 2023 employing a purposive sampling approach in a university environment, as the respondents are likely to possess the highest level of existing financial knowledge within this population. The 214 valid responses were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, with the objective of contributing to the development of theory in this field of study. The results demonstrate that perception (β = 0.519) and reliability (β = 0.253) collectively explained 51.8% of the variance in satisfaction. Moreover, the results indicate that perception accounts for 49.2% of the variance in reliability, suggesting the existence of an indirect effect on satisfaction. Therefore, the findings suggest that, despite the advent of digital banking, face to face service remains a pertinent concern in Hungary, and financial institutions should prioritize the factors that shape customer satisfaction. The study contributes to the literature and to the development of customer loyalty strategies for banks based on these findings.

Keywords: attitudes; bank; consumer behavior; PLS-SEM; satisfaction

1. Introduction

Technological advances are affecting customer-centric services in numerous ways, including banking transactions that can be linked to queuing. Technological advances are becoming increasingly dominant in banking activities, as financial institutions have transitioned from traditional banknotes to ATMs and banking functions on mobile devices. However, this change is ongoing, as cloud-based applications, the use of big data, and new types of financial instruments (e.g., cryptocurrencies) have entered the markets and the social scene (Balkan, 2021) and cashier less technology was implemented in the retail sector (Szabó-Szentgróti et al., 2023a; Szabó-Szentgróti et al., 2023b; Szabó-Szentgróti et al., 2024). The recent changes, coupled with the proliferation of financial innovation, are leading to the

dissolution of the traditional boundaries between banks and markets, creating a novel landscape for the future of the sector. This could potentially extend to the integration of financial services under the auspices of Big Tech companies, which could then become an integrated platform for the delivery of financial and non-financial services. (Boot and Thakor, 2024). However, this scenario is not always optimal, as for some banking services (e.g., premium customers), physical contact is essential for the provision of highly customized, contact-based services that require active customer participation (Ho and Wong, 2022; Wirtz and Lovelock, 2016). Moreover, the potential for digitalization to disrupt the customer experience for the high-income population is a further consideration. This social group continues to demand personal interactions and personalized service in banks (Jaksic and Marinc, 2019). These digitalization-related contradictions present a challenge for banks (Filho et al., 2023), as they may lead to the exclusive primacy of digital technology being perceived as the optimal approach.

The situation in Hungary is more specific, as the trend of bank branch closures, especially in small settlements, may result in the poorer segments of society being deprived of physical banking services. Furthermore, online banking solutions cannot replace face-to-face banking due to customer attitudes. The newest studies of customer behavior at banks in Hungary e.g., Szili et al. (2022) revealed that the COVID-19 pandemic has led to a decline in personal visits to bank branches. In terms of satisfaction, Hungarian customers rated trustworthiness, accessible location, and good customer service as important. Additionally, the study found that younger bank customers are more critical of the service (Szili et al., 2022). A further area of investigation was the attitude towards bank loans. The findings revealed that young adults (aged 18–25) are utilizing bank loans as a means of financial planning for the future. This, coupled with the predictability of the process, has led to a notable increase in satisfaction with bank credit in Hungary since 2012–2013 (Béres and Huzdik, 2022). A study conducted in Hungary in 2008 revealed that the quality and convenience of banking services, the helpful and friendly disposition of bank staff and experts, the existence of personalized customer service, a diverse product portfolio, the ease of access to banking information, and the extent of the ATM network are among the most highly anticipated features of banking institutions (Bátor, 2008).

Furthermore, digital banking solutions do not have a significant impact on the frequency of bank visits among the Hungarian population, and their use does not vary significantly depending on the distance from the bank. Nevertheless, the actual distance travelled by Hungarian customers is a significant factor in their willingness to visit a bank. The opportunities offered by the environment have a significant impact on the value of the service to the customer. However, digital receptiveness is also a generational difference in this population. The frequency of visits to the branch decreases accordingly as the propensity to visit a branch, also taking into account the digital affinity in society, is slightly higher for residents aged 40+ than for younger age groups. (El-Meouch et al., 2023). This specific situation is further complicated by the uneven distribution of financial wealth concentration in Hungary, which adds to the complexity of the banking sector. In addition to the specific situation for the poorer segments of the population, personal banking advice is of

course a central element for the high-income population in Hungary (Kazinczy, 2020). Moreover, the analysis of the most digitization in the EU27 indicates that Hungary is among the least digitized countries in both general and financial digitization (Kovács and Vinkóczi, 2020).

The conjunction of these particular factors and the extant international research in this domain renders an analysis of customer satisfaction with local personal banking a pertinent undertaking. This is on the basis of the extant literature, which indicates that in Hungary, there is a strong customer preference for face-to-face transactions. Consequently, it is worthwhile to examine bank satisfaction. Though some aspects of the study have been touched upon by researchers, there is a lack of correlational studies and impact studies in the area of bank satisfaction. This study aims to contribute to the literature in Hungary by filling this gap and exploring the factors that influence bank satisfaction. The results may assist commercial banks in optimizing their operations, as they offer valuable insights and correlations for reaching a broader income and age demographic. Moreover, it is possible to identify relevant information for countries facing comparable circumstances. In consideration of the aforementioned circumstances, the following research question was formulated: What factors influence retail banking customers' satisfaction with personal banking? Due to this nature of the issue, which concerns consumer perceptions and expectations, the structural equation model (SEM) methodology, which is increasingly utilized for psychological analyses, but also by social scientists (Saris and Stronkhorst, 1984), is recommended for its analysis. The following stated objectives provide a basis for answering the research question:

- A more nuanced comprehension of the perspectives of banking customers with regard to personal banking in the digital world.

The advent of digitalization and the global pandemic have precipitated profound changes in the landscape of product and service sales, significantly influencing the factors that shape customer satisfaction. The digitalization of banking is also undergoing a period of diversification, with institutions striving to embrace the novel capabilities offered by fintech providers. This evolution may potentially lead to a reduction in the prevalence of face-to-face transactions. However, the essence of banking transactions and settlements hinges upon the establishment of trust, underscoring the continued relevance of personal interactions with financial institutions. The present study is primarily motivated by a desire to gain insight into how individuals perceive personal contact in banking institutions.

- To provide insight into personal banking issues for the benefit of bank management.

The comprehension of customer expectations provides the bank's management with the potential to guarantee the provision of appropriate customer services and to inform the formulation of future strategies. The findings on customer satisfaction have the potential to inform the development of long-term strategies for bank decision-makers, representing a crucial motivation for this study. The additional motivation is the opportunity to gain insight into the Hungarian market, as the closure of bank branches represents a deviation from the importance of in-person banking, which can be gauged through customer satisfaction surveys.

Furthermore, it is crucial to highlight that the Scopus database, which

encompasses studies of superior quality in comparison to larger databases (Mongeon and Pauls-Hus, 2016; Panibratov et al. 2022), does not yield any results when the terms "Hungary," "bank," "satisfaction," and "SEM" are utilized in simultaneous search. This observation suggests that the combination of subject field and analytical approach is novel.

2. Literature review and hypotheses development

The following literature review is an examination of the primary literature on bank satisfaction, with the objective of providing empirical evidence to support the hypotheses.

2.1. Consumer satisfaction

The concept of consumer satisfaction in the context of banking can be approached from a multitude of perspectives. **Table 1** provides a summary of previous research that has focused on customer satisfaction in various areas of banking.

Table 1. Research areas in bank satisfaction.

Source	Research area	Main results
El-Meouch et al. (2023) (Hungary)	Online versus in-person banking	Online solutions are not a complete substitute for face-to-face administration.
Hu et al. (2023) (China)	Different bank categories	Keep in step with the social environment
Damberg, 2023 (Germany)	Bank-customer relationship management	Corporate reputation has a positive impact on customer confidence and satisfaction.
Bushashe (2023) (Ethiopia)	Private banks	Bank-specific factors have a significant positive impact on bank performance.
Bhattacharya and Bera (2023) (Emerging markets)	M-wallet Services	The perceived quality, brand familiarity, functional congruence and compatibility impact on satisfaction.
Bharti et al. (2023) (India)	AI-based digital banking	Trust is the most important factor for AI-based technologies.
Jahan and Shahria (2022) (Bangladesh)	Mobil banking	Cost, convenience and responsiveness have a significant impact on satisfaction.
Szili et al. (2022) (Hungary)	Bank selection	There is no difference between genders, but young and old people choose different banks.
Eren (2021) (Turkey)	Chatbot usage	Perceived trust, performance and corporate reputation significantly influence consumer satisfaction.
Mondego and Gide (2020) (Australia)	Mobile Payment Systems	Behavioral and organizational factors have a significant impact on the trust and acceptance of consumers.
Alhassany and Faisal (2018) (Cyprus)	Internet banking	A clear, easy-to-use website is needed, and its usefulness is influenced by other consumer's experiences.
Vijayabanu et al. (2015) (India)	Learning organization and private banks	There is a significant relationship between the learning organization and the bank's telecoms composition.

A review of the literature reveals that the issue of personal banking has been a topic of research in Hungary, largely due to consumer dissatisfaction with the closure of branches (El-Meouch et al., 2023). This is in line with the expectation that personal banking may play a significant role in this country.

A multitude of factors, including the role of the intermediary, quality, waiting time, complaint handling, and others, can influence customer attitudes towards

banks. Among these factors, service quality is of particular importance, as it determines the consumer's perception of the service environment. In the case of a failure to monitor customer perception, the result may be a loss of customers, thus providing competitors with the opportunity to attract these customers (Ramachandran and Chidambaram, 2012). Three dimensions of service quality in the banking sector have been identified: functional, technical, and image. However, customer perception of overall service quality is more influenced by customer perception of technical quality than their perception of functional quality (Emari et al., 2011). Uddin and Akhter (2012) indicate that, in addition to service quality, fair service charges can have a direct positive impact on customer satisfaction. However, this impact can also be indirect, through the assessed value. Therefore, monitoring and creating customer retention strategies is an important aspect for banks, which can be communicated to existing and potential customers by advertising the value proposition to customers through multiple platforms (e.g., website, flyer, poster). Furthermore, customer satisfaction has been investigated from a business perspective, as customer loss can affect the competitiveness of banks by weakening client loyalty. Based on the results, a key indicator of satisfaction is the existence and availability of bank branches. Additionally, there is a tendency for females to have higher satisfaction than males, which may be due to differences in value judgements (Felix, 2015). With respect to loyalty, it was identified that this type of relationship with the bank is more emotional than customer satisfaction. However, it is still associated with a deeper level of customer involvement. Consequently, the customer may purchase more products from the bank or recommend the service provider to their environment (family members, friends) (Belás and Gabčová, 2016). Similarly, it has been noted that during times of economic crisis, such as the first wave of COVID-19, financial security significantly impacts consumer satisfaction, as evidenced by the heightened financial concerns among students (Kálmán et al., 2021). Additionally, customer satisfaction with smaller banks is higher than with large banks, when the number of customer complaints is taken into account (Sedunov, 2020).

2.2. Reliability and perception of banks

The reliability of customer relationships is a crucial factor in the success and profitability of financial institutions. This aspect of business can be considered a proxy for the quality of service provided, which in turn affects customer satisfaction. Additionally, reliability can influence customer retention, which can be a strategic advantage for banks in the long term. This is particularly important in an increasingly competitive environment (Ibhar, 2004). Moreover, long-term customer retention contributes to the customer and financial institution experience, which can result in a mutually beneficial situation for banks and clients (Mohr and Nevin, 1990). This conclusion has been partly refuted and complemented by some research (Edith-Onajite-Hamilton-Ibama, 2020), which has identified a weak negative correlation between bank reliability and bank performance. However, this discrepancy may also be attributed to the differing levels of detail in the analyses, as in both cases the authors advocate for enhanced service reliability. In the context of

perception, previous research (Pisnik and Snoj, 2010) has demonstrated that perceived quality has a positive effect on satisfaction with a bank. Additionally, perceived value has been identified as a potential mediating variable, exhibiting a positive influence on customer satisfaction in a banking environment. This suggests that customer perception may influence satisfaction in parallel with reliability. Moreover, these factors are of equal importance for electronic banking services in addition to face-to-face banking (Nagar and Ghai, 2019). The financial attitudes of university students, which are influenced by their perceptions of economic security, also play a significant role in shaping their expectations and satisfaction levels with banking services (Zéman et al., 2023). Furthermore, consumer satisfaction is frequently contingent upon a multitude of factors, including the hours of operation, the conduct of staff, the time required for implementation, the availability of office space, the cost-to-quality ratio, the manner in which complaints are addressed, the popularity of the services offered, and the effective utilization of communication channels (Bena, 2021). These factors can also be conceptualized as elements of reliability and perception.

H1: The general opinion of the bank's reliability has a significant positive impact on customer satisfaction with the bank.

H2: The customer's perception of the bank's staff has a significant positive impact on their satisfaction with the bank.

The analysis of the relationship between perception and reliability is a significant endeavor due to the assumption that human perception and experience are not always reliable. The assessment of the reliability of quantified human reasoning is often challenging, if not impossible (Lupyan, 2017). Furthermore, the influence on customer perceptions may also impact the corporate performance of banks (Tulcanaza-Prieto et al., 2022), which makes the reliability-derived results of this research of interest from the perspective of bank management. The findings of psychological research indicate that individuals frequently perceive the reliability of their perceptions due to their assumption of an objective reality. However, it is evident that perception can be significantly influenced by specific cognitive processes, which generate useful representations from the perceived input. The findings of psychological research indicate that individuals frequently perceive the reliability of their perceptions due to their assumption of an objective reality. However, it is evident that perception can be significantly influenced by specific cognitive processes, which generate useful representations from the perceived input (Lupyan, 2017). A particularly intriguing issue within the banking services sector is the direct and indirect impact of perception on reliability and satisfaction, given the underlying psychological context is divisive.

H3: The general opinion of the bank's reliability has a significant positive impact on customers' perceptions of bank staff.

It is evident that there are substantial differences in demographic characteristics (e.g., gender, generation) that may influence the level of satisfaction with banks, that has been disputed by numerous studies (Bhat and Darzi, 2014). Some studies (Linn, 1975) have indicated that there is no significant difference in satisfaction based on gender, while other studies have demonstrated the opposite (Andrade et al., 2019; Weimann, 1985). Studies that have identified a difference have found that male tend

to be more assertive in their approach to service, while female customers tend to be more sensitive to the quality of service provided (Kwok et al., 2016; Weimann, 1985). Furthermore, age is a non-negligible moderating factor, as different generations have disparate customer needs in the banking sector. Additionally, older age groups may encounter difficulties with digital banking (Flaherty et al., 2017), which may result in disparate perceptions regarding the fundamental aspects of personal banking.

H4: The age group of the consumers has a significant impact on their satisfaction with the bank.

H5: The gender of the consumers has a significant impact on their satisfaction with the bank.

The results of previous studies, as well as the current research in the field, make it an exciting and interesting endeavor to test the hypotheses developed.

3. Methodology

The methodology is grounded in a complex statistical technique, namely structural equation modeling (SEM), that can be described as a combination of factor analysis and regression. In view of its inherent complexity, the application of SEM in this study is detailed in the following subsections.

3.1. General overview

The research is based on SEM, which has been used continuously and increasingly in psychological analyses since the 1970s. The complexity of the model allows for the exploration of relationships between manifest-latent and latent-latent variables, facilitating the examination of more intricate relationships and pathways. This is made possible by SEM's handling of a system of regression equations, which differs from the approach of simple and multiple linear regression due to its flexibility (Nachtigall et al., 2003). In this study, Partial Least Squares Structural Equation Modelling (PLS-SEM) was selected as the most appropriate structural equation modelling option, given the existing literature which suggests that this approach is well-suited to exploratory research (Hair et al., 2014b). PLS-SEM is a suitable method for maximizing the explained variance of endogenous latent variables, making it appropriate for data-rich but theory-poor research. Furthermore, PLS-SEM can be used in theory building, which can contribute new insights to the existing literature (Fornell and Bookstein, 1982; Hair et al., 2014b). In regard to the optimal sample size, the ten times rule is applicable. This stipulates that the sample size should be a minimum of ten times the size of the number of included manifest variables (Nunnally and Bernstein,1994; Ranatunga et al., 2020). This provides a suitable perspective for social science analyses that often rely on the results of questionnaire surveys that are easily and quickly accessible (Anderson and Gerbing, 1988; Sekaran, 2006).

The application of PLS-SEM encompasses a diverse array of social science research fields, including management (Ton et al., 2022), customer behavior (Szabó-Szentgróti et al., 2024), sustainability (Vinkóczi et al., 2024), and, with respect to this paper, bank satisfaction (Ahmed et al., 2021; Bhattacharya and Bera, 2023;

Jahan and Shahria, 2022; Suleiman and Abdulkadir, 2022). Accordingly, the selected application of PLS-SEM is considered an appropriate methodology for the analysis of the issue matter of this paper. The analyses were conducted using IBM SPSS Statistics 25 and SmartPLS 3.2.9.

3.2. Data collection

The use of questionnaires is an accepted method of data collection in PLS-SEM process (Zaato, 2023), and was therefore deemed an appropriate approach for the present study's investigation of consumer awareness. The methodology for data collection is outlined in **Table 2**.

Table 2. Details of the sample and data collection.

Property	Value
Data collection period	October to November 2023
Context	Hungary
Sampling method	purposive
Data collection format	online questionnaire
Data collection implementation	Google Forms
Main scale types	nominal, ordinal
Ordinal scale type	5-point Likert scale
Sample size	220
Valid responses	214
Validity rate	97.27%
Confidence level	95%

In addition to the Hungarian context, purposive sampling was a crucial element in this study, as the university community is likely to offer the most relevant knowledge into banking services, which is a pivotal aspect in the context of face-to-face banking. In order to maximize the probability of receiving a response, an online questionnaire format was selected for distribution in October and November of 2023. In accordance with the recommendations of the existing literature (Szili et al., 2022), two age groups were achieved for the purpose of making comparisons between younger and older age categories. In early October a preliminary testing phase was conducted with 15 respondents in a university context to ensure the accuracy and precision of the translation of the items from English into Hungarian. In order to ensure the effective transmission of information, a 5-point Likert scale (ranging from strongly disagree to strongly agree) was employed (Chen et al., 2015) in the PLS-SEM core aspect of the questionnaire. The respondents' demographic data were recorded using items measured on a nominal scale. The validity rate of the responses received during the data collection period, following the removal of responses with a standard deviation of less than 0.25, was 97.27% with 214 valid responses. The analyses were conducted with a confidence level of 95%, which is the most commonly used acceptance criterion (Simundic, 2008). In accordance with the recommendations set forth in the ten times rule for PLS-SEM, the number of manifest variables included in the construct could not exceed 21. Furthermore, the

existing literature on sample size for structural equation modeling indicates that a sample size of 100 is relatively small, 100-200 is considered medium, and a sample size exceeding 200 is regarded as large (Kline, 2005).

3.3. Exploratory factor analysis

The analysis was based on validated items, yet the composition of latent variables identified in a Nigerian analysis, which surveyed 282 working residents in Split (Suleiman and Abdulkadir, 2022), may differ from that observed in Hungary. Consequently, exploratory factor analysis (EFA) was deemed a necessary step to assess the validity, reliability and sufficiency of potentially novel latent variables the construct (Zhang et al., 2015). EFA was performed using maximum likelihood estimation and varimax rotation, as this is the recommended setting for questionnaire analyses in the field of social science (De Vellis, 2003). The basic criteria for the EFA also encompass these compliance points, the thresholds for which are delineated in **Table 3**. The correlations were calculated using Spearman's rho, given the ordinal scales used (Ritter, 2012).

Table 3. Indicators to be tested in EFA.

Test	Threshold	Role	Source
Correlation	<0.30	Item compliance	Habing (2003)
Kurtosis and skewness	−2 to +2	Normality	George and Mallery (2010)
Kaiser-Meyer-Olkin (KMO)	>0.60	Construct adequacy	Reddy and Kulshrestha (2019)
Variance inflation factor (VIF)	<5.00	Multicollinearity	
Cronbach's alpha	>0.60	Reliability	Akinwande et al. (2015); Ates, (2022); Hair et al. (2014b); Nunnally (1978)
Composite reliability (CR)	>0.60	Sufficiency, validity	
Average variance extracted (AVE)	>0.50	Sufficiency, validity	
Heterotrait-Monotrait Ratio (HTMT)	<0.90	Discriminant validity	Hair et al. (2021)

The aforementioned considerations are all highly pertinent to the construct under examination. However, in the case of PLS-SEM, the absence of a normal distribution does not constitute an exclusionary reason for performing the analysis (Hair et al., 2017). Nevertheless, it is beneficial to provide an overview of the deviation from the normal distribution (George and Mallery, 2010) prior to the application of the method. In contrast, the examination of multicollinearity is a prerequisite for all factor and regression-centered analyses. The potential implications of multicollinearity include increased standard errors and reduced statistical power, which may hinder the exploration of meaningful relationships between variables that are obscured within the construct (Kline, 2015; Kyriazos and Poga, 2023). In addition, the factor loadings should not exhibit a value below 0.7, which represents the minimum acceptable level for a PLS-SEM condition (Hair et al., 2021). Additionally, discriminant validity testing is a component of EFA. Two methods have been proposed for this testing: the Fornell-Larcker criterion and the heterotrait-monotrait ratio test (HTMT) (Hair et al., 2021). The former is specifically proposed for reflective measurement models. During the testing phase, it is essential

to ensure that the square root of the AVE is not exceeded by the values of the correlations between the latent variables. It is also imperative to ensure that HTMT values do not exceed 0.9, as this may lead to inconsistencies within the construct (Henseler et al., 2015; Radomir and Moisescu, 2019). The KMO value provides an overall indication of the adequacy of the construct with the following value limits: below 0.50 (unacceptable), 0.50–0.59 (miserable), 0.6–0.69 (mediocre), 0.70–0.79 (middling), 0.80–0.89 (meritorious), higher mint 0.9 (marvelous) (Darem, 2014).

3.4. Partial least squares structural equation modelling

The PLS-SEM approach allows for the examination of pathways between manifest-latent and latent-latent variables at the 95% confidence level selected for this study. The term "partial least squares" comes from the segmented approach to data analysis, making it appropriate for smaller sample sizes. The process involves multiple iterations, first refining the measurement model and then optimizing the structural model (Hair et al., 2014a; Hair and Alamer, 2022). Regarding the equation, the following steps constitute the initialization process for PLS-SEM (Lohmöller, 1989; Sarstedt et al., 2021):

Determination of internal weights:

$$Vji = f(x) = \begin{cases} cov(Y_j; Y_i) \\ 0 \end{cases}$$

$Y_j; Y_i$: *adjacent latent variables*

Internal approximation:

$$\tilde{Y}_j := \sum_i B_{ji} Y_i$$

b_{ij}: *inner weights*

Y_i: *adjacent latent variables*

Determination of outer weights:

$$\tilde{Y}_{jn} = \sum_{k_j} \widetilde{W}_{k_j} X_{k_j n} + D_{jn} \ Mode \ A \ Block \ for \ reflective \ method$$

$X_{k_j n}$: *raw data for indicator* $\widetilde{W}_{k_j}$: *outer weights*

D_{jn}: *error term from a bivariate regression*

Outer approximation:

$$Y_{jn} := \sum_{k_j} \widetilde{W}_{k_j} X_{k_j n}$$

$X_{k_j n}$: *raw data for indicator*

$\widetilde{W}_{k_j}$: *outer weights*

Subsequently, the equations are solved, thereby determining the external weights, external loads, and path coefficients, in addition to estimating the location parameters. This process is repeated until convergence is achieved in the PLS-SEM

(Sarstedt et al., 2021).

In PLS-SEM models, two types of latent variables can be distinguished: endogenous and endogenous latent variables. The latter can be used to explain other constructs in the model, whereas the former are the factors explained in the model. Additionally, mediator variables can be employed to measure the mediated effect of the exogenous latent variable on the endogenous latent variable (Hair et al., 2021). It is crucial to highlight that the present study applied the latter of the formative and reflexive measurement models for all latent variables when conducting PLS-SEM. This approach was selected due to its capacity to ascertain the descriptive capability of the latent variables, as opposed to the cause explanatory approach inherent to the formative measurement model (Kazár, 2014). However, the applicability of PLS-SEM is contingent upon compliance with model fit indicators. The two primary model fit indicators proposed in the literature (Rozman et al., 2020) are the normed fit index (NFI) and the standardized root mean square residual (SRMR). In regard to NFI, it is recommended that a value exceeding 0.5 and approaching 1 be applied for an optimal model fit (Lohmöller, 1989). Regarding SRMR, values below 0.08 are deemed acceptable (Rozman et al., 2020). In consideration of the evidence that substantiates the appropriateness of the complex construct for EFA and PLS-SEM, it is reasonable to proceed with the implementation of the model and to test the hypotheses.

4. Results

In consideration of the findings yielded, the results pertaining to the sample and the hypotheses tested in relation to the modeling can be duly reported in the following subsections.

4.1. Description of the sample

It is important to begin by describing the most important aspects of the sample (**Table 4**), which provides the frame of reference for the results in subsequent analyses.

Table 4. Descriptive statistics of the sample.

Variables and the coding of response options		*N*	*%*
Gender	Male (1)	61	28.5
	Female (2)	153	71.5
Age group	Born after 1995 (1)	149	69.6
	Born before 1995 (2)	65	30.4
Highest educational level	Secondary school (1)	128	59.8
	Higher vocational education (2)	16	7.5
	Bachelor (3)	50	23.4
	Master (4)	15	7.0
	PhD (5)	5	2.3

The sample structure exhibits partial consistency with the gender and educational distribution of universities with an economic profile. These institutions

demonstrate a higher proportion of female students and those enrolled in bachelor's programs (secondary or higher vocational education is the highest education level). The age groups were primarily classified according to generation. However, due to the suggestions of the existing literature (Szili et al., 2022) and the observed discrepancies in age distributions, two groups were created to implement comparisons between younger and older age groups. The data collected through purposive sampling was of sufficient quality for the proposed analyses. Furthermore, the demographic factors (nominal variables) available for assignment were suitable for testing hypotheses related to moderator variables.

4.2. Measurement results

The results of the EFA (**Table 5**) indicated that the construct was reasonable. The correlations between the included manifest variables are satisfactory, and no issues with multicollinearity are evident in the construct. The data indicate that there is no considerable divergence from the normal distribution for items measured on the ordinal scale, which is deemed suitable for PLS-SEM analysis. The KMO value indicates an excellent model fit, with a classification value exceeding 0.9 (marvelous). In regard to the conceptualization of the latent variables, the empirical evidence suggests that the construct items exhibit satisfactory levels of validity, reliability, and sufficiency. In regard to discriminant validity, the extant literature recommends the use of the HTMT test, as it can achieve higher specificity and sensitivity rates than the Fornell-Lacker criterion (Henseler et al., 2015). The construct developed in the present study is regarded as having satisfactory discriminant validity, as indicated by the HTMT value. Additionally, the Fornell-Lacker criterion was examined to ensure comprehensive detail in the analysis, which also confirmed the adequacy of the discriminant validity.

Table 5. EFA results.

Tests	Values	Acceptance
Correlation	between 0.353 and 0.738	yes
Kurtosis	between -0.630 and 0.460	yes
Skewness	between -0.738 and -0.124	yes
Kaiser-Meyer-Olkin (KMO)	0.922	yes
Variance inflation factor (VIF)	between 1.590 and 2.860	yes
Cronbach's alpha	between 0.757 and 0.902	yes
Composite reliability (CR)	between 0.892 and 0.927	yes
Average variance extracted (AVE)	between 0.718 and 0.805	yes
Heterotrait-Monotrait Ratio (HTMT)	0.774 and 0.845	yes

Overall, the included manifest variables and the constructed latent variables were appropriate for PLS-SEM analyze. However, as a preliminary step, it is essential to delineate the manifest and latent variables that constitute the construct identified through EFA (**Table 6**) before undertaking a review of the PLS-SEM results. Firstly, it is important to note that all included manifest variables were incorporated into the analysis based on the findings of Suleiman and Abdulkadir

(2022). In the construct created by EFA, a total of 3 latent variables were created involving 10 manifest variables, thus satisfying the ten times rule. The rule of thumb is that a sample of 100 would be sufficient for this construct. Furthermore, the loadings associated with the manifest variables also satisfy the requirements of PLS-SEM, exhibiting values above 0.7. The following were the model fit indicators for the PLS-SEM: NFI: 0.825; SRMR: 0.070

Table 6. Latent and manifest variables identified by EFA.

Latent variable	Manifest variable	Code	Loading
Satisfaction (S)	I am satisfied with products and services provided by my banks.	S_1	0.846
	I am satisfied with financial services advice.	S_2	0.856
	The overall service quality provided by my banks is excellent.	S_3	0.897
Perception (P)	Employees of bank are always willing to help customers.	P_1	0.864
	Employees of bank respond to customer request promptly.	P_2	0.835
	Employees of bank are polite and friendly staff.	P_3	0.854
	The bank employees are knowledgeable and give precise answers to our inquiries.	P_4	0.826
	I am satisfied with employees respond and prompt services.	P_5	0.857
Reliability (R)	The Bank employees provide services at the promised time.	R_1	0.896
	When you have problems, bank is able to solve problem and cooperate.	R_2	0.898

The model fit indicators met the requisite criteria, thus enabling an investigation of the paths within the construct (**Table 7**) based on the criteria established by the EFA and PLS-SEM. This was evaluated through the implementation of a bootstrap procedure utilizing a 2000-sample subset at the 95% confidence level. The results demonstrate that all the direct paths are significant, thereby confirming the hypothesized effect on bank satisfaction. Furthermore, the variance in satisfaction can be explained by perception and reliability together, accounting for 51.8% of the total variance, which is considered adequate ($R^2 > 0.5$) in social science research (Ozili, 2023). Furthermore, the model demonstrated that perception explained 49.2% of the variance in reliability. Additionally, indirect effects could be examined along the perception-reliability-satisfaction pathway. However, the present study was not primarily designed to investigate the mediator effect. Nevertheless, the results indicated that a partial mediator effect is present, as evidenced by the significant existence of both the total, indirect and direct pathways.

Table 7. Path coefficients determined by Bootstrap method.

Path	Original sample	Sample mean	Standard deviation	*T* statistics	*P*
Perception → reliability	0.702	0.701	0.044	15.903	<0.001
Perception → satisfaction	0.519	0.521	0.067	7.799	<0.001
Reliability → satisfaction	0.253	0.251	0.070	3.617	<0.001

Moreover, the results demonstrated that the direct effect is more pertinent ($\beta = 0.519$) than the indirect effect ($\beta = 0.253$). However, the partial effect indicated that decision-makers should consider both potential effects, as the predictors suggested that satisfaction was positively influenced in both types of paths. The same

bootstrapping adjustment was applied to identify any significant moderator effects (gender, age) in the model construct (**Table 8**).

Table 8. Path coefficients determined by Bootstrap method.

Path	Moderator variable	Original Sample	Sample mean	Standard deviation	*T* statistics	*P*
Perception → satisfaction	Age group	−0.026	−0.026	0.060	0.442	0.659
	Gender	0.004	0.005	0.066	0.066	0.948
Reliability → satisfaction	Age group	0.022	0.021	0.053	0.425	0.671
	Gender	0.024	0.023	0.063	0.375	0.708

The findings suggest that neither gender nor age significantly affects perceptions of consumer awareness, as measured by both perception and reliability paths.

4.3. Hypotheses testing

The results of the EFA and PLS-SEM tests are used to evaluate the hypotheses and are summarized in **Table 9**. The results substantiate the acceptance of 3 hypotheses, as evidenced by the significant positive impacts of direct pathways.

Table 9. Results of hypothesis testing based on PLS-SEM results.

Path	Reason standardized coefficient value (SCV), *T* statistic, *P*	Result
H1: R → S	SCV: 0.253, *T* statistic: 15.903, *P* < 0.001	Supported
H2: P → S	SCV: 0.519, *T* statistic: 7.799, *P* < 0.001	Supported
H3: P → R	SCV: 0.702, *T* statistic: 3.617, *P* < 0.001	Supported
H4: P → S or R → S moderated by age group	P → S UCV: −0.026, *T* statistic: 0.442, *P* > 0.050 R → S UCV: 0.022, *T* statistic: 0.425, *P* > 0.050	Not supported
H5: P → S or R → S moderated by gender	P → S UCV: 0.004, *T* statistic: 0.066, *P* > 0.050 R → S UCV: 0.024, *T* statistic: 0.375, *P* > 0.050	Not supported

The moderating effect of gender and age group on satisfaction through both perception and reliability was rejected due to the high significance values observed.

5. Discussion

In addition to a review of the results, an examination of the interpretability of the PLS-SEM construct results in the existing literature base is of particular importance. This is facilitated by the presentation of a more transparent form of the model in **Figure 1**, which includes both manifest-latent and latent-latent relationships.

A particularly crucial aspect of this analysis is the examination of the relationships that emerge from the factor loadings. These relationships can be identified by considering the descriptive ability of the latent variables, namely perception, reliability, and satisfaction, to be described by manifest variables. With regard to perception, willingness to assist customers ($\beta = 0.864$), as defined in the literature (Mulat, 2017) as part of responsiveness, is the item that most effectively

captures the perception of banking customers. It should be noted that willingness also encompasses expertise, as the absence of this quality leads to a deterioration in the perception of the service by customers. In another perspective, this attitude is the willingness of the bank, or the staff describing it to the customer, to provide quick and efficient assistance to the clients (Gupta and Agarwal, 2013). The perception is analyzed in this study as a combination of several latent variables, where willingness is interpreted as part of responsiveness, but its positive effect is also expressed here in terms of bank customer satisfaction. In psychological terms, perception can be understood as a consumer theory framework that is shaped subjectively through one's own or others' experiences, influencing consumer attitudes prior to or during the service process (Mcdonald, 2011). The findings of the present study indicate that this fundamental concept may serve as a foundation for the advancement of both banking reliability and banking satisfaction.
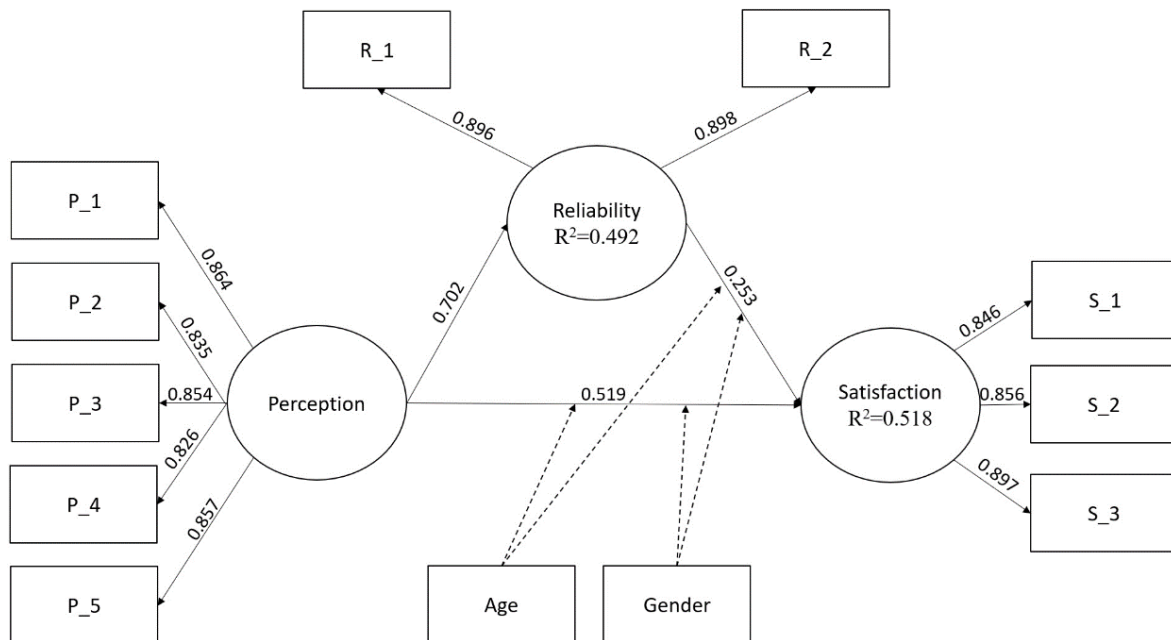

Figure 1. PLS–SEM model with standardized regression weights.

With regard to reliability, the item that most accurately represents the latent variable is cooperation in problem-solving ($\beta = 0.898$). This result is consistent with the findings of previous literature, which indicates that the business processes of modern banks are based on the dual objective of attracting and retaining customers through the exploitation of opportunities offered by cooperation. Therefore, transactional marketing has been superseded by customer relationship marketing, which cultivates long-term bank-customer relationships through cross-functional collaborations (Marko et al., 2015). These collaborations are accessible to banks in both face-to-face and online banking contexts, and it is crucial for banks to leverage them in both scenarios, as they enable banks to provide customers with more expedient and customized products (Pena-García et al., 2021). The banks' conformity to promised timelines ($\beta = 0.896$) is of closely equal relevance as cooperation. This factor is also a component of responsiveness (Mulat, 2017), but in the contemporary era, time has become a pivotal element for individuals, and its

utilization has undergone a transformation, as evidenced by the growing body of research in sociology examining the use of time and its alterations within the population (Cornwell et al., 2019). Reliability is a critical factor in determining the quality of service, which is reflected in customer satisfaction. When banks provide reliable services, consumers develop trust in them. This in turn requires bank employees to undergo continuous professional development in order to become long-term engaged employees (Gelencsér et al., 2024; Miah et al., 2024), so that they can handle more complex requests with confidence and without problems (Karpagam and Rajakrishnan, 2022). The present study corroborates this causal path and posits that reliability can be interpreted as an indirect effect of perception. Though the direct effect of perception is more pronounced, banks are advised to prioritize both factors due to the partial mediating effect.

The overall service quality item ($\beta = 0.897$) is the most accurate indicator of customer satisfaction with banking services. This result is also consistent with previous findings that link this factor to the presence of advanced technology and the delivery of customer-centric service to maintain a similar level of satisfaction (Gonu et al., 2023). The results of the present study indicate that, in addition to maintaining satisfaction, perceptual manifest variables (friendly service, responsiveness) may positively influence consumer satisfaction with banks. However, when positive Beta values are taken into account, these factors may not be the most dominant items in influencing consumer satisfaction as opposed to willing to help customers.

In regard to the moderator variables (gender, age), no significant impact was observed in the present study with respect to any of the pathways to satisfaction. The results may be in contradiction with those of some of the previous studies (El-Meouch et al., 2023; Flaherty et al., 2017; Szili et al., 2022; Weimann, 1985), but this may be attributed to the purposive university sample applied in this paper, the specific situation in Hungary (Szili et al., 2022) and the country's status as a laggard in the adoption of digital technologies (Nagy and Fazekas, 2018). In the context of the digital age, it is encouraging to note that face-to-face banking remains a preferred option among the Hungarian population pursuing studies or employment at the university level. This is the case despite the fact that the demographic is likely to possess the requisite knowledge to make informed decisions about banking services.

In Hungary, the pandemic has resulted in a notable shift towards digital financial services. The government and financial institutions have set forth objectives to curtail the use of cash, reinforce e-government, enhance financial literacy, and cultivate a resilient financial system. The country is demonstrating commendable advancement in this regard, as the banking system has attained a moderate level of digitalization, with customer relationships and products already exhibiting a high degree of digitization (Szemán et al., 2022). The proposals of the Hungarian Banking Association also indicate a further digitalization of banking processes, in accordance with international best practices. (Becsei et al., 2023) While such improvements in customer experience for international competitiveness appear to be novel, this research suggests that, in contrast to electronic banking, face-to-face banking should remain a significant component of the banking sector. In the context of a country's intensified embrace of digital technologies, it is crucial to recognize the continued necessity for face-to-face interactions. The transfer of emotions, for

instance, is a crucial aspect of financial transactions that cannot be fully replicated in an online platform. Consequently, it is vital to prioritize continuous training and retraining in human resources to equip banks with the requisite skills to navigate the ever-evolving digital landscape. This should be an integral component of banks' HRM roadmaps (Kuchciak and Warwas, 2021).

It can be observed that the government's actions may have unintended consequences for the public. This is evidenced by the discrepancy between the perception of bank branch closures in Hungary (El-Meouch et al., 2023) and the purported positive effects of digitalization. However, research on commercial banks in Hungary indicates that overheads and liquidity have a considerable negative impact on the profitability of commercial banks. This is due to the fact that bank size and asset quality are bank-specific factors that can generate these types of problems (Serwadda, 2018). Despite consumer expectations to the contrary (e.g., resistance to bank branch closure), banks must aim to reduce overheads, which makes defining optimal operating policies a challenging task. In relation to bank branch closures, it is also pertinent to mention that a European consumer survey revealed that individuals belonging to the older age group, those with limited educational attainment, and those residing in economically disadvantaged regions were the least inclined to switch banks. In Hungary, the bank switching rate was less than 10% in 2016 (Fernandez-Gutierrez and Ashton, 2024), which could be attributed to the country's aging population. However, this finding is inconsistent with the trend of branch closures and the role of face-to-face banking, as the results of the present study indicated that age did not exert a significant moderating influence on consumer satisfaction. In addition to a familiarity with technological advancements, it is crucial for banking professionals to possess a comprehensive understanding of work and communication principles. This knowledge can be effectively disseminated by banks as part of their knowledge management strategy (Akram and Hilman, 2018). Furthermore, it is imperative to ensure the availability of personalized services that align with consumer needs and can be delivered in a prompt and efficient manner. In the contemporary digital era, it is crucial for financial institutions to consider consumer expectations, which indicate a consumer preference for maintaining in-person banking services in Hungary, irrespective of gender or age group.

6. Conclusion

The topic of bank satisfaction has been the subject of numerous studies, yet the advent of contemporary globalization and digitalization trends necessitates further investigation in this domain. Accordingly, the present study's research question (What factors influence retail banking customers' satisfaction with personal banking?), which represents the primary objective of the study, can be considered to be answered by developing and comprehending the PLS-SEM construct.

The results also underscore the importance of the topic, particularly in light of the continued significance of face-to-face banking for individuals in a university environment. It is also important to highlight the role of time, which, in addition to keeping appointments, is influenced by the preparedness of banking staff. Customers who are well prepared on the subject expect to be properly informed on specific,

often complex issues, and thus the preparedness of the banking staff is a significant factor in determining customer satisfaction. It is crucial for banks to recognize these opportunities and integrate them into their operations. In order to do effectively, it is essential that they comprehend the role and impact of direct and indirect pathways between perception, reliability, and satisfaction factors. In consideration of these factors, banking management can develop strategies that facilitate the acquisition of new customers and the retention of existing customers over the long term. It should be noted that these steps are not facilitated by the current branch closure strategies in Hungary, where the distance from the institution may cloud the personal use of the service. It is crucial to emphasize that the training of bank employees and the assessment of their performance should constitute a fundamental element of the human resources strategy of the bank, from the perspective of meeting consumer needs. However, this necessitates that the banking strategy should also be aligned with the tenets of personal banking, as employees are expected to adhere to this institutional guideline (Bhatia and Kaur, 2021). This study contributes to the advancement of this managerial discourse by investigating the factors that influence customer satisfaction in the context of personal banking. Gaining insight into these factors can facilitate the formulation of strategic directions, even if determining them is not straightforward in terms of profitability.

It is important to note that the results of this research should be interpreted with caution, as they are based on a questionnaire database, which inherently requires a cross-sectional analysis (i.e., responses at a given point in time for a given sample). Furthermore, the sample was selected purposely, yet it does not encompass the entirety of bank customers, nor is it representative of the university community. Nevertheless, the analysis may indicate additional avenues for further research, which could be conducted on a proposed representative sample. A potential further decomposition of the latent variable of perception or the inclusion of additional moderator variables (e.g., income) could yield novel results. Overall, the partial identity and inconsistency of the results with other studies substantiate the contribution of the present study to the existing literature and underscore the necessity of extending the research direction to other populations.

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