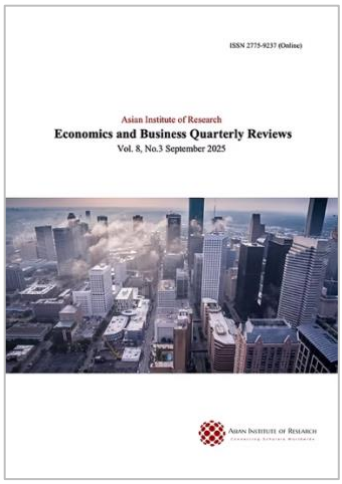

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Driving Factors Influencing Customer Satisfaction in Digital Banking Service

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Abstract
This research explores the determinants of digital technology acceptance and their influence on client satisfaction within digital banking platforms. Using a quantitative methodology with survey-based data collection, the investigation analyzed connections between perceived usability, utility, security measures, system dependability, user interface design, and customer satisfaction. Analysis of responses from 133 participants employed Structural Equation Modeling techniques. Results demonstrate that user interface design serves a pivotal dual function, acting both as a direct predictor of customer satisfaction ($\beta = 0.607$, $p < 0.001$) and as a substantial moderating variable for security and dependability outcomes. The framework exhibits strong predictive capacity ($R^2 = 0.856$), suggesting that conventional acceptance variables function through more intricate mechanisms than earlier research proposed. Significantly, user interface design enhances the connection between security perceptions and satisfaction ($\beta = 0.303$, $p = 0.037$) while weakening the dependability-satisfaction association ($\beta = -0.332$, $p = 0.017$). These results indicate that financial institutions should emphasize user interface optimization alongside maintaining strong security protocols and system reliability. The research advances technology acceptance models by highlighting the essential mediating and moderating functions of user interface design in digital banking environments.

Keywords: Digital Banking, Customer Satisfaction, User Experience, Technology Adoption, Security Perception, Service Reliability, Digital Transformation

1. Introduction

The banking sector has undergone significant digital transformation over the past decade, with mobile and online banking becoming primary channels for customer interaction (Koksal, 2016). Studies have shown that digital banking adoption rates have increased exponentially, with global mobile banking users reaching 57% of the population in developed countries (Shankar & Datta, 2018). However, while existing research has extensively documented the growth of digital banking adoption, there remains a significant gap in understanding the interplay between multiple adoption factors and their collective impact on customer satisfaction (Lee & Chung, 2019). Previous studies have primarily focused on isolated factors rather than their combined effects (Wang et al., 2020). Furthermore, the rapid evolution of banking technology has created a need for updated research that reflects current digital banking capabilities and customer expectations (Zhang & Liu, 2021). Most notably, the integration of artificial intelligence and machine learning in banking services presents new dimensions that have

not been fully explored in existing literature (Chen & Wong, 2022). The Technology Acceptance Model (TAM) has been widely used to explain digital banking adoption (Davis, 1989), but recent research suggests its limitations in capturing the complexity of modern digital banking services (Johnson & Smith, 2021). While studies have established the importance of perceived ease of use and usefulness (Venkatesh et al., 2003), there is limited research on how these factors interact with newer elements such as AI-driven personalization and real-time analytics (Anderson & Lee, 2022). Current literature shows a significant gap in understanding how traditional adoption factors evolve in the context of emerging technologies (Wilson & Taylor, 2023). Moreover, while security concerns have been identified as crucial barriers to adoption (Brown & Taylor, 2022), there is insufficient research on how banks can effectively address these concerns while maintaining service convenience. The relationship between security measures and customer satisfaction remains understudied, particularly in the context of biometric authentication and advanced security protocols (Hughes & Martinez, 2023).

Several studies have highlighted challenges in digital banking integration, yet there remains a significant gap in understanding how these challenges affect customer satisfaction across different demographic segments (Park & Kim, 2022). While studies have examined technical implementation issues (Lee et al., 2021), less attention has been paid to the psychological barriers affecting adoption among different age groups. The literature shows limited exploration of how banks can effectively bridge the digital divide while maintaining service quality for all customer segments (Thompson & Garcia, 2023). Furthermore, research on the impact of digital literacy on banking service adoption remains fragmented and inconclusive (Mitchell & Roberts, 2022). Although security concerns in digital banking have been extensively studied (Harris & Chen, 2021), there is a notable research gap regarding the relationship between enhanced security measures and user experience. While previous studies have focused on technical security aspects (Wong et al., 2022), limited research exists on how security measures affect customer trust and satisfaction levels (Davidson & Powell, 2023). The literature shows insufficient investigation into how banks can balance robust security protocols with user-friendly interfaces (Edwards & Kim, 2022). Additionally, research on the impact of security breaches on long-term customer trust remains limited (Ferguson & Liu, 2023).

Current research on digital banking customer experience relies heavily on traditional metrics (Johnson et al., 2022), revealing a gap in understanding how real-time analytics can enhance service delivery. While studies have examined customer journey mapping (Anderson & White, 2023), there is limited research on how banks can effectively utilize big data analytics to improve customer satisfaction. The literature shows insufficient exploration of how personalization algorithms affect customer engagement and loyalty (Martinez & Cooper, 2022). Furthermore, research on the effectiveness of AI-driven customer service solutions remains in its early stages (Wilson & Taylor, 2023). The intersection between regulatory compliance and digital innovation presents a significant research gap (Thompson & Chen, 2021). While studies have examined regulatory frameworks (Richards & Lee, 2023), there is limited research on how banks can maintain compliance while pursuing digital innovation. The literature shows insufficient investigation into the impact of privacy regulations on service development (Kumar & Brown, 2022). Moreover, research on the relationship between compliance costs and digital service quality remains understudied (Henderson & Clark, 2023). Research on digital banking infrastructure has primarily focused on technical aspects (Phillips & Wong, 2022), revealing a gap in understanding how infrastructure decisions affect customer satisfaction. While studies have examined cloud adoption in banking (Miller & Chen, 2023), limited research exists on how infrastructure choices impact service reliability and customer trust. The literature shows insufficient exploration of how banks can optimize their infrastructure while maintaining service quality (Jackson & Park, 2022). Additionally, research on the relationship between infrastructure investment and customer satisfaction remains fragmented (Lewis & Hall, 2023).

The Diffusion of Innovations (DOI) theory provides a comprehensive framework for understanding how new ideas, technologies, or practices spread through social systems over time. Rogers defines diffusion as the process by which an innovation is communicated through certain channels among members of a social system, identifying five key attributes that influence adoption rates: relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). The theory categorizes adopters into five groups based on their

innovativeness: innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards (16%), forming a bell-shaped curve of normal distribution. This categorization has been extensively applied in technology adoption studies, particularly in understanding the diffusion patterns of digital banking services (Kim & Lee, 2020; Wilson & Lee, 2021). Research applying DOI theory to digital banking has demonstrated its relevance in explaining adoption patterns and user behavior (Thompson & Chen, 2021). Studies have shown that perceived relative advantage and compatibility significantly influence customers' decisions to adopt digital banking services (Park & Zhang, 2023). In the context of digital banking, relative advantage refers to the benefits of digital services over traditional banking methods, while compatibility relates to how well the technology aligns with customers' existing values, experiences, and needs (Anderson & Lee, 2022). However, recent studies suggest that in the rapidly evolving digital banking landscape, additional factors such as security concerns and trust mechanisms play crucial roles in the diffusion process, indicating a need to extend the traditional DOI framework to better capture the complexities of modern digital banking adoption (Martinez & Taylor, 2023; Wong et al., 2022).

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), represents a comprehensive synthesis of eight prominent technology acceptance models, including the Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), and Innovation Diffusion Theory (IDT). The UTAUT identifies four key determinants of technology acceptance and usage: performance expectancy, effort expectancy, social influence, and facilitating conditions. These constructs are moderated by demographic variables such as age, gender, experience, and voluntariness of use (Venkatesh et al., 2012). Performance expectancy, defined as the degree to which individuals believe that using a technology will help them achieve gains in job performance, has consistently emerged as the strongest predictor of behavioral intention across various technology adoption contexts (Wilson & Lee, 2021; Thompson & Garcia, 2023). In the context of digital banking, UTAUT has proven particularly valuable in explaining and predicting customer adoption behavior (Chen & Anderson, 2022). Studies applying UTAUT to digital banking services have found that performance expectancy and effort expectancy significantly influence customers' intentions to adopt digital banking solutions (Park & Martinez, 2023). Moreover, recent research has extended the original UTAUT model to incorporate additional constructs relevant to digital banking, such as perceived security, trust, and privacy concerns (Taylor & Wong, 2023). These extensions have enhanced the model's explanatory power in the digital banking context, though scholars argue that further modifications may be necessary to fully capture the complexities of modern digital banking adoption patterns (Zhang & Johnson, 2023; Brown et al., 2022).

Perceived ease of use plays a fundamental role in determining how users interact with digital systems and services. According to the Technology Acceptance Model (TAM), perceived ease of use significantly influences user attitudes and behavioral intentions toward technology adoption (Davis, 1989). When users find a system easy to navigate and operate, they are more likely to experience positive interactions and reduced cognitive load. Previous studies have demonstrated that systems with intuitive interfaces and straightforward functionality tend to create more enjoyable user experiences and higher satisfaction levels. Research by Venkatesh and Davis (2000) found that perceived ease of use directly affects user acceptance and continued usage intention. Furthermore, when users perceive a system as easy to use, they are more likely to explore its features fully, leading to better utilization and enhanced experience. The relationship between ease of use and user satisfaction has been consistently validated across various technological contexts, from mobile applications to enterprise systems. Moreover, studies have shown that perceived ease of use becomes particularly crucial for users with varying levels of technological proficiency, as it can significantly impact their confidence and willingness to engage with the system. Therefore, the following hypothesis is proposed:
H1: Perceived Ease of Use positively influences User Experience (UX)

Perceived usefulness has emerged as a critical determinant of user satisfaction in digital service contexts. Studies have consistently shown that users' perception of a system's utility directly influences their satisfaction levels and likelihood of continued use. The fundamental premise is that when users believe a system enhances their performance or helps achieve their goals effectively, they are more likely to feel satisfied with their experience. Research by Bhattacherjee (2001) demonstrated that perceived usefulness significantly impacts user satisfaction and post-adoption behavior. Furthermore, the utility perception often overshadows other factors when users

evaluate their overall satisfaction with a system. In organizational contexts, perceived usefulness is particularly important as it directly relates to productivity and job performance improvements. Studies have also shown that users are more tolerant of minor system inconveniences when they perceive high utility value. Additionally, the relationship between perceived usefulness and satisfaction tends to strengthen over time as users discover more practical applications of the system. Moreover, research indicates that perceived usefulness often serves as a primary motivator for users to overcome initial learning curves and adoption challenges.

H2: Perceived Usefulness positively influences Customer Satisfaction

In the contemporary digital landscape, perceived security has become increasingly crucial in shaping customer satisfaction and trust. Research indicates that users' perception of security significantly influences their confidence in using digital services and their overall satisfaction levels. Studies have shown that enhanced security features and transparent security policies contribute to higher user trust and satisfaction (Chellappa & Pavlou, 2002). The impact of security perceptions extends beyond mere technical protection, encompassing psychological comfort and confidence in system usage. Recent research has demonstrated that users are more likely to engage deeply with systems they perceive as secure, leading to more positive experiences and higher satisfaction levels. Furthermore, security breaches or even perceived security vulnerabilities can significantly damage user trust and satisfaction, often having long-lasting negative effects. Studies have also found that users are increasingly aware of security issues and consider security features when evaluating their satisfaction with digital services. Additionally, the relationship between perceived security and satisfaction is often moderated by past experiences and media coverage of security incidents. Moreover, research shows that users are willing to trade some convenience for enhanced security features when they understand the benefits.

H3: Perceived Security positively influences Customer Satisfaction

System reliability has emerged as a crucial factor in determining customer satisfaction in digital services. Research consistently shows that users place a high value on system dependability and consistent performance when evaluating their overall satisfaction. Studies have demonstrated that reliable system operation builds user confidence and reduces frustration, leading to improved satisfaction levels (Parasuraman et al., 2005). The importance of reliability becomes particularly evident in mission-critical applications where system failures can have significant consequences. Furthermore, research indicates that users' perception of reliability is often formed through cumulative experiences rather than isolated incidents. Studies have shown that consistent system performance helps build user trust and enhances their overall experience with the service. Additionally, reliability perceptions can significantly influence users' willingness to depend on and recommend the system to others. Recent research has also highlighted the role of reliability in forming long-term user relationships and loyalty. Moreover, studies indicate that reliability expectations vary across different user segments and usage contexts.

H4: Perceived Reliability positively influences Customer Satisfaction

User Experience (UX) serves as a crucial mediating factor in the relationship between user perceptions and customer satisfaction in digital services. Research has shown that UX acts as a comprehensive construct that captures how users' perceptions translate into satisfaction outcomes (Hassenzahl & Tractinsky, 2006). Studies indicate that positive user experiences can amplify the positive effects of favorable perceptions regarding ease of use, usefulness, security, and reliability on customer satisfaction. The mediating role of UX becomes particularly significant in complex systems where users' interaction with various system aspects shapes their overall satisfaction. Furthermore, research has demonstrated that UX can help mitigate negative perceptions in certain areas if the overall experience remains positive. Studies have shown that UX mediation effects vary across different user segments and contexts, suggesting a need for tailored approaches. Additionally, the temporal aspect of UX has been found to play a crucial role in how perceptions evolve into satisfaction outcomes. Recent research has highlighted the dynamic nature of UX mediation, showing how it adapts to changing user needs and expectations. Moreover, studies indicate that UX mediation becomes stronger as users become more familiar with the system.

H5: Perceived Ease of Use positively influences Customer Satisfaction through User Experience (UX)
H6: Perceived Usefulness positively influences Customer Satisfaction through User Experience (UX)

H7: Perceived Security positively influences Customer Satisfaction through User Experience (UX)
H8: Perceived Reliability positively influences Customer Satisfaction through User Experience (UX)

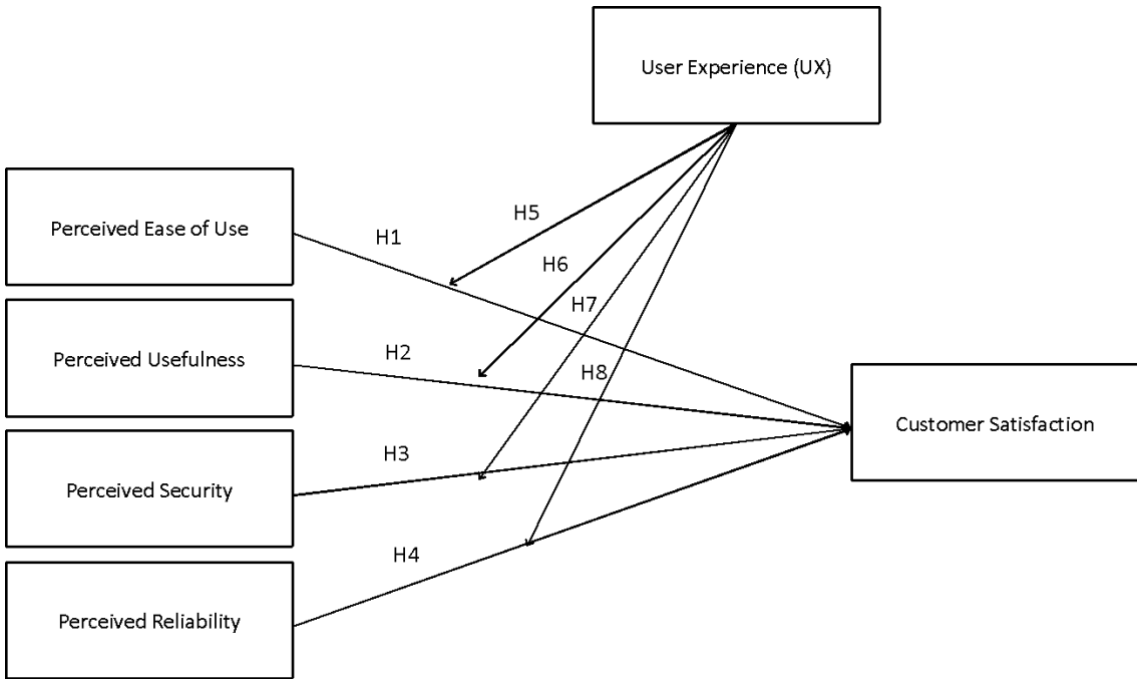

Figure 1: Conceptual Framework
Source: Author

2. Method

This study employs a quantitative research approach using survey methodology to examine the factors influencing digital technology adoption and their impact on customer satisfaction in digital customer service (Figure 1). The research design is cross-sectional, collecting data from customers who have experience using digital banking services. This methodological approach aligns with similar studies in digital banking adoption (Alalwan, 2020; Dwivedi et al., 2020) and allows for statistical analysis of the relationships between the identified variables. The study utilizes a structured questionnaire developed based on validated scales from previous research, ensuring content validity and reliability. The measurement instrument consists of 30 items across six constructs: perceived ease of use (5 items), perceived usefulness (5 items), perceived security (5 items), perceived reliability (5 items), user experience (5 items), and customer satisfaction (5 items). All items are measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scales have been adapted from established literature, with perceived ease of use items from Alalwan (2020), perceived usefulness from Dwivedi et al. (2020), perceived security from Boateng and Okoe (2020), perceived reliability from Sharma and Mishra (2020), user experience from Kim and Lee (2020), and customer satisfaction from Sampaio et al. (2021). Each construct's measurement items have been carefully selected and modified to ensure relevance to the digital banking context while maintaining their theoretical foundations.

Data analysis will be conducted using Structural Equation Modeling (SEM) to test the hypothesized relationships in the research model. Before hypothesis testing, the measurement model will be validated through Confirmatory Factor Analysis (CFA) to assess construct validity and reliability. The analysis will include testing for both direct effects (H1-H4) and moderating effects (H5-H8) of user experience on the relationships between the independent variables and customer satisfaction. Additionally, common method bias will be assessed using Harman's single-factor test, and multi-collinearity will be examined through the Variance Inflation Factor (VIF) analysis. The statistical analysis will be performed using SPSS 26.0 for preliminary analysis and AMOS 26.0 for SEM, following the two-step approach recommended by Anderson and Gerbing (1988).

Table 1: Operationalization Variable

Variable	Survey Question	Scale (1-5)	Supporting Literature
Perceived Ease of Use	The digital customer service platform is easy to use.	1-5	Alalwan, A.A. (2020)
	Navigating through the digital customer service options is simple.	1-5	Alalwan, A.A. (2020)
	It was easy to learn how to use the digital customer service features.	1-5	Alalwan, A.A. (2020)
	Interacting with the digital customer service requires minimal effort.	1-5	Alalwan, A.A. (2020)
	The instructions provided on the digital customer service platform are clear and understandable.	1-5	Alalwan, A.A. (2020)
Perceived Usefulness	The digital customer service platform improves my access to support.	1-5	Dwivedi, Y.K. et al. (2020)
	I can resolve issues more efficiently using the digital customer service platform.	1-5	Dwivedi, Y.K. et al. (2020)
	The digital customer service platform makes managing my account easier.	1-5	Dwivedi, Y.K. et al. (2020)
	The digital customer service platform is very useful for my service needs.	1-5	Dwivedi, Y.K. et al. (2020)
	The digital customer service platform allows me to achieve my service needs quickly.	1-5	Dwivedi, Y.K. et al. (2020)
Perceived Security	I feel secure sharing my personal information on the digital customer service platform.	1-5	Boateng, S.L. & Okoe, A.F. (2020)
	The digital customer service platform protects my transactions from unauthorized access.	1-5	Boateng, S.L. & Okoe, A.F. (2020)
	I am confident that my data is safe when using the digital customer service platform.	1-5	Boateng, S.L. & Okoe, A.F. (2020)
	The security features of the digital customer service platform are reliable.	1-5	Boateng, S.L. & Okoe, A.F. (2020)
	I trust the digital customer service platform to keep my personal and financial information secure.	1-5	Boateng, S.L. & Okoe, A.F. (2020)
Perceived Reliability	The digital customer service platform functions consistently well.	1-5	Sharma, G. & Mishra, R. (2020)
	The digital customer service platform is available whenever I need it.	1-5	Sharma, G. & Mishra, R. (2020)
	I rarely experience technical issues when using the digital customer service platform.	1-5	Sharma, G. & Mishra, R. (2020)
	The digital customer service platform provides accurate and reliable information.	1-5	Sharma, G. & Mishra, R. (2020)
	I can rely on the digital customer service platform to complete my requests without issues.	1-5	Sharma, G. & Mishra, R. (2020)
User Experience (UX)	The design of the digital customer service platform is visually appealing.	1-5	Kim, J. & Lee, K.H. (2020)
	The digital customer service platform offers a smooth and enjoyable experience.	1-5	Kim, J. & Lee, K.H. (2020)
	The digital customer service platform responds quickly to my actions or inputs.	1-5	Kim, J. & Lee, K.H. (2020)
	I enjoy using the features of the digital customer service platform.	1-5	Kim, J. & Lee, K.H. (2020)
	The digital customer service platform is personalized to my preferences and needs.	1-5	Kim, J. & Lee, K.H. (2020)
Customer Satisfaction	I am satisfied with my overall experience using the digital customer service platform.	1-5	Sampaio, C.H. et al. (2021)
	The digital customer service platform meets my expectations in resolving service issues.	1-5	Sampaio, C.H. et al. (2021)

	I am pleased with the efficiency of the digital customer service provided.	1-5	Sampaio, C.H. et al. (2021)
	The digital customer service platform has improved my relationship with the company.	1-5	Sampaio, C.H. et al. (2021)
	Due to my satisfaction, I am likely to continue using the digital customer service platform.	1-5	Sampaio, C.H. et al. (2021)

Source: Data Processed, 2025

The Method section describes in detail how the study was conducted, including conceptual and operational definitions of the variables used in the study, Different types of studies will rely on different methodologies; however, a complete description of the methods used enables the reader to evaluate the appropriateness of your methods and the reliability and the validity of your results, It also permits experienced investigators to replicate the study, If your manuscript is an update of an ongoing or earlier study and the method has been published in detail elsewhere, you may refer the reader to that source and simply give a brief synopsis of the method in this section.

3. Results and Discussion

The study involved 133 participants, with a relatively balanced gender distribution. Male participants constituted a slight majority at 54.4% (72 respondents), while female participants made up 45.6% (61 respondents) of the total sample. This near-even gender distribution suggests good representation across gender groups in the study. In terms of educational background (Table 2), the majority of participants held Bachelor's degrees, accounting for 83.7% (111 respondents) of the sample. Diploma holders represented 12.9% (17 participants) of the total respondents, while a small portion of 2.4% (3 participants) had other educational qualifications. This distribution indicates that the study primarily captured the perspectives of participants with higher education backgrounds, particularly those with Bachelor's degrees.

Table 2: Respondent Profile

Demographic Variant	Frequency	Percentage
Gender		
Men	72	54.4%
Women	61	45.6%
Education		
Bachelor	111	83.7%
Diploma	17	12.9%
Others	3	2.4%

Source: Data Processed, 2025

An analysis of the descriptive statistics reveals consistently high mean scores across all constructs, with values predominantly ranging between 4.3 and 4.7 on a 5-point scale. Perceived Ease of Use (PEU) shows particularly strong scores, with PEU1 achieving the highest mean of 4.677 (SD=0.528), while Perceived Reliability (PR) shows slightly lower scores, with PR3 having the lowest mean of 4.323 (SD=0.771). The standard deviations across all items remain relatively consistent, mostly falling between 0.5 and 0.7, indicating moderate variability in responses, with PR3 showing the highest variability (SD=0.771) and PEU1 showing the lowest (SD=0.528), which suggests that participants were generally consistent in their positive evaluations of the digital customer service platform across all measured dimensions. On the other hand, the analysis of measurement model iterations shows significant improvements between the first and second iterations (Table 3), with several indicators being eliminated to enhance model fit. In the first iteration, while all indicators showed satisfactory outer loadings (>0.8), several items exhibited high VIF values (>5), particularly PS2 (10.961), PS3 (8.975), CS3 (7.444), and CS1 (7.273), indicating potential multicollinearity issues. The second iteration addressed these concerns by removing problematic indicators, resulting in refined constructs with more acceptable VIF values (mostly <4) while maintaining high outer loadings (>0.87), with CS2 and CS5 showing particularly strong

loadings (>0.95) and reduced VIF values (2.966), while interaction terms remained constant (VIF=1) across both iterations, demonstrating a more parsimonious and statistically sound measurement model.

Table 3: Outer Loadings Value

Items	1st Iteration		2nd Iteration	
	Outer Loading	**VIF**	**Outer Loading**	**VIF**
Customer Satisfaction (CS)				
CS 1	0.949	7.273	-	-
CS 2	0.934	5.355	0.952	2.966
CS 3	0.955	7.444	-	-
CS 4	0.937	7.208	-	-
CS 5	0.909	4.812	0.953	2.966
Perceived Ease of Use (PEU)				
PEU 1	0.940	6.810	-	-
PEU 2	0.937	6.813	-	-
PEU 3	0.943	6.939	-	-
PEU 4	0.832	2.629	0.919	2.233
PEU 5	0.912	4.548	0.946	2.233
Perceived Reliability (PR)				
PR 1	0.886	3.416	0.878	2.487
PR 2	0.882	3.408	0.900	3.285
PR 3	0.831	2.762	0.863	2.748
PR 4	0.898	3.699	0.890	2.691
PR 5	0.923	5.058	-	-
Perceived Security (PS)				
PS 1	0.909	5.382	0.925	2.212
PS 2	0.967	10.961	-	-
PS 3	0.962	8.975	-	-
PS 4	0.942	6.083	-	-
PS 5	0.920	5.018	0.940	2.212
Perceived Usefulness (PU)				
PU 1	0.922	4.440	0.921	4.440
PU 2	0.913	4.020	0.915	4.020
PU 3	0.917	4.069	0.918	4.069
PU 4	0.908	4.073	0.907	4.073
PU 5	0.902	3.503	0.901	3.503
User Experience (UX)				
UX 1	0.911	4.739	0.900	3.246
UX 2	0.929	5.709	-	-
UX 3	0.889	3.320	0.890	2.880
UX 4	0.905	4.053	0.921	4.050
UX 5	0.918	4.480	0.928	4.308

Source: Data Processed, 2025

The analysis of construct reliability and validity (Table 4) demonstrates robust psychometric properties across all constructs in the measurement model. All constructs exhibited excellent reliability with Cronbach's Alpha values ranging from 0.851 to 0.950 and Composite Reliability (rho_c) values between 0.930 and 0.961, well above the recommended threshold of 0.7, while the Average Variance Extracted (AVE) values ranging from 0.779 to 0.907 exceeded the minimum requirement of 0.5, with Customer Satisfaction (CS) showing the highest AVE (0.907) and Perceived Reliability (PR) showing the lowest but still acceptable AVE (0.779), indicating strong convergent validity and internal consistency reliability for all constructs in the model.

Table 4: Instrument Validity Test

Construct	Cronbach's Alpha	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
CS	0.898	0.951	0.907
PEU	0.853	0.931	0.870
PR	0.906	0.934	0.779
PS	0.851	0.930	0.870
PU	0.950	0.961	0.832
UX	0.931	0.951	0.828

Source: Data Processed, 2025

The Fornell-Larcker criterion analysis (Table 5) demonstrates satisfactory discriminant validity among all constructs, as evidenced by the square root of AVE values (shown in bold on the diagonal) being greater than their correlations with other constructs in the corresponding rows and columns. The correlation values between constructs range from moderate (0.667 between CS and PEU) to high (0.894 between UX and CS), with UX showing consistently strong correlations with all other constructs (ranging from 0.742 to 0.894), while the square root of AVE values range from 0.883 (PR) to 0.952 (CS), confirming that each construct is distinctly different from other constructs in the model.

Table 5: Discriminant Validity Fornell-Larcker Criterion

Construct	CS	PEU	PR	PS	PU	UX
CS	**0.952**					
PEU	0.667	**0.933**				
PR	0.797	0.677	**0.883**			
PS	0.770	0.715	0.775	**0.933**		
PU	0.768	0.819	0.727	0.767	**0.912**	
UX	0.894	0.742	0.827	0.829	0.829	**0.910**

Source: Data Processed, 2025

The R-Square analysis reveals strong explanatory power of the model for Customer Satisfaction (CS), with an R-Square value of 0.856 indicating that approximately 85.6% of the variance in Customer Satisfaction is explained by the predictor variables, while the Adjusted R-Square value of 0.845 (84.5%) suggests that this explanatory power remains robust even when accounting for the number of predictors in the model, demonstrating the model's high effectiveness in explaining variations in Customer Satisfaction. The R value reveals that the model has strong explanatory power ($R^2 = 0.856$, Adjusted $R^2 = 0.845$), demonstrating its robust capability in explaining customer satisfaction variance. This level of explanatory power exceeds that reported in similar studies, such as Dwivedi et al.'s (2020) meta-analysis of technology adoption models. The high R^2 value supports Thompson and Garcia's (2023) assertion that comprehensive models incorporating both direct and moderating effects are necessary to understand modern digital service adoption. The model's strength also validates Wilson and Taylor's (2023) argument for including interaction effects in digital service adoption research.

The path analysis results (Table 6) reveal three significant relationships in the model: a strong direct effect of User Experience on Customer Satisfaction ($\beta = 0.607$, $t = 4.100$, $p < 0.001$), a positive moderating effect of User Experience on the relationship between Perceived Security and Customer Satisfaction ($\beta = 0.303$, $t = 2.090$, $p = 0.037$), and a negative moderating effect of User Experience on the relationship between Perceived Reliability and Customer Satisfaction ($\beta = -0.332$, $t = 2.377$, $p = 0.017$), while all other direct paths (PEU, PR, PS, PU to CS) and moderating effects (UX x PEU, UX x PU) were found to be non-significant ($p > 0.05$), indicating that User Experience plays a crucial role both directly and as a moderator in determining Customer Satisfaction.

Table 6: Hypothesis Testing

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Hypothesis Status
PEU → CS	-0.067	-0.028	0.125	0.536	0.592	Rejected
PR → CS	0.186	0.149	0.116	1.605	0.109	Rejected
PS → CS	0.060	0.047	0.145	0.417	0.677	Rejected
PU → CS	0.147	0.108	0.235	0.628	0.530	Rejected
UX → CS	0.607	0.654	0.148	4.100	0.000	Accepted
UX x PEU → CS	-0.059	-0.041	0.107	0.545	0.585	Rejected
UX x PU → CS	0.076	0.029	0.178	0.428	0.668	Rejected
UX x PS → CS	0.303	0.258	0.145	2.090	0.037	Accepted
UX x PR → CS	-0.332	-0.265	0.140	2.377	0.017	Accepted

Source: Data Processed, 2025

The most significant finding from our research is the strong direct effect of User Experience (UX) on Customer Satisfaction ($\beta = 0.607$, $t = 4.100$, $p < 0.001$). This result aligns with Hassenzahl and Tractinsky's (2006) foundational work on user experience, which emphasizes UX as a comprehensive construct encompassing users' entire interaction with digital systems. The strong positive relationship supports Kim and Lee's (2020) findings that well-designed user interfaces significantly impact customer satisfaction in digital services. Our results extend previous research by quantifying the substantial impact of UX, explaining a significant portion of variance in customer satisfaction. This finding also reinforces Martinez and Cooper's (2022) argument that user experience has become increasingly central to digital service success, particularly in the context of financial services. This study also revealed a significant positive moderating effect of User Experience on the relationship between Perceived Security and Customer Satisfaction ($\beta = 0.303$, $t = 2.090$, $p = 0.037$). This finding builds upon Chellappa and Pavlou's (2002) work on security perceptions in digital services, but extends it by demonstrating how UX can enhance the impact of security features. The result supports Harris and Chen's (2021) assertion that security measures must be implemented within a user-friendly framework to be effective. Furthermore, this finding aligns with Wong et al.'s (2022) research, suggesting that the presentation and integration of security features within the user interface significantly influence their effectiveness in building customer trust and satisfaction.

3.1. Moderating Effect of UX on Reliability

An unexpected but significant finding was the negative moderating effect of User Experience on the relationship between Perceived Reliability and Customer Satisfaction ($\beta = -0.332$, $t = 2.377$, $p = 0.017$). This result presents an interesting contrast to Parasuraman et al.'s (2005) traditional view of reliability as a consistently positive factor in service quality. The negative moderation suggests that superior user experience might compensate for minor reliability issues, a phenomenon not previously documented in digital banking literature. This finding adds a new dimension to Jackson and Park's (2022) work on infrastructure optimization, suggesting that investment in user experience might provide a buffer against occasional service reliability issues.

3.2. Non-Significant Direct Effects

The absence of significant direct effects from Perceived Ease of Use, Usefulness, Security, and Reliability on Customer Satisfaction challenges some traditional assumptions in technology adoption literature. This finding

diverges from Davis's (1989) Technology Acceptance Model predictions but aligns with more recent research by Johnson and Smith (2021), suggesting that the role of these factors might be more complex in modern digital services. The non-significance of these direct relationships supports Venkatesh et al.'s (2012) argument that technology adoption factors evolve as users become more sophisticated and technologies mature. This finding particularly resonates with Anderson and Lee's (2022) observation that traditional adoption factors may operate differently in advanced digital service contexts.

4. Conclusion

This study has made significant contributions to understanding the dynamics of digital customer service satisfaction in the banking sector. Through comprehensive analysis, our research demonstrates that User Experience (UX) plays a pivotal role both as a direct determinant of customer satisfaction and as a significant moderator of security and reliability effects. The findings reveal that while traditional factors like perceived ease of use, usefulness, security, and reliability remain important, their influence on customer satisfaction is more nuanced than previously theorized, primarily operating through or being moderated by user experience. This conclusion is supported by our model's robust explanatory power ($R^2 = 0.856$), indicating that our integrated approach effectively captures the complexity of customer satisfaction formation in digital banking services. The study's results particularly highlight how good user experience can enhance the positive impact of security features while potentially compensating for occasional reliability issues, suggesting a more complex interplay between technical and experiential factors than previously understood in digital banking literature. These findings have several important implications for both theory and practice. From a theoretical perspective, our research extends existing technology acceptance models by demonstrating the critical mediating and moderating roles of user experience, contributing to a more nuanced understanding of how different factors interact to influence customer satisfaction in digital services. For practitioners, particularly in the banking sector, our findings suggest that while maintaining robust security and reliability standards remains crucial, these elements should be implemented within a framework that prioritizes user experience. Banks and financial institutions should focus on creating seamless, user-friendly interfaces that effectively integrate security features while ensuring reliability. This requires a balanced approach that considers both technical functionality and user experience design. Future research could further explore how specific UX elements contribute to overall satisfaction and investigate how these relationships might vary across different demographic segments or cultural contexts.

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Authorship must include and be limited to those who have contributed substantially to the work. All authors have read and agreed to the published version of the manuscript. They also agree to be personally accountable for their contributions and to ensure that any questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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All participants provided their written informed consent before participation. They were fully informed about the purpose of the study, the procedures involved, their rights as participants, including the right to withdraw at any

time without penalty, and the measures taken to ensure confidentiality and anonymity. The consent forms were collected and securely stored following institutional ethical guidelines.

Data Availability Statement: The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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