

Development of a Customer Satisfaction Model for Mobile Banking Usage through a Gender Moderation Approach at HIMBARA Banks in East Java

Endie Rianto¹, Slamet Riyadi², Sri Utami Ady³

¹²³University of Dr. Soetomo, Indonesia.

mhs.endie.rianto@unitomo.ac.id *✉

ARTICLE INFO

ABSTRACT

Keywords:

Mobile Banking;
Customer
Satisfaction; SEM-
PLS; Gender;
HIMBARA Bank;
Moderation;

Background: Mobile banking services have become the primary channel for banking transactions in Indonesia, with HIMBARA Bank active users reaching 79.75 million in 2024. However, customer satisfaction levels remain variable, and the role of gender as a moderating factor has not been extensively studied.

Method: This study employs a quantitative approach using Structural Equation Modeling–Partial Least Squares (SEM-PLS) and Moderated Regression Analysis (MRA). Data were collected from 371 mobile banking users of HIMBARA Banks (Bank Mandiri, BRI, BNI, BTN) in five major cities in East Java. The independent variables consist of technology (X1), knowledge (X2), trust (X3), security (X4), and risk (X5), with usage decision (Z) as the intervening variable, gender (M) as the moderating variable, and customer satisfaction (Y) as the dependent variable.

Results: Technology ($\beta=0.175$; $p=0.001$) and knowledge ($\beta=0.231$; $p=0.000$) had a significant positive effect on customer satisfaction. Risk had a negative yet non-significant effect on satisfaction ($\beta=-0.029$; $p=0.599$). Trust ($\beta=0.047$; $p=0.405$) and security ($\beta=0.114$; $p=0.067$) were not found to have a significant direct effect on satisfaction. The mobile banking usage decision was proven to mediate the effects of technology, trust, security, and risk on customer satisfaction. Gender did not significantly moderate the relationship between usage decision and satisfaction ($\beta=0.020$; $p=0.597$). The R^2 value of customer satisfaction was 0.513.

Conclusion: The developed model confirms that technology and knowledge are the primary determinants of customer satisfaction among mobile banking users, while the usage decision plays an important role as a mediator. The key distinction from the original dissertation lies in the reduction of independent variables to five (removing rapid service and ease of use), yielding a more parsimonious model focused on intrinsic factors of digital banking technology adoption

Received: 10/30/2025

Revised: 1/20/2026

Accepted: 1/25/2026

How to cite this article:

Rianto, E., Riyadi, S., Ady, S.U. (2026). Development of a Customer Satisfaction Model for Mobile Banking Usage through a Gender Moderation Approach at HIMBARA Banks in East Java. *Sharia Economic and Management Business Journal (SEMBJ)*, 7(1), 330-336. <https://doi.org/10.62159/sembj.v7i1.2456>

INTRODUCTION

The Indonesian banking industry is experiencing a massive virtual evolution, marked by a significant increase in mobile banking service adoption. Data from Bank Indonesia (2023) recorded the value of digital banking transactions reaching IDR 13,328.52 trillion in 2023, while mobile banking transactions increased from IDR 1,159 trillion in 2016 to IDR 4,684 trillion in August 2021, representing a growth of more than 300% (Syahputra & Suparno, 2022). Specifically, HIMBARA Banks (Himpunan Bank Milik Negara/State-Owned Bank Association) recorded consistent active user growth: BRI through the BRImo application at 38.45 million users (growing 30.2%), Bank Mandiri through Livin' at 21.3 million users (growing 45%), BNI through wondr by BNI at 14.2 million users (growing 18.7%), and BTN Mobile at 5.8 million users (growing 22.3%) in 2024 (BRI, 2024; Bank Mandiri, 2024; BNI, 2024; BTN, 2024).

Despite the continued growth in mobile banking adoption, customer satisfaction with digital banking services remains a challenge. The phenomenon of gender disparity in mobile banking usage has also become a serious concern, as McKinsey (2023) reported a 23% gap between male users (67%) and female users (44%) in Indonesia. Data from OJK (2023) also indicate that the mobile banking activation rate among women is only 38%, far below men at 61%. This situation underscores the importance of examining the determinant factors of customer satisfaction in mobile banking usage, including the role of gender as a moderating variable.

In contrast to previous research, which generally tested seven variables simultaneously (Rianto, 2026), this study offers a more parsimonious model using five independent variables: technology, knowledge, trust, security, and risk, without including rapid service and ease of use. The justification for this variable reduction is based on two considerations: first, rapid service and ease of use are conceptually more related to interface quality, which is relatively standardized across HIMBARA Banks; second, focusing on the five core variables allows for a more in-depth examination of the intrinsic factors underlying digital banking technology adoption behavior.

This study is grounded in the integration of three major theories: the Theory of Buyer Behavior (TBB), the Technology Acceptance Model (TAM), and the Theory of Planned Behavior (TPB). The use of SEM-PLS and Moderated Regression Analysis (MRA) provides a methodological advantage in analyzing complex relationships among variables, including mediation and moderation effects simultaneously. The objective of this study is to develop a customer satisfaction model for HIMBARA Bank mobile banking users in East Java, considering the role of gender as a moderating variable, using five selected independent variables.

METHOD

This research utilizes a quantitative method with an clarifying and correlational design. The research population comprises mobile banking users at four HIMBARA Banks in East Java (Bank Mandiri, BRI, BNI, and BTN). A sample of 371 respondents was selected using a purposive sampling technique, distributed across five cities: Surabaya, Malang, Kediri, Madiun, and Jember.

The research variables consist of: (1) independent variables: technology (X1), knowledge (X2), trust (X3), security (X4), and risk (X5); (2) intervening variable: mobile banking usage decision (Z); (3) moderating variable: gender (M); and (4) dependent variable: customer satisfaction (Y). The fundamental distinction from previous research is the exclusion of the rapid service and ease of use variables, resulting in a model that is more focused on intrinsic factors of technology adoption.

Data were collected through a questionnaire using a 4-point Likert scale. Data analysis employed Structural Equation Modeling–Partial Least Squares (SEM-PLS) using SmartPLS 4.0 and Moderated Regression Analysis (MRA) for gender moderation testing. The measurement model was evaluated through outer loadings, Average Variance Extracted (AVE), Composite Reliability, Cronbach's Alpha, and discriminant validity (Fornell-Larcker Criterion and HTMT)."

Table 1. Demographic Profile of Respondents

Category	Sub-Category	Count (n)	Percentage (%)
Sex	Male	198	53.5%
	Female	173	46.5%

Dominant Age	26–35 years	148	40.0%
Education	Bachelor's Degree (S1)	168	45.4%
Occupation	Private Sector Employee	143	38.6%
Monthly Income	IDR 5–10 Million/Month	130	35.1%
Usage Duration	> 3 Years	140	37.8%
Frequency	Every Day	142	38.4%

Source: Primary Data Processed, 2025

RESULTS AND DISCUSSION

Measurement Model Evaluation (Outer Model)

All indicators exhibited outer loading values above 0.70, indicating satisfactory convergent validity. The AVE values of all variables exceeded 0.50, and both composite reliability and Cronbach's alpha surpassed 0.70. The following is a summary of the reliability and validity test results for the five-variable model:

Table 2. Construct Reliability and Validity

Variable	Cronbach's Alpha	CR (rho_a)	CR (rho_c)	AVE
Technology (X1)	0.900	0.906	0.938	0.834
Knowledge (X2)	0.944	0.945	0.955	0.780
Trust (X3)	0.926	0.928	0.953	0.871
Security (X4)	0.858	0.858	0.934	0.876
Risk (X5)	0.928	0.930	0.949	0.821
Usage Decision (Z)	0.766	0.766	0.851	0.589
Customer Satisfaction (Y)	0.847	0.851	0.897	0.686
Gender (M)	0.809	0.828	0.874	0.636

Source: SmartPLS 4.0 Output, 2025

Direct Effect Test

The results of the direct effect test (inner model) are presented in Table 3. In this five-variable model, the $X \rightarrow Y$ and $X \rightarrow Z$ relationships were tested without including rapid service (X6) and ease of use (X7). The obtained coefficient values represent the net effect of each variable after model reduction.

Table 3. Direct Effect Test Results

Variable Relationship	β	T-Statistic	P-Value	Remark
Technology (X1) \rightarrow Usage Decision (Z)	0.174	3.454	0.001	Significant
Knowledge (X2) \rightarrow Usage Decision (Z)	-0.009	0.168	0.867	Not Significant
Trust (X3) \rightarrow Usage Decision (Z)	0.160	2.829	0.005	Significant
Security (X4) \rightarrow Usage Decision (Z)	0.205	3.765	0.000	Significant
Risk (X5) \rightarrow Usage Decision (Z)	-0.169	2.882	0.004	Significant
Technology (X1) \rightarrow Customer Satisfaction (Y)	0.175	3.361	0.001	Significant
Knowledge (X2) \rightarrow Customer Satisfaction (Y)	0.231	3.661	0.000	Significant
Trust (X3) \rightarrow Customer Satisfaction (Y)	0.047	0.833	0.405	Not Significant
Security (X4) \rightarrow Customer Satisfaction (Y)	0.114	1.833	0.067	Not Significant
Risk (X5) \rightarrow Customer Satisfaction (Y)	-0.029	0.525	0.599	Not Significant
Usage Decision (Z) \rightarrow Customer Satisfaction (Y)	0.182	3.195	0.001	Significant
Gender \times Usage Decision \rightarrow Customer Satisfaction (Y)	0.020	0.529	0.597	Not Significant

Source: SmartPLS 4.0 Output, 2025

Indirect Effect Test (Mediation)

The results of the indirect effect test through the usage decision (Z) as a mediator are presented in Table 4. This test was conducted using bootstrapping with 5,000 subsamples.

Table 4. Indirect Effect Test Results (Mediation)

Mediation Path	Indirect β	T-Statistic	P-Value	Remark
Technology (X1) \rightarrow Z \rightarrow Customer Satisfaction (Y)	0.032	2.243	0.025	Significant (Partial Mediation)
Knowledge (X2) \rightarrow Z \rightarrow Customer Satisfaction (Y)	-0.002	0.159	0.873	Not Significant
Trust (X3) \rightarrow Z \rightarrow Customer Satisfaction (Y)	0.029	2.114	0.035	Significant (Full Mediation)
Security (X4) \rightarrow Z \rightarrow Customer Satisfaction (Y)	0.037	2.418	0.016	Significant (Full Mediation)
Risk (X5) \rightarrow Z \rightarrow Customer Satisfaction (Y)	-0.031	1.967	0.049	Significant (Full Mediation)

Source: *SmartPLS 4.0 Output, 2025*

Coefficient of Determination (R Square)

Table 5. Coefficient of Determination

Variable	R Square	R Square Adjusted	Interpretation
Customer Satisfaction (Y)	0.513	0.499	Moderate–Strong
Usage Decision (Z)	0.532	0.523	Moderate–Strong

Source: *SmartPLS 4.0 Output, 2025*

Discussion

Effect of Technology on Customer Satisfaction

Technology was proven to have a significant positive effect on customer satisfaction ($\beta=0.175$; $T=3.361$; $p=0.001$). This finding is consistent with Zainul et al. (2020), who found that information technology has a significant effect on customer satisfaction at Bank Syariah Mandiri. The outer loading values of the technology indicators ranged from 0.905 to 0.927, indicating that transaction speed, application utility, and support for daily financial activities are the technology dimensions that most strongly influence satisfaction. In this five-variable model, the effect of technology becomes more prominent as it is not "compressed" by the ease of use variable, which shares a close conceptual relationship with technology.

Effect of Knowledge on Customer Satisfaction

Knowledge is the variable with the strongest direct effect on customer satisfaction in this model ($\beta=0.231$; $T=3.661$; $p=0.000$). This finding is in line with Hastuti et al. (2024), who found that knowledge has a significant effect on the satisfaction of BSI Mobile users ($t=4.620$; $p=0.000$). Customers who possess strong digital literacy, are able to optimally utilize various mobile banking features, and can evaluate the suitability of services to their needs tend to exhibit higher levels of satisfaction. The grand mean of the knowledge variable at 3.18 indicates a reasonably adequate level among HIMBARA Bank customers in East Java.

Effects of Trust and Security on Customer Satisfaction

Trust ($\beta=0.047$; $p=0.405$) and security ($\beta=0.114$; $p=0.067$) were not proven to have a significant direct effect on customer satisfaction. However, both were found to have a significant effect on the usage decision (trust: $\beta=0.160$; $p=0.005$; security: $\beta=0.205$; $p=0.000$), and the usage decision significantly mediates the effects of both on satisfaction. This finding indicates that trust and security function as hygiene factors in mobile banking usage—their absence diminishes the usage decision, but their presence does not directly generate higher satisfaction.

Effects of Risk on Customer Satisfaction and Usage Decision

Risk had a significant negative effect on the usage decision ($\beta=-0.169$; $p=0.004$), yet was not significantly related to satisfaction directly ($\beta=-0.029$; $p=0.599$). Through the mediation path, risk was proven to have a significant negative effect on satisfaction via the usage decision ($\beta=-0.031$; $p=0.049$). This finding affirms that cyber risk management (phishing, social engineering) should be prioritized by HIMBARA Banks as a strategy to enhance usage confidence, which ultimately contributes to customer satisfaction.

Moderating Role of Gender

Gender was not proven to moderate the relationship between the usage decision and client contentment ($\beta=0.020$; $T=0.529$; $p=0.597$). This finding differs from Sofyan et al. (2024), who found a significant gender moderation effect in conventional customer service settings, but is consistent with the argument that digital mobile banking services are increasingly gender-neutral as digital inclusion rises. The HTMT value for gender at 0.371, well below the 0.90 threshold, confirms that gender is a distinct and precisely measured variable, yet does not possess a meaningful moderating effect in the context of HIMBARA Banks.

CONCLUSION

This study successfully developed a comprehensive customer satisfaction model for mobile banking users of HIMBARA Banks in East Java by integrating five independent variables, namely technology, knowledge, trust, security, and perceived risk, with the mobile banking usage decision serving as an intermediary variable and gender acting as a variable that moderates. The results demonstrate that technology and customer knowledge are the most influential determinants of customer satisfaction, with knowledge exhibiting the strongest direct effect on satisfaction. This result indicates that customers who possess an improved comprehension of cellular banking features, digital financial services, and transaction procedures are greater inclined to experience increased levels of contentment. Likewise, advanced technological capabilities, including system dependability, simplicity of use, and application execution, contribute significantly to enhancing customer satisfaction. Although trust and security do not exert significant direct effects on customer satisfaction, the results reveal that both variables play essential roles as prerequisite elements that motivate clients to make the decision to utilize cellular banking applications. In other words, trust and security influence satisfaction indirectly through the mediation of the mobile banking usage decision, suggesting that customers must first perceive the service as trustworthy and secure before they are willing to adopt and continuously use the application, ultimately leading to greater satisfaction. Similarly, perceived risk also affects client contentment via the same intermediary mechanism, emphasizing the importance of minimizing users' perceived uncertainties in digital financial transactions. The mediation analysis further confirms that the choice to utilize cellular banking considerably transmits the effects of technology, trust, security, and perceived risk to customer satisfaction. This finding highlights the strategic importance of customer adoption behavior as an intermediate process that transforms technological and psychological factors into positive satisfaction outcomes. Consequently, increasing clients' readiness to utilize mobile banking services should become a central objective in digital banking strategies. Furthermore, the moderation analysis indicates that gender does not significantly influence the connection among cellular banking utilization decisions and client contentment. This finding proposes that the utilization and satisfaction patterns of cellular banking support among HIMBARA Bank customers have become increasingly gender-neutral, reflecting the broad acknowledgment and accessibility of virtual banking technologies beyond both male and female users. The lack of a noteworthy facilitating impact implies that customer satisfaction is primarily determined by service quality and user experience rather than demographic differences based on gender. From a methodological perspective, the proposed parsimonious model, consisting of five independent variables, successfully explains 51.3% of the variance in clients satisfaction ($R^2 = 0.513$), achieving descriptive strength comparable to the original seven-variable model while offering a more concise, focused, and interpretable framework. This demonstrates that a simplified model can effectively capture the essential determinants of customer satisfaction without sacrificing predictive capability. The managerial implications of this study emphasize that HIMBARA Banks should prioritize initiatives aimed at improving customers' digital literacy and financial technology knowledge through continuous education and training programs. In addition, banks should invest in the development of innovative,

user-friendly, and reliable mobile banking technologies while simultaneously strengthening cybersecurity infrastructures to enhance customer confidence and encourage sustained usage. Since trust and security contribute indirectly through the usage decision, strategies designed to increase customer adoption are expected to generate substantial improvements in overall satisfaction. Finally, future studies are encouraged to investigate additional moderating variables, like age, level of education, digital literacy, revenue level, and frequency of mobile banking usage, which may provide stronger explanatory power than gender in understanding customer satisfaction within the rapidly evolving digital banking environment in Indonesia.

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