

Mobile Banking Service Quality and Customer Loyalty: Sequential Mediation of Customer Trust and Perceived Risk through Customer Satisfaction: Evidence from Commercial Bank of Ethiopia in Afar Region

Abdu Kamil Abdu; and Saeid Mohammed Yimer

Department of Management, Samara University, Semera, Ethiopia.

Corresponding author: abkamilyahoo4569@gmail.com

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Abstract

The study examines the effects of mobile banking service quality on customer loyalty through perceived risk, customer trust, and customer satisfaction. An explanatory research design with a quantitative approach was used. Data were collected from mobile banking users of the Commercial Bank of Ethiopia in Afar region using convenience sampling technique. PLS-SEM was employed to assess both measurement and structural models. Mobile banking service quality reduces perceived risk and strongly increases customer trust. Customer satisfaction is the strongest predictor of loyalty. Simple mediation results show significant indirect effects through perceived risk, trust, and satisfaction. The sequential mediation confirms that trust and satisfaction form powerful pathway to loyalty. Banks should prioritize trust building and service quality improvements to enhance customer satisfaction and loyalty. The study integrates perceived risk and customer trust as dual mediators to explain customer loyalty in mobile banking service quality.

Keywords: Mobile Banking Service Quality, Perceived Risk, Customer Trust, Customer Satisfaction, Customer Loyalty, Sequential Mediation.

Introduction

The global financial system is undergoing a rapid digital transformation in which mobile banking has emerged as a central mechanism for delivering financial services beyond physical boundaries (Sahar *et al.*, 2025). Among digital banking services, mobile banking becomes important innovations in banking industry to get a competitive advantage in the market (Khan *et al.*, 2021). The rapid development of technology in the financial services sector has become the norm in recent years (Khera, 2023). This innovation has changed the dynamics of the banking sector by allowing both firms and individuals to conduct business activity without having to go to the bank (Anisimova & Komisarov, 2020). Mobile banking becomes a central strategy for banks, driving growth and facilitating customer transactions. It allows customers to perform any transaction anytime and anywhere, which saves precious time (Sahoo & Pillai, 2017). It provides services such as account information, payment processing, deposits, withdrawals, transfers, investments, ATM servicing, and other content related services (Markoska *et al.*, 2017).

The emergence and incrementing significance of the service industry has made the measurement of service quality increasingly important (Ghotbabadi *et al.*, 2015). In terms of mobile banking, both the providers and the users benefit greatly. It offers an expanded client base, improved safety, and lower operational expenses for the banks (Orina & Ochogo, 2021). Service quality means the distinction between the anticipation of the customer and the actual performance level that is observed (Gakere, 2016). High-quality service improves customer satisfaction and reduces customer attrition (Thakur, 2018). Service quality is therefore a key metric for measuring e-banking user satisfaction, and researchers have extensively studied the relationship between the two (Parasuraman, 2002).

Recent worldwide studies have emphasized the significant role of mobile banking service quality in customer satisfaction and loyalty such as Lee and Hwan (2005) in Taiwan, Ngo *et al.* (2016) in Vietnam, Kumar *et al.* (2024) in India, Zhou *et al.* (2021) in Singapore, Sasono *et al.* (2025), and Jimenez *et al.* (2016) in Mexico. These studies recognized mobile banking as a powerful tool for emerging financial inclusion and reduce service delivery gaps.

Similarly, in Africa, adoption of digital banking technologies significantly improve access to financial services and enhance customer satisfaction. For example, Meshack and Mutuku (2023) studied in Kenya, Fidelis *et al.* (2025) conducted in Nigeria, Masoma and Maduku (2025) in South Africa, Boateng *et al.* (2021) in Ghana, and Shipekesa (2025) in Zambia have identified the dimension of service quality of mobile banking such as transaction speed, security, convenience, efficiency, and accessibility as key drivers of customer satisfaction. Mobile banking is the most popular e-banking platform in among the technological facilities deployed by the commercial banks in Ethiopia, alongside internet banking, ATMs, and POS systems (Tessema *et al.*, 2026). Studies on various banks have also highlighted the importance of mobile banking as embraced as strategic innovation to improve customer experience and operational performances. Beshir and Zelalem (2020), Geressu (2024), Ketema (2020), Teshome *et al.* (2025) and Tessema *et al.* (2026), have mentioned in their respective works regarding the mobile banking system with customer satisfaction and loyalty.

Customer satisfaction is widely acknowledged as a critical determinant of long-term customer retention and organizational success in banking sectors (Sari *et al.*, 2025). High quality mobile services are generally associated with increased level of customer satisfaction due to their ability to meet or exceed customer expectations (Ayinaddis *et al.*, 2023). Nevertheless, the relationship between mobile banking service quality is not always direct, as it is often influenced by the intervention of psychological factors (Ranjan, 2025). Among these factors, customer trust plays a crucial role in building confidence and reducing perceived risks, which makes individuals more comfortable with and willing to adopt mobile banking services (Legass & Durmuş, 2024). A study found that both mobile banking service quality and customer trust have effect on customer satisfaction (Pratiwi & Pinem, 2022). Another study confirm that mobile banking service quality influences customer trust and

their trust affect their satisfaction (Rouf *et al.*, 2024). Moreover, Erdem (2025), Khatoon *et al.* (2020), and Koo and Wati (2010) found that customer trust mediate in the relationship between service quality and customer satisfaction.

Despite the widespread availability of mobile phones and the growing popularity of mobile banking over e-banking among bankers, adoption of mobile banking for transactions and accessing financial information has not reached its full potential (Addula, 2025). In Ethiopia, banks face increasing competition, making the delivery of quality service through new technologies and the creation of customer satisfaction crucial for success (Mengist & Kassaye, 2025; Yimer *et al.*, 2026). While these banks are actively participating in the global advancement of mobile banking services (Kassaye & Alamirew, 2025), the growth of mobile banking users, particularly in terms of transaction volume and active engagement, lags behind traditional banking methods (Chali, 2026).

Previous studies on mobile banking services have limitations. Many, such as Alexis and Chen (2019) and Lwin *et al.* (2019), focused on specific aspects like ATMs and internet banking, neglecting a comprehensive examination of mobile banking quality. Some studies suffered from small sample sizes Farah *et al.* (2018) and Mwendwa *et al.* (2016), limiting generalizability, while others Hijazi (2022), and Shankar *et al.* (2022) employed qualitative methods, which may not be much enough. Furthermore, some studies Adewoye (2013) lacked robust theoretical grounding, and most of studies have methodological gap since they have conducted without the mediation analysis. Pastoral communities such as in the Afar region of Ethiopia, represent unique context characterized by mobility, limited infrastructure, distinct socio-economic practices. In conclusion, although extensive research has examined mobile banking service quality and customer loyalty, most existing studies have focused either on direct relationships or on single mediation mechanisms such as trust or satisfaction independently. This narrow focus limits a deeper understanding of how customer loyalty is formed through more complex psychological processes. In particular, limited empirical attention has been given to sequential mediation pathways that explain how perceived risk and trust jointly influence customer satisfaction before leading to loyalty. Furthermore, the interaction between trust and perceived risk within a unified behavioral model remains underexplored in existing literature. These gaps are more pronounced in developing and emerging regional contexts, where digital banking adoption is influenced by unique infrastructural and socio-economic challenges. Therefore, there is a need for an integrated model that explains customer loyalty through sequential psychological mechanisms, particularly in under-researched settings such as the Afar region.

Literature Review

Theoretical Foundations

This study integrates complementary theoretical perspectives to explain mobile banking service quality and its effect on customer loyalty through perceived risk, customer trust, and customer satisfaction. The SERVQUAL model provides core foundation for defining

service quality in terms of reliability, responsiveness, assurance, empathy, and tangibility which in mobile banking translate into system performance security and user experience (Parasuraman *et al.*, 1988; Zhou *et al.* 2021). This study is grounded in the Stimulus-Organism-Response (SOR) theory, which provides a comprehensive lens for understanding customer behavioral responses in digital banking environments. In this framework, mobile banking service quality represents the external stimulus that shapes customers' internal psychological states, including trust and perceived risk. These internal states represent the organism component, where trust functions as a positive cognitive belief in the system, while perceived risk reflects uncertainty and security concerns. These psychological evaluations subsequently influence customer satisfaction as an effective response. Finally, satisfaction drives the behavioral response, which is customer loyalty toward mobile banking services. Accordingly, trust is expected to reduce perceived risk, while perceived risk negatively affects satisfaction, and satisfaction serves as a key determinant of loyalty. This theoretical integration provides a clear and structured explanation of how service quality translates into customer loyalty through sequential psychological mechanisms. The stimulus-organism-response theory explains how service quality act as an external stimulus that shapes internal psychological states such as perceived risks, trust, and customer satisfaction which subsequently drive customer loyalty (Adewoye, 2013; Arora & Banerji, 2024; Türkdemir *et al.*, 2023; Wei *et al.*, 2025). The technology acceptance model and unified theory of acceptance and use of technology framework further classify adoption behavior by highlighting perceived risk and trust as key determinants of customer loyalty (Apau *et al.*, 2025; Dewi & Purnamasari, 2026; Marikyan & Papagiannidis, 2024). The DeLone and McLean information system success model supports the central role of service quality in driving customer satisfaction and continuance intention (Chand *et al.*, 2026; DeLone & McLean, 2003). Expectations-confirmation theory and relationship marketing theory explains how satisfaction emerges from expectation fulfillment and evolves into long-term loyalty through trust and value creation (Morgan & Hunt, 1994; Oliver, 1980). Collectively. These theories provide a robust framework linking service quality to customer loyalty through sequential cognitive and affective mechanisms.

Mobile Banking Service Quality and Perceived Risk

Mobile banking service quality has become determinant factors of risk perceptions where higher quality reduces uncertainty and vulnerability in digital transactions (Almaiah *et al.*, 2023; Ananta & Fitri, 2025). Reliable system performance, fast transaction processing and intuitive interfaces enhance user confidence thereby lowering perceived financial and performance risks (Palamidovska-Sterjadovska *et al.*, 2025). Security and privacy features are core in mobile banking service quality that directly mitigate perceived risks (Terlizzi *et al.*, 2026). Furthermore, responsiveness an effective customer support reduces psychological and time related risk by assuring users that problems will be promptly resolved (Jangir *et al.*, 2022). In turn, reduced perceived risk enhances trust and encourages

continued usage, suggest that service quality operates as risk buffering mechanism in digital financial service (Almaiah *et al.*, 2023).

H₁: There is negative relationship between mobile banking service quality and perceived risk

Mobile Banking Service Quality and Customer Trust

Mobile banking service quality is a key antecedent of customer trust in digital financial services. Recent studies show that system reliability, reliability, security, responsiveness, an ease of use positively influence user's trust by signaling competence and reducing uncertainty (Abdullah *et al.*, 2023; Chen & Lin, 2024). High quality service delivery enhances confidence in transactions and strengthens user's belief in the bank (Li *et al.*, 2023). Conversely, poor service performance such as system failure or security concerns undermine trust and discourages continued usages (Anaam, 2025; Rahma & Akter, 2023). Empirical evidence consistently confirms that service quality act as a primary driver of trust formation in mobile banking environments (Singh & Srivastva, 2025; Zhao *et al.*, 2024). Therefore, improving mobile banking service quality is essential to build and sustain customer trust.

H₂: There is positive relationship between mobile banking service quality and customer trust

Perceived Risk and Customer Satisfaction

Perceive risk plays a critical role in shaping customer satisfaction in digital and financial service environments. It is a subjective expectation of customers about the potential losses such as financial, privacy, performance or security failures when using a service, which leads to reduction of customer satisfaction (Jangir *et al.*, 2023). In fintech and mobile banking contexts, higher perceived risk negatively influences user satisfaction by increasing anxiety and reducing perceived service value (Abikari, 2026). Empirical evidence how that when users perceive strong security and privacy threats, their satisfaction declines (Daoud *et al.*, 2026). Moreover, perceived risk has been shown to weaken post adoption satisfaction by undermining trust and increasing cognitive discomfort during service use (Li *et al.*, 2023). Consequently, reducing perceived risk through improved security, transparency, and reliability is essential for enhancing the level of customer satisfaction.

H₃: There is negative relationship between perceived risk and customer satisfaction

Perceived Risk and Customer Loyalty

Customer loyalty is strongly influenced by perceived risk as customers tend to remain committed to digital service only under uncertainty about financial loss, privacy breaches, or service failure is minimized. Previous researches in fintech environment demonstrated that higher perceived risk significantly reduces trust and weakens long term loyalty intentions (Alrawad *et al.*, 2023). In mobile digital platforms, perceived risk negatively affects both trust and continued usage behavior (Li *et al.*, 2025). Similarly, research on digital banking confirms that security concerns and perceived vulnerability lower customer's willingness to stay loyal when the service quality is high (Ajouz *et al.*, 2025). Moreover,

studies in banking apps demonstrated that the risk perception indirectly reduce loyalty by hurting the satisfaction level (Chen *et al.*, 2022; Trivedi, 2019).

H₄: There is negative relationship between perceived risk and customer loyalty

Customer Trust and Customer Satisfaction

Customer trust refers to a willingness, beliefs and perceptions of customers that a firm will act reliably, honestly, and in their best interest in a given situation (Reiersen, 2017). Trust reflects confidence in the service provider's integrity and competence, and it reduces perceived risk when customers must depend on the provider for products or services (Hassan & Basit, 2021). Customer trust is usually linked to customer expectations concerning the organization's capability to keep its promises (Rukmi *et al.*, 2026). It lays for the firm to maintain customer loyalty (Elizar *et al.*, 2020). In the mobile and digital banking context, customer trust becomes essential for building confidence during the usage of mobile banking particularly for security, privacy, reliability and performance. In this view, customer trust is not a one-time belief but a sustainable and consistent psychological state shaped by repeated interactions with the system (Che *et al.*, 2023).

H₅: There is positive relationship between customer trust and customer satisfaction

Customer Trust and Customer Loyalty

Customer trust widely recognized as the determinants of customer loyalty in digital banking services. Trust reduces perceived uncertainty and risk in technology base transactions. Previous studies confirm that when customers trust on mobile banking platform, they are moving like to continue using it, recommend it to others, and resist switch to competitors even alternatives are available (Rahmatika & Soesanto, 2022; Simiyu & Bonuke, 2023). Trust also enhances perceived relationship security which directly strengthens loyalty intention through repeated satisfaction experiences (Pratiwi & Pinem, 2022). In digital banking context, trust is built through perceived integrity, reliability and security of services (Che *et al.*, 2023; Sharma & Sharma, 2019). Recent evidence further confirms that trust plays as a critical mediating role between service experiences and loyalty (Chauhan *et al.*, 2022; Gao & Waechter, 2017).

H₆: There is positive relationship between customer trust and customer loyalty

Customer Satisfaction and Customer Loyalty

Saleem and Raja (2014) defined customer satisfaction as a key objective any bank that wants to survive and stay competitive in this dynamic business environment must try to achieve. According to Gomachab and Maseke (2018), customer satisfaction is a measure on how the services provided or supplied by an organization meets or exceeds the expectations of a consumer. Customer satisfaction can be evaluated through different ways (Nunkoo *et al.*, 2025). Customer satisfaction score, net promoter score and customer effort score are the most widely used tools to measure customer satisfaction particularly social medias

digital business and physical interactions (Baquero, 2022; Thakur, 2018). Firms conduct customer satisfaction survey to know customer interest, preference, challenges, and area of improvement to make their business grow (Malthouse *et al.*, 2013). Customer satisfaction is a key factor in formation of customer's desires for future purchase (Ibojo, 2015; Shanka, 2012). If the customer is well satisfied results customer loyalty, encourage more purchases, and promote positive referrals, enhance profitability and growth (Nunkoo *et al.*, 2025). In contrast, low satisfaction leads to complaints, negative responses, and customers' attrition. In today's competitive environments, particularly for banking industry, customer satisfaction one of the most critical issues (Gazi *et al.*, 2025).

H₇: There is positive relationship between customer satisfaction and customer loyalty

Mediating Role of Perceived Risk, Customer Trust, and Customer Satisfaction

Perceived risk mediates the relationship between mobile banking service quality and customer loyalty as improved system reliability and security features reduce uncertainty and enhance user's satisfaction and loyalty (Kamboj *et al.*, 2025; Kumar *et al.*, 2023). Perceive risk remains a significant barrier in digital financial services, and its mitigation strengthens satisfaction and loyalty outcomes (Nguyen *et al.*, 2024; Van *et al.*, 2022). Similarly, customer trust is widely known variable that mediates the relationship between mobile banking service quality, and customer satisfaction and loyalty, where high quality mobile banking service foster confidence and reliability perceptions that translate into higher satisfaction and loyalty levels (Marinkovic & Kalinic, 2022; Toqeer *et al.*, 2021). Another study confirms that customer trust effectively transmits the influence of service quality to customer satisfaction and trust (Beanning, 2024). Furthermore, customer satisfaction mediates the relationship between perceived risks and customer loyalty. The reduced perceive risk improves customer satisfaction, and leads to customers continued a service usage (Hassan *et al.*, 2024; Tan & Corner, 2023). Likewise, it also mediates customer trust and customer loyalty relationship. Customer trust enhances positive experiences that convert into loyalty outcomes (Phi & Huong, 2023; Shin *et al.*, 2022).

H₈: Perceived risk significantly mediates the relationship between mobile banking service quality and customer satisfaction

H₉: Perceived risk significantly mediates the relationship between mobile banking service quality and customer loyalty

H₁₀: Customer trust significantly mediates the relationship between mobile banking service quality and customer satisfaction

H₁₁: Customer trust significantly mediates the relationship between mobile banking service quality and customer loyalty

H₁₂: Customer satisfaction significantly mediates the relationship between perceived risk and customer loyalty

H₁₃: Customer satisfaction significantly mediates the relationship between customer trust and customer loyalty

Sequential Mediating Role of Customer Trust, Perceived Risk and Customer Satisfaction

Perceived risk and customer satisfaction jointly transmit the influence of mobile banking service quality to customer loyalty. Superior service quality first attenuates perceived risks, which then enhances customer satisfaction and ultimately drives sustained usage and advocacy behavior (Hassan *et al.*, 2024; Van *et al.*, 2022). This pathway reflects a risk to satisfaction conversion process in which uncertainty reduction serves as the initial trigger for downstream relational outcomes (Islam *et al.*, 2024). Concurrently, service quality foster customer trust by signaling competence and integrity in digital service delivery, which is then reinforced through satisfying user experiences that translate into sustained loyalty outcomes (Gün & Söyük, 2025; Seridaran *et al.*, 2025). Studies confirm that trust alone does not fully explain loyalty unless mediated by satisfaction, highlights complementary and sequential nature of these constructs (Anaam, 2025; Hussein *et al.*, 2023).

H₁₄: Perceived risk and customer satisfaction sequentially mediates the relationship between mobile banking service quality and customer loyalty

H₁₅: Customer trust and customer satisfaction sequentially mediates the relationship between mobile banking service quality and customer loyalty

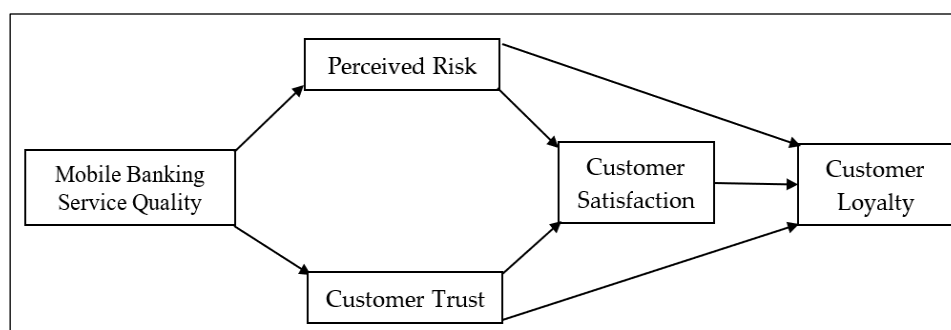


Figure 1. Conceptual framework

Methods

This study adopted explanatory research design to rigorously examine the casual relationships among mobile banking service quality, perceived risk, customer trust, customer satisfaction, and customer loyalty. A quantitative research approach is employed to enable satisfaction testing of hypothesized relationships and mediation effects.

The target population comprises mobile banking users of commercial bank of Ethiopia in afar region with particularly Samara-Logia city. Given the large and indeterminate population size, the sample size is determined as 384 users using Cochran's formula.

$$n = \frac{Z^2 p(1-p)}{e^2} = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 384$$

A convenience sampling technique is utilized due to accessibility consideration and absence of comprehensive sampling frame for mobile banking users in the study area. Data were

collected from 327 users through structured questionnaire adapted from instruments in prior studies with items measured on a Likert scale to capture respondent's perceptions consistently.

The data analysis is conducted using structural equation modeling with Smart PLS. The analysis follows two step models. The measurement model is examined to check the internal consistency, convergent and discriminant validity. The structural model is then assessed to test the path coefficients, and mediation effects.

Results

Measurement Model Assessments

The study targeted 384 respondents, off which 327 valid responses were collected, yielding an 85.2% response rate. Measurement model evaluates whether the constructs are measured the reliability and validity before the interpretation of structural relationships.

Reliability Tests

The reliability tests assess the internal consistency of measurement items that indicates the indicators intended to measure the same construct produce stable and consistent results. In PLS-SEM, this is commonly evaluated using by indicators' loadings, Cronbach's alpha and composite reliability.

Figure 2 presents that most indicators loadings exceed the recommended threshold and support satisfactory indicatory reliability. Although CT₃ had lower loading of 0.574, it was retained because indicator loading above 0.04 may be acceptable when AVE and composite reliability remain above recommended threshold (Hair *et al.*, 2019). Following the PLS-SEM guideline, the items was retained because it does not adversely affect the AVE, composite reliability and contributes to the content const validity construct. In the graph This implies that each observed variables shares substantial proportion of its variance with underlying latent construct.

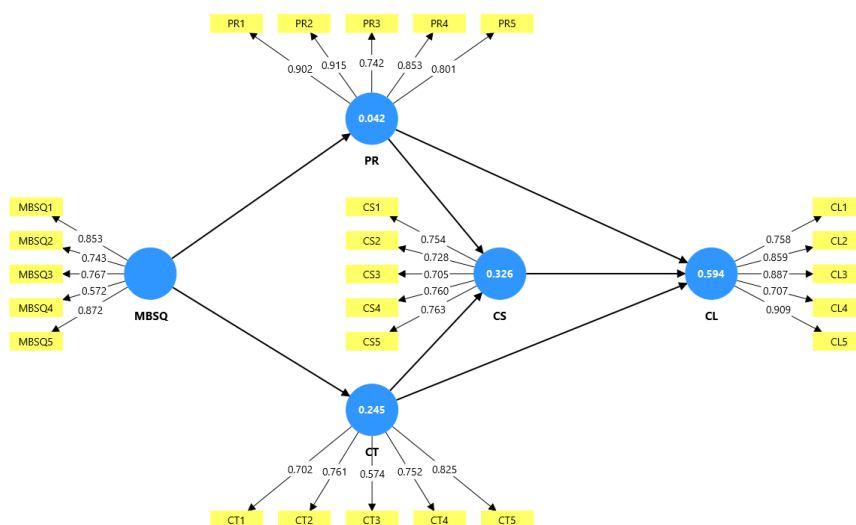


Figure 2: Measurement model

The measurement model's internal consistency measured by Cronbach's alpha and composite reliability. All constructs should exceed the recommended threshold with both Cronbach's alpha and composite reliability above 0.70.

Table 1. Cronbach's alpha, composite reliability and average variance extracted (AVE)

Constructs	Cronbach's alpha	Composite reliability (rho_a)	AVE)
Customer loyalty	0.882	0.886	0.685
Customer satisfaction	0.799	0.808	0.551
Customer trust	0.775	0.795	0.530
Mobile banking service quality	0.822	0.849	0.591
Perceived risk	0.899	0.913	0.714

Table 1 presents adequate internal consistency for all constructs, as evidenced by the value of Cronbach's alpha ranges from 0.775 to 0.899, and composite reliability ranges 0.795 to 0.913 which are beyond to the recommended value. Therefore, all constructs are reliable and satisfy the quality of the measurement model.

Validity Tests

The validity tests comprise convergent and divergent validities. The convergent validity is supported as all construct achieve the AVE values above the 0.50 threshold. As shown in table 1, the AVE values of all variables adequately explain their respective latent variables.

Table 2. HTMT ratio

	CL	CS	CT	MBSQ	PR
CL					
CS	0.847				
CT	0.611	0.622			
MBSQ	0.699	0.751	0.602		
PR	0.440	0.400	0.216	0.243	

Table 2 reports the HTMT ratios to assess the discriminant validity. All values range from 0.216 to 0.847 which are below the conservative threshold of 0.85. Overall, the constructs are valid.

Table 3. Fornier Larker criteria

	CL	CS	CT	MBSQ	PR
CL	0.828				
CS	0.737	0.743			
CT	0.521	0.507	0.728		
MBSQ	0.587	0.621	0.495	0.769	
PR	-0.395	-0.350	-0.180	-0.206	0.845

Table 3 presents the Fornell-Larcker criterion that discriminant validity is generally achieved as the square root of AVE for each construct exceed its correlations with other constructs. Overall, the validity criteria are acceptable.

Structural Model Assessments

The structural model assessments evaluate the relationship among construct to examine the direct and indirect effects.

Coefficient of Determination (R^2)

Figure 3 presents the explanatory power of endogenous variables in the structural model through the coefficient of determination (R^2). The results indicate that the model explained 59.4% of the variance in customer loyalty, 32.6% of the variance in customer satisfaction, 24.5% of the variance in customer trust, and 4.2% of the variance in perceived risk. Based on commonly accepted thresholds, the model demonstrates moderate explanatory power for customer loyalty and customer satisfaction, weak explanatory power for customer trust, and very weak explanatory power for perceived risk.

Effect Size (f^2)

Table 4. Coefficient of Determination

Constructs	f-square
CS -> CL	0.563
CT -> CL	0.072
CT -> CS	0.301
MBSQ -> CT	0.325
MBSQ -> PR	0.044
PR -> CL	0.052
PR -> CS	0.103

Table 4 shows the result of effect size (f^2) that was examined to assess the relative contribution of each exogenous construct to the endogenous variables. The results show that customer satisfaction had a large effect on customer loyalty ($f^2 = 0.563$), while customer trust had a small effect on customer loyalty ($f^2 = 0.072$). Customer trust exerted a medium effect on customer satisfaction ($f^2 = 0.301$), and mobile banking service quality had a medium effect on customer trust ($f^2 = 0.325$). However, mobile banking service quality had a small effect on perceived risk ($f^2 = 0.044$). Similarly, perceived risk had small effects on customer loyalty ($f^2 = 0.052$) and customer satisfaction ($f^2 = 0.103$). These findings suggest that customer satisfaction and customer trust are the strongest mechanisms through which mobile banking service quality influences customer loyalty.

Direct Effects

Direct effects show the immediate the influence of one variable on another. Figure 3 demonstrates the structural model with direct effects indicate that mobile banking service quality significantly reduces perceived risk ($\beta = -0.206$, $p = 0.001$) while strongly enhance customer trust ($\beta = 0.495$, $p = 0.000$). This indicates its dual role in lowering risk and building confidence. Perceived risk exerts a significant negative influence on customer satisfaction ($\beta = -0.268$, $p = 0.000$) and customer loyalty ($\beta = -0.155$, $p = 0.000$). This confirms that higher risk perceptions undermine both outcomes. Customer trust has strong effect on customer satisfaction ($\beta = 0.458$, $p = 0.000$) and significant effect on customer loyalty ($\beta = 0.197$, $p = 0.000$). Notably, customer satisfaction demonstrates the strongest direct effect on customer loyalty ($\beta = 0.585$, $p = 0.000$), establishes it as the most critical driver in the model.

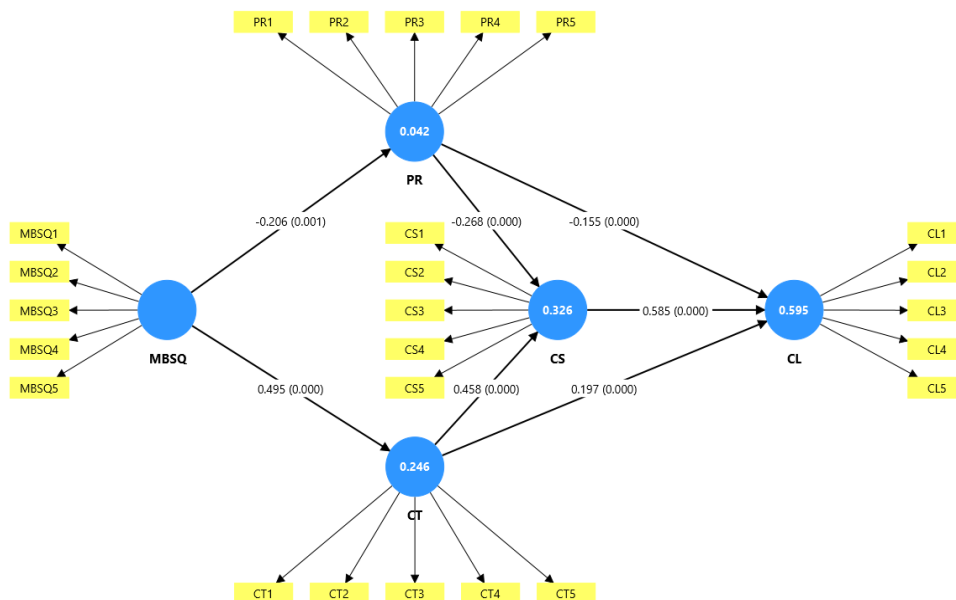


Figure 3: Structural model

Indirect Effects Analysis

The indirect effects analysis indicates that the model exhibit both simple and sequential mediation mechanism.

Simple Mediations

Simple mediation occurs where mobile banking service quality influences customer satisfaction indirectly through single mediators such as perceived risk ad customer trust. Similarly, perceived risk and customer trust affect the customer loyalty through customer satisfaction.

Table 5. Simple mediations

Relationships	β	Mean	Std. Dev.	T-value	P values
MBSQ -> PR -> CS	0.055	0.057	0.023	2.383	0.017
MBSQ -> PR -> CL	0.032	0.033	0.014	2.302	0.021
MBSQ -> CT -> CS	0.227	0.232	0.039	5.801	0.000
MBSQ -> CT -> CL	0.098	0.099	0.027	3.591	0.000
PR -> CS -> CL	-0.157	-0.157	0.029	5.422	0.000
CT -> CS -> CL	0.268	0.269	0.033	8.208	0.000

Table 5 shows the simple mediation results that all indirect effects are statistically significant, but their magnitudes vary. The effect of mobile banking service quality on customer satisfaction via perceived risk is ($\beta = 0.055$, $p = 0.017$), and its effect on customer loyalty through perceived risk also limited ($\beta = 0.032$, $p = 0.021$). This suggests that perceived risk plays a minor role in transmitting the influence of mobile banking service quality to customer outcomes.

On the contrary, the indirect effects through customer trust are much stronger. The effect of mobile banking service quality on customer satisfaction via customer trust is substantial ($\beta = 0.227$, $p = 0.000$), and its effect on customer satisfaction through customer trust is also significant ($\beta = 0.098$, $p = 0.000$). This confirms that customer trust as a key mechanism linking mobile banking service quality to both customer satisfaction and loyalty.

Furthermore, perceived risk reduces customer loyalty indirectly by lowering satisfaction as depicted the negative indirect effect ($\beta = -0.157$, $p = 0.000$). On the other hand, customer trust exerts a strong positive indirect effect on customer loyalty through satisfaction ($\beta = 0.268$, $p = 0.000$). This indicates that customer satisfaction is the most powerful mediating channel in translating trust into loyalty outcomes.

Sequential Mediations

Sequential mediation is also evident, where service quality affects loyalty through chain of mediators, particularly via customer trust and customer satisfaction and through perceived risk leading to customer satisfaction and then customer loyalty.

Table 6. Sequential mediations

Relationships	β	Mean	Std. Dev.	T-value	P values
MBSQ -> PR -> CS -> CL	0.032	0.033	0.014	2.362	0.018
MBSQ -> CT -> CS -> CL	0.133	0.136	0.025	5.381	0.000

Table 6 shows the sequential mediation result confirms that both indirect pathways are statistically significant, but their strengths differ substantially. The path MBSQ $\rightarrow$ PR $\rightarrow$ CS $\rightarrow$ CL shows significant effect ($\beta = 0.032$, $p = 0.018$). This reveals that mobile banking service quality improves loyalty, first by reducing perceived risk, which then enhances customer satisfaction and ultimately customer loyalty. In contrast, the pathway MBSQ $\rightarrow$ CT $\rightarrow$ CS

→ CL demonstrates a much stronger and highly significant effect ($\beta = 0.133$, $p = 0.000$). This highlights that mobile banking service quality drives customer loyalty through primarily building customer trust which in turn increases customer satisfaction and leads to higher customer loyalty.

Overall, the analysis confirms that all proposed hypotheses are supported and accepted that demonstrate clear and coherent alignment between theories and evidences.

Discussion

The results of the study align strongly with recent empirical evidence in mobile banking researches. The finding that mobile banking service quality reduces perceived risk and enhances customer trust is consistent with studies showing that improved digital banking service attributes significantly strengthen trust and reduce user uncertainty (Almaiah *et al.*, 2023; Zadhwa & Suparna, 2023). The negative effect of perceived risk on satisfaction and loyalty supports recent evidence that security concerns remain a persistent barrier in mobile banking adoption, directly reducing continued usage intentions (Apau *et al.*, 2025; Asghar & Nabeel, 2025). In contrast, the strong positive role of customer trust in driving satisfaction and loyalty confirms that trust functions as a central cognitive mechanism translating service quality into behavioral outcome in fintech context (Marek *et al.*, 2025; Sharma, 2025). The dominant effect of satisfaction on loyalty is also reinforced by recent findings that satisfaction is the most immediate predictor of retention and repeat usage in digital banking environments (Khemiri & Jallouli, 2026; Lakchan & Samaraweera, 2023). Overall, these findings provide strong empirical support for the proposed sequential mediation model linking mobile banking service quality to customer loyalty through trust, perceived risk, and satisfaction. The results indicate that trust plays a crucial role in reducing perceived risk, which in turn enhances customer satisfaction and ultimately strengthens loyalty. This finding is consistent with particularly the Stimulus-Organism-Response theory, which emphasizes the role of internal psychological states in shaping behavioral outcomes. The relatively stronger influence of trust compared to perceived risk suggests that in mobile banking contexts, building confidence in system reliability is more critical than simply reducing uncertainty. In the context of the Afar region, these findings may be further explained by limited digital literacy, infrastructural constraints, and heightened sensitivity to security concerns, which make trust a particularly important determinant of user satisfaction and continued usage. Theoretically, the study extends existing literature by confirming the importance of sequential mediation pathways in explaining customer behavior. Practically, the findings suggest that banks should prioritize improving system reliability, enhancing communication about security features, and implementing trust-building strategies to strengthen customer loyalty.

Conclusion

This study assessed measurement and structural relationships in a mobile banking context using PLS-SEM. The measurement model demonstrated strong reliability and validity. The reliability tests confirmed through acceptable indicator loadings, internal consistency, and composite reliability. For the validity assessment, the convergent validity through AVE, and discriminant validity via HTMT and Fornell-Larcker criteria checked and satisfied the conditions. The structural model's results confirm mobile banking service quality reduces perceived risk and strengthens customer trust. The result reveals that trust and satisfaction are key drivers of loyalty. Perceived risk negatively affects satisfaction and loyalty. The mediation analysis further shows that satisfaction is the most critical transmission channel linking perceived risk, trust and loyalty. Findings highlights building trust and enhancing satisfaction are more influential than risk reduction alone in shaping customer loyalty in mobile banking services. These insights offer implications for digital banking strategy and customer retention.

Research Contributions

This study makes several important contributions to the existing literature on mobile banking adoption and customer loyalty. First, it develops and empirically tests a dual sequential mediation model that explains how trust and perceived risk jointly influence customer satisfaction and subsequently customer loyalty. This provides a more comprehensive understanding of the psychological processes underlying customer behavior in digital banking. Second, the study contributes contextually by providing empirical evidence from the Afar region, an under-researched and infrastructurally challenged area, thereby extending the generalizability of mobile banking literature. Third, the study integrates trust and perceived risk within a single conceptual framework, addressing a gap in previous studies that have typically examined these constructs separately. Overall, these contributions enhance both theoretical and contextual understanding of customer loyalty formation in mobile banking environments.

Ethical Consideration

This study was conducted in accordance with instructional research ethics standards. Participation was voluntary, informed consent was obtained from all respondents and confidentiality was assured.

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