Enhancing Loan Payment Efficiency Through Mobile App Technology Utilization in the Banking Sector of Battambang City, Cambodia

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Abstract

In the context of Cambodia's growing digital finance landscape, mobile loan payment systems have emerged as critical tools for enhancing financial service efficiency. However, there is limited empirical research examining the factors influencing user satisfaction and loan payment efficiency through mobile apps in this context. This study aimed to identify key predictors of user satisfaction with mobile loan payment systems and to explore how gender differences and user experience shape loan payment outcomes in Battambang's banking and microfinance sectors. A mixed-methods approach is employed in this study by combining survey data from 283 users with interview data from 30 participants across urban and rural areas of Battambang City. Quantitative results, analyzed using partial least squares structural equation modeling, revealed that performance expectancy as well as technological and security factors significantly predicted user satisfaction, which in turn strongly influenced mobile loan payment efficiency. Effort expectancy, social influence, and facilitating conditions were non-significant, likely because Cambodian users are already familiar with smartphones, mobile banking, and e-wallet apps. Since loan repayment is a private matter, peer influence is minimal, and as mobile payment systems have become normalized, ease of use and infrastructure are taken for granted, with greater focus now placed on performance, trust, and security. Gender-based analysis showed that user satisfaction had a significantly greater impact on mobile loan payment among female users. Qualitative findings further highlighted that speed, security, and trust were reinforced as core experiential dimensions of user satisfaction. The study concludes that user-centered, secure, and gender-responsive design of mobile loan payment systems is essential for promoting adoption and improving efficiency. These insights provide actionable implications for financial institutions aiming to scale digital payment platforms in emerging economies.

Introduction

Countries with well-developed and strong financial systems have stronger economic growth and can effectively reduce poverty and income inequality (Pazarbasioglu et al., 2020). Expanding access to financial services can enhance opportunities for individuals facing economic hardships, particularly women, to achieve greater financial stability. In the world's poorest economies, 65% of adults still lack access to smartphones and basic transaction accounts, limiting their ability to conduct financial transactions safely and efficiently (Naeem et al., 2022) (Pazarbasioglu et al., 2020).

In the recent decades, the use of cell phones has expanded rapidly, and advances in smartphones financial transactions have made it possible to deliver banking services in new ways, especially to people with low incomes (Shaikh et al., 2023). Mobile payments have enhanced financial service accessibility, enabling customers to conduct transactions as well as send and receive domestic and international money transfers with greater ease (Fu and Liu, 2023). The shift from in-person transactions to digital financial services (DFS) has contributed to social well-being and is a crucial element in global economic growth strategies focused on development (Raghunath et al., 2024).

Banks and microfinance organizations are actively creating DFS that meet customers' diverse financial requirements in order to keep up with contemporary technological advancements and improve user convenience and trust (Koswara, 2024). The consumer's experience is enhanced, transaction costs are decreased, speed is increased, security and transparency are guaranteed, and novel business models and DFS innovations help (Mpofu, 2024). Additionally, traditional financial service procedures like account opening, transaction execution, operation verification, and financial activity monitoring have been evolved by digitalization (Chamboko, 2024). Customers no longer need to visit branch locations or speak with banking agents because DFS, for instance, provides affordable, effective, and transparent banking services via smartphones or tablets (Wenner et al., 2017).

In developing countries, including those in Asia and Cambodia, the expansion of mobile money and mobile banking services by means of smartphones has been driven by fintech innovations outside the traditional banking sector. These services provide secure and fast money transfers to previously unbanked customers (Demirgüç-Kunt and Singer, 2017) (Lashitew et al., 2019). According to Group Special Mobile Association reports, mobile money and mobile banking offer an improved and more convenient alternative for those with bank accounts by reducing the complexities of financial transactions, such as document requirements, long waiting times, and service fees (Beck et al., 2015) (Demir et al., 2020).

Recently, financial inclusion through digitalization has gained significant attention, particularly in developing countries. Its widespread adoption, particularly for small-scale domestic money transfers (Ahmad et al., 2021) (Jack and Suri, 2014), has enhanced transaction recording, transparency, trust, and financial literacy among users (Aron, 2018).

Even though around 5.2 billion people across the globe now use mobile phones and mobile money as well as mobile banking are becoming increasingly popular, many developing countries still remain behind wealthier nations when it comes to integrating financial services (Demirgüç-Kunt et al., 2021). Access to financial services has been hindered by the disparity among credit-based financial inclusion and savings-based financial inclusiveness (World Bank Organization, 2022) (Donovan, 2012). In order to facilitate electronic financial transactions, a broader approach to financial services - from credit to savings - is being developed (Arun and Kamath, 2015) (Ahmad et al., 2021).

After the COVID-19 crisis and according to projections for 2022, Cambodia's economy was expected to grow between 4.5% and 5.1%. This growth marked the recovery of domestic economic activities and an increase in export demand across key sectors (World Bank Organization, 2022) (Asian Development Bank, 2023) (Leang et al., 2023) (Pazarbasioglu et al., 2020).

At the same time, digital payment systems were implemented in the economic and banking sectors, covering both public and private frameworks (Leang et al., 2023). In practice, users have observed both improvements and challenges in adopting digital payment systems. These include operational expectations, support during obstacles, social influences on users, and facilitation assistance (Adewoye, 2013). The challenges encountered include unmet expectations during financial transactions, a lack of user knowledge, encouragement from surrounding individuals, the compatibility of digital platforms, and internet system constraints.

Rationale and problem statement

Since the late 1990s, rapid technological advancements have shaped the evolution of banking, enabling financial institutions to expand their operations and improve service delivery (Oliner and Sichel, 2000) (Consoli, 2005). The rise of mobile devices, especially smartphones, has led to the growth of mobile banking, allowing users to conduct transactions anytime and anywhere (Tay et al., 2022). This shift has transformed financial service delivery and allowed banks and microfinance institutions to better respond to changing customer expectations.

Despite progress in DFS, institutions and customers in Battambang province continue to face obstacles in fully utilizing mobile banking technologies. Common challenges include slow response times, unsatisfied consumers needs (Meas et al., 2024), concerns about convenience and security (Pheap et al., 2022), limited trust in mobile payments (Norng, 2022), and unstable technical support (International Monetary Fund and World Bank, 2023). While prior studies have addressed mobile banking adoption and financial inclusion (Demirgüç-Kunt et al., 2021) (World Bank, 2022), few have specifically focused on the efficiency of mobile loan payment - particularly in Cambodia.

Furthermore, in the context of mobile loan payment, research has mostly ignored important efficiency factors like quality of service, decrease in errors, speed of transaction, accuracy, and cost-effectiveness (Meas et al., 2024) (Pheap et al., 2022). Although there is evidence of distinct digital spending patterns by gender, gender-based distinctions between mobile loan payment system experiences are still not well understood (Be, 2025) (Norng, 2022). Mobile loans in emerging economies are made more difficult by system incompatibilities and technical instability (International Monetary Fund and World Bank, 2023).

By investigating the effectiveness, difficulties, and consumers' experiences with mobile loan payment systems located in Battambang Province, this study attempts to fill these research gaps. Its conclusions are intended to assist financial institutions in enhancing digital loan offerings, bolstering consumer confidence by building trust and sustaining engagement, addressing users' concerns about safety and usability, and helping less tech-savvy users build confidence and use mobile financial tools safely and effectively.

Research objectives

1. To identify and analyze the key factors influencing User Satisfactions (USS) toward Mobile Loan

Payment Efficiency (MLP) in banking and microfinance institutions in Battambang Province.

2. To assess how gender-based differences influence the perceptions and experiences of banking and microfinance institution operators and consumers regarding MLP.

3. To examine benefits and challenges experienced by consumers when utilizing mobile loan repayment systems, particularly in terms of speed, security, and trust.

Research question

1. What are the key factors that influence USS toward MLP in banking and microfinance institutions in Battambang Province?

2. How does gender-based differences influence the perceptions and experiences of banking and microfinance institution operators and consumers regarding MLP?

3. What are the primary benefits and challenges faced by consumers when using mobile loan payment system, particularly in terms of speed, security, and trust?

Literature review

Mobile Technology and Digital Financial Adoption

Mobile apps have increasingly influenced financial inclusion, particularly in rural communities, by providing access to information and enabling transactions previously hindered by geographical constraints (Asongu and Odhiambo, 2017). While large financial institutions attempt to improve personalized accessibility, challenges persist in developing countries, where infrastructure and user digital literacy may limit full adoption (Tay et al., 2022). Mobile banking, also referred to as mobile banking, extends financial services, such as money transfers, savings, stock transactions, and loan repayments, to virtually anywhere and at any time (Bankole et al., 2011). In the Vietnamese context, users perceive digital payment methods as highly convenient, particularly for retail purchases, utility payments, and online shopping. Among the most commonly adopted options are bank transfers, followed by Smart Banking/QR codes, e-wallets, and Visa cards (Linh, 2025). In this context, users' satisfaction, attitudes, and the gamification of perceived ease play a positive role in shaping their intention to continue using mobile wallets. However, concerns about trust exert a negative influence, discouraging sustained adoption (Rahman et al., 2024).

Mobile Loan Payment: Definition and Characteristics

Mobile loan payment, a core DFS feature in Cambodia, allows users to repay loans through smartphones or tablets (Shaikh and Karjaluoto, 2015) (Norng, 2022). Effective mobile loan platforms must balance ease of use, personalization, security, and trust. Prior work emphasizes system usability and confidentiality as essential for user confidence (Hamid et al., 2022) (Anagreh et al., 2024).

Recent security advances, including biometric authentication and public key infrastructure (Omowole et al., 2024), highlight progress in technical safeguards, but their real-world adoption remains uneven. The literature suggests that although high-tech solutions exist, their impact on perceived trust and satisfaction varies depending on user literacy and prior experience, revealing a gap in empirical evidence for rural Cambodian populations.

Mobile Loan Payment Solutions and Technology

Mobile loan solutions operate mainly through bank account, credit cards, or telecom billing systems (Wenner et al., 2017) (Munyendo et al., 2022) (Duane et al., 2014). While bank-linked models offer direct debit efficiency, credit card models are limited by penetration rates, and telecom-based solutions risk fragmentation between providers. Mobile loan payment users were more willing to adopt e-banking services when they experienced the banks' modern facilities. In this context, the perceived benefits of using e-banking became highly valued, leading consumers to form more favorable impressions of the service (Kim et al., 2025).

Technologically, mobile loan platforms utilize Global System for Mobile Communications channels such as Short Message Service, Unstructured Supplementary Service Data, and General Packet Radio Service/Wireless Application Protocol, along with advanced tools like SIM-based apps, near-field communication, and mobile wallets (Hariyanti et al., 2021) (Chamboko, 2024) (Carr, 2007) (Kurniawan et al., 2024) (Abbas et al., 2024). Insightfully, while technological diversity enhances potential accessibility, it may create complexity and integration challenges, particularly where regulatory alignment between banks and telecoms is weak (Bankole et al., 2011) (Brem et al., 2016). Village savings groups in Cambodia

encounter multiple barriers when accessing formal banking services, including geographic distance, collateral requirements, cumbersome procedures, and limited trust, which reflect broader challenges in adopting mobile banking solutions (Cadungog-Uy and Flores, 2024).

User Satisfaction and Challenges in Cambodia

User satisfaction is a critical driver of adoption, retention, and efficiency in mobile loan payment systems (Meas et al., 2024) (Norng, 2022). Satisfaction is shaped by multiple factors, including service quality, speed, reliability, ease of use, and affordability (He and Soun, 2025) (Un and Ngoy, 2024) (Pheap et al., 2022). Yet, many descriptive accounts tend to treat these dimensions in isolation, overlooking their interconnections and how trade-offs can affect user trust (Rahman et al., 2024). For example, while frequent security updates may enhance safety, they can also reduce perceived convenience, particularly for more tech-savvy users (Pheap et al., 2022). In addition, broader systemic issues - such as fragmented platforms, regulatory uncertainty, and misaligned standards - continue to constrain efficiency (Brem et al., 2016) (Hamid et al., 2022). These insights indicate that structural and contextual challenges are just as important as technological or user-centric factors, though they remain underexplored in the Cambodian context. A study on customers' behavioral intentions to use mobile banking in Phnom Penh emphasizes that successful adoption depends on reducing user effort through thoughtful app design - for instance, by integrating automatic data entry or preset defaults for routine transactions. These features both make the system easier to use and encourage stronger customer engagement (Be, 2025).

To move forward, a clear roadmap for banks and financial institutions should prioritize robust security, user-friendly design, responsive customer service, continuous user education, and strong commitments to procedural fairness. These measures build trust as well as strengthen loyalty and sustain customer satisfaction in an increasingly competitive market (He and Soun, 2025) (Sroeurn and Kohsuwan, 2025). Maintaining service fairness and service quality remains especially critical, as satisfaction directly drives loyalty. Within this framework, distributive and procedural fairness exert the strongest effects on satisfaction, while responsiveness and assurance emerge as the most influential factors shaping positive user experiences (Sroeurn and Kohsuwan, 2025). Robust infrastructure, well-designed facilities, and supportive systems either safeguard customer investments or elevate service standards, especially in the delivery of e-banking services (Kim et al., 2025).

Theoretical Framework: UTAUT and Mobile Loan Payment

The Unified Theory of Acceptance and Use of Technology (UTAUT) explains adoption through Performance Expectancy (PEE), Effort Expectancy (EFE), Social Influence (SOI), and Facilitating Conditions (FAC) (de Sena Abrahão et al., 2016). With PEE, users are motivated by perceived efficiency and usefulness of mobile loan services, which drives satisfaction and adoption (Trachuk and Linder, 2017) (Liao and Ho, 2021) (Wu et al., 2023). For EFE, ease of use, intuitive interfaces, and low barriers to learning influence repeated use (Sair and Danish, 2018) (Mallik et al., 2020). Moreover, it is emphasized that perceived usefulness is significantly affected by ease of use, compatibility, and individual innovativeness (Liu et al., 2019). SOI is a consumer's opinion regarding the support that important people give to technology (Alfany et al., 2019). Along with SOI, peer, family, and institutional endorsements shape adoption behavior, highlighting the social embeddedness of mobile finance (de Sena Abrahão et al., 2016) (Hameed et al., 2024). People's attitudes and actions within their social media profiles are crucial in determining behavioral intentions regarding the use of mobile payments services (Nasution et al., 2022). In addition, FAC explicit infrastructure, regulatory support, and customer guidance enhance adoption (Garrett et al., 2014). It addresses accessibility and serves users financial control (Matita and Chauma, 2020). However, gaps remain in accessibility for lower-literacy or rural users (Trachuk and Linder, 2017) (Phajane, 2023) (Putrevu and Mertzanis, 2024) and this drives in concerning for mobile loan payment transition (Micheni et al., 2013). While UTAUT accounts for general adoption drivers, it insufficiently explains efficiency outcomes, security trust interactions, and socioeconomics constraints in Cambodian mobile loan payment. Thus, it has been proposed that PEE, EFE, SOI, and FAC affect the effectiveness of mobile loan payments by means of user satisfaction acting as a mediator.

H1: Performance Expectancy (PEE) significantly influences User Satisfaction (USS) toward Mobile Loan Payment Efficiency (MLP).

H2: Effort Expectancy (EFE) significantly influences User Satisfaction (USS) toward Mobile Loan Payment Efficiency (MLP).

H3: Social Influence (SOI) significantly influences User Satisfaction (USS) toward Mobile Loan Payment Efficiency (MLP).

H4: Facilitating Conditions (FAC) significantly influence User Satisfaction (USS) toward Mobile Loan Payment Efficiency (MLP).

Technological, Security and Financial Factors

Technological and security factors (TSF) play a pivotal role in shaping users' trust, efficiency, and willingness to continue using digital financial systems (Nelloh et al., 2019) (Omowole et al., 2024) (Hariyanti et al., 2021). Advances such as near-field communication, dual-chip smartphones, and biometric authentication are increasingly adopted to improve accuracy and transaction speed (Almaiah et al., 2022) (Koswara, 2024). However, existing research seldom considers how these innovations function under the combined pressures of rural infrastructure constraints, limited digital literacy, and fragmented regulatory environments. When users are able to engage with such crucial technologies, they either facilitate the cross-border exchange of regulatory and informational guidelines (Zetzsche et al., 2021), or contribute to shaping legal frameworks (Akaayar, 2025) and strengthening payment connectivity systems (Brunnermeier et al., 2023). Financial and economic factors (FEF), including literacy, inclusion, and stability, further mediate user satisfaction (An et al., 2025) (Donovan, 2012) (Norng, 2022). Positive environments promote confidence and efficiency, while deficits exacerbate stress and reduce adoption (Chandel and Chandel, 2025) (Hasan and Perumal, 2024). Therefore, empirical studies rarely examine the intersection of technological safeguards and financial literacy on MLP in Cambodia that drives as a key area for research.

H5: Technology and Security Factors (TSF) positively influence User Satisfaction (USS) toward Mobile Loan Payment Efficiency (MLP).

H6: Financial and Economic Factors (FEF) impact User Satisfaction (USS) toward Mobile Loan Payment Efficiency (MLP).

Mobile Loan Payment Efficiency and User Satisfaction

Calderon highlighted the emotional dimensions of financial service use, reporting that 66% of digital payment users showed Post-Traumatic Stress Disorder symptoms, underscoring the psychological stakes involved (Calderon, 2025). Nevertheless, improvements in digital transactions led to significant gains: a 7% reduction in transaction time, a 50% drop in costs, a 150% increase in usage frequency, and an 80% reduction in errors - all contributing to a 6% rise in user satisfactions. These results affirm the value of digital systems in enhancing speed, accuracy, and affordability (Wu et al., 2023), and consumers can recognize the practical benefits of mobile payments in streamlining financial operations (Ogbari et al., 2024). User satisfaction (USS) is critical for mobile loan payment, linking quality, speed, and trust to adoption and retention (Adewoye, 2013) (Wu et al., 2023) (Ahmad et al., 2021) (Mer and Virdi, 2021). Advanced wallet applications demonstrate that efficiency depends not only on transaction speed but also on security, affordability, accuracy, and overall user experience (Wang et al., 2025) (Linh, 2025) (León, 2021).

H7: User Satisfactions (USS) impacts Mobile Loan Payment Efficiency (MLP) through the mediating roles of performance expectancy (PEE), effort expectancy (EFE), social influence (SOI), technological and security factors (TSF), and financial and economic factors (FEF).

The convergence of PEE, EFE, SOI, TSF, FEF, and USS under UTAUT provides a comprehensive, context-sensitive framework. However, prior work remains largely descriptive, highlighting a research gap in systematically linking these factors to efficiency outcomes, particularly in the Cambodian bank and microfinance context.

As illustrated in Figure *1*, the model predicts the effectiveness of mobile loan payment, emphasizing the roles of PEE, EFE, SOI, TSF, FEF, and USS as key factors driving adoption
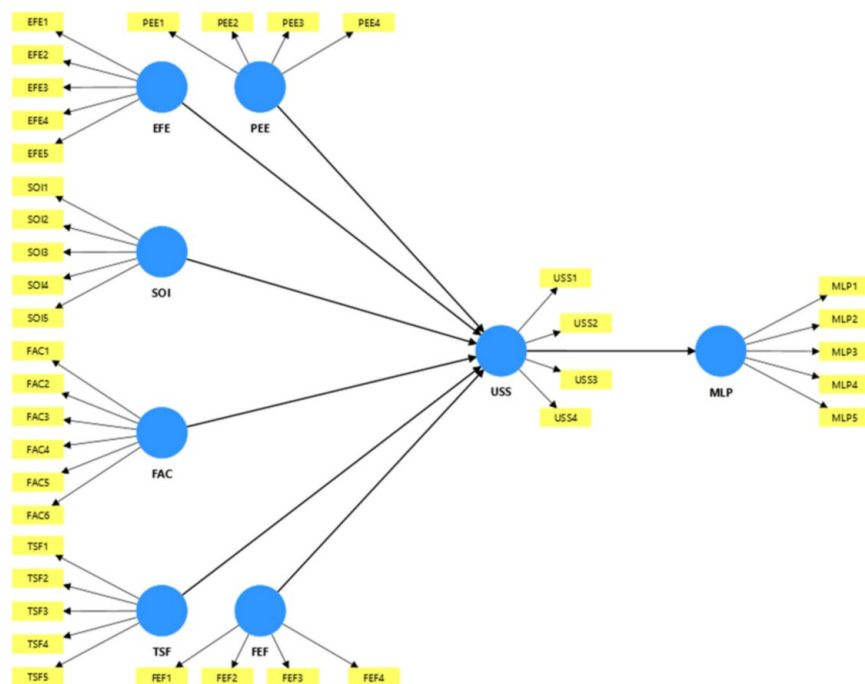
FIGURE 1: Research Model

EFE, Effort Expectancy; FAC, Facilitating Conditions; FEF, Financial and Economic Factors; MLP, Mobile Loan Payment Efficiency; PEE, Performance Expectancy; SOI, Social Influence; TSF, Technology and Security Factors, USS, User Satisfaction

Source: Author

Research Method

Within the framework of explanatory research, this study employs a mixed-methods approach using an explanatory sequential mixed-methods design (Ivankova et al., 2006). The design consists of two distinct but interconnected phases: an initial quantitative phase, followed by a qualitative phase (Siddiqui et al., 2021) (Ghasempour et al., 2014).

This study used a quantitative methodology, employing a structured questionnaire adapted from (Naruetharadhol et al., 2021), (Mallat, 2007), and (Hampshire, 2017), and revised under the close supervision of an advisor with research expertise (see Appendices). All items were developed through a pilot test prior to use, and survey data were collected between June 15 and July 5, 2025. To analyze the data, SmartPLS software was utilized for structural equation modeling. The study focused on customers of five banks to examine the relationship between mobile loan payments and digital financial inclusion. Given the large and dispersed population, conducting a full survey was not feasible. Therefore, convenience sampling was employed - a non-probability method frequently used in resource-constrained, exploratory research to ensure timely and cost-effective data collection (Wikipedia, 2024) (Stratton, 2021). While this approach limits the generalizability of the findings, it remains appropriate for the exploratory nature of the study and provides valuable initial insights into MLP in the Cambodian context. A sample of 283 respondents was determined based on the guideline provided by (Bartlett et al., 2001). Using an online distribution process, 350 clients received the survey electronically through personal applications. After excluding 14 of the 297 returned responses due to inconsistencies, the final valid sample comprised 283 respondents, representing 80.86% of the total. A self-administered questionnaire, accompanied by a cover letter outlining the study's objectives, voluntary participation, and ethical considerations, served as the primary data collection instrument. The questionnaire, available in both English and Khmer, included demographic questions and sections measuring key research variables using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

In this study, PEE, EFE, SOI, FAC, TSF, and FEF served as independent variables, while mobile loan payment served as the dependent variable. USS was assigned as the mediating variable and was conceptualized as an order construct based on the UTAUT framework (de Sena Abrahão, 2016). In total, 38 items were used to measure all constructs.

In the second phase, 30 participants from two specific areas - Battambang Town (an urban area) and Ek

Phnom District (a rural area) in Battambang Province - were interviewed using a semi-structured format to gather qualitative data. The objective of this phase was to learn more about the advantages and challenges associated with efficient mobile loan payments. Anomalies or surprising patterns that surfaced from the quantitative results were also clarified. A human-coded thematic analysis was employed to examine the interview data. The researcher systematically identified recurrent themes, concepts, and contradictions within participant responses. The essential opinions and impressions of the respondents were then defined by grouping these insights into more general thematic categories. Through iterative rereading of the categorized data, themes were identified and enhanced to ensure accuracy and consistency. The final interpretation made a clear connection between the research questions and the thematic findings. Among the main themes found are as follows: (1) Speed, which includes features like quick transactions, ease of use, and time savings. (2) Security: which represents user concerns and safeguards pertaining to mobile device security, system-level protections, and legal awareness. (3) Trust: which covers elements like reliability of service, personal experiences, institutional reputation, and conditional trust in the system.

Results And Discussion

Participants' demographics

A total of 283 participants, including banking staff, microfinance agents, and customers, from Battambang Province took part in the study. The sample was predominantly male (66.4%), with a smaller proportion of female participants (33.6%). Most participants were between the ages of 23 and 32 (55.2%), representing the early- to mid-career age range. They were followed by those between the ages of 33-37 (21.9%), 38 and older (12.4%), and 18-22 (10.6%). All participants reported maintaining an active bank account, confirming their relevance to the study's focus on mobile loan repayment. Although a minority (31%) disclosed limited or unclear understanding of self-service technologies, the majority demonstrated good familiarity, with 52.7% indicating they comprehended the systems well and 16.6% reporting very clear comprehension. Bank employees were the primary source of awareness about mobile applications (79.2%), followed by social media (11.3%), advertisements (6.4%), and individual networks (3.2%). In terms of occupation, bankers comprised the majority (81.3%), while government employees, investors, NGO workers, farmers, and others had smaller representations. The majority of participants (51.6%) made between $301 and $500 per month, whereas 17.7% made less than $300 and 30.7% made more than $500. With 81.3% having a bachelor's degree, 12.4% having completed secondary school, and a small percentage having master's or doctoral degrees, educational attainment was noticeably high. Overall, this profile represents a professionally active, reasonably educated, and moderately earning population with substantial access to digital banking technologies, making it an appropriate sample for examining the effectiveness of mobile loan payment systems.

Table 1 represents demographic and socioeconomic profiles of participants in the study (N = 283).

Participants	N = 283	Percent (%)
Sex		
Male	188	66.4
Female	95	33.6
Age (five groups)		
18-22	30	10.6
23-27	78	27.6
28-32	78	27.6
33-37	62	21.9
38 and above	35	12.4
Maintains a bank account		
Yes	283	100
No	0	0
Awareness of self-service technology		
Do not understand at all	18	6.4
Understand a little	34	12.0
Not very clear	35	12.4

Understand well	149	52.7
Understand very clearly	47	16.6
Awareness of mobile applications via		
Bank agent	224	79.2
Social media	32	11.3
Friends or family	9	3.2
Advertisements	18	6.4
Other	0	0
Occupation		
Investor	10	3.5
Banker	230	81.3
State agency	13	4.6
Farmer	6	2.1
NGO	7	2.5
Other	17	6.0
Monthly income		
501 USD and above	87	30.7
301 USD–500 USD	146	51.7
300 USD and below	50	17.7
Education		
Illiterate	0	0
Primary school	2	0.7
Secondary school	35	12.4
Bachelor's degree	230	81.3
Master's degree	15	5.3
Doctorate	1	0.4
Total	283	100

TABLE 1: Participants' Demographics

NGO, Non-Government Organization

Source: Author

Measurement model analysis

Convergent Validity

To assess the convergent validity of the constructs in the model, several key indicators were examined, including Cronbach's alpha, composite reliability (ρ_a and ρ_c), and average variance extracted (AVE).

Acceptable convergent validity is established when Cronbach's alpha and composite reliability values are ⩾0.70, and AVE values are ⩾0.50 (Rasoolimanesh, 2022).

Cronbach's alpha values ranged from 0.875 to 0.923, indicating that all constructs in the study exhibited strong internal consistency reliability, surpassing the suggested threshold. High composite reliability across constructs is also indicated, as both ρ_a and ρ_c values were significantly higher than the minimum acceptable value of 0.70. Additionally, each construct's AVE exceeded the 0.50 threshold (ranging from

0.668 to 0.765), indicating that, on average, each construct accounts for over 50% of the variance of its indicators. This supports the adequacy of convergent validity.

In conclusion, the findings offer compelling proof that the estimation model has sufficient convergent validity, guaranteeing that the items in each construct reliably represent the desired latent variable.

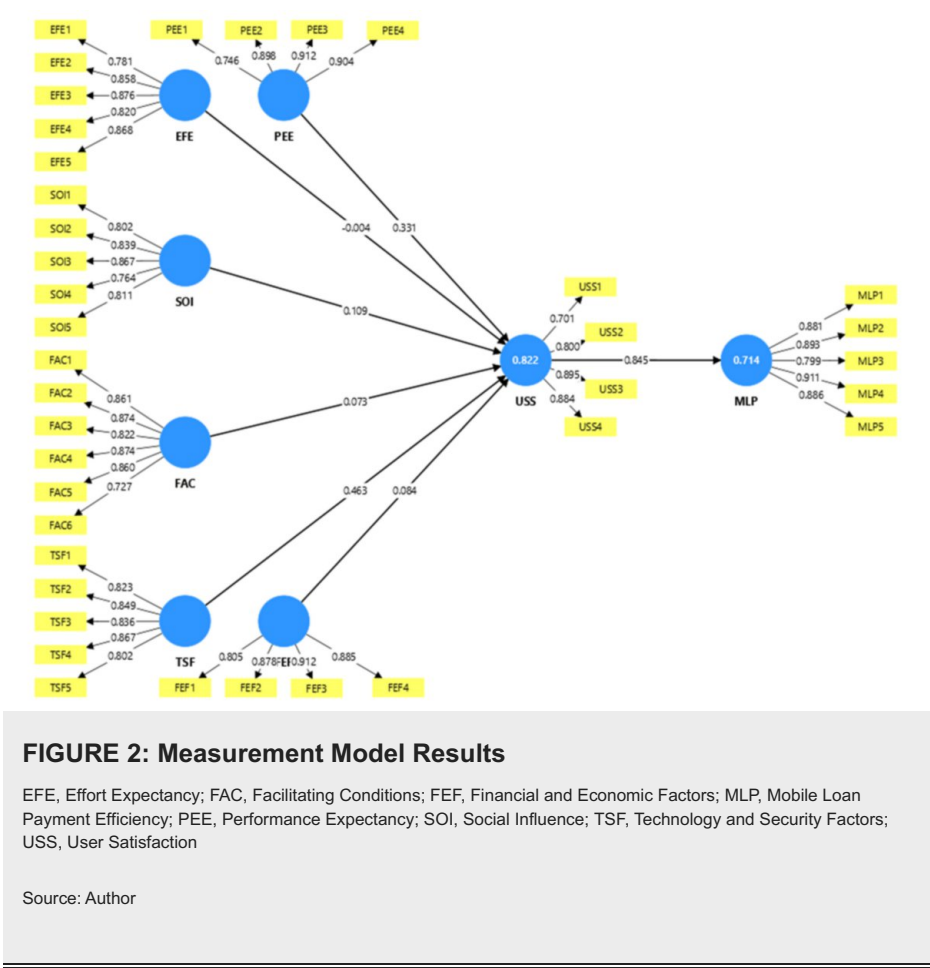The data in Table 2 represents the item convergent validity for the study.

Construct reliability and validity	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extract
EFE	0.896	0.896	0.924	0.708
FAC	0.914	0.918	0.934	0.702
FEF	0.894	0.903	0.926	0.759
MLP	0.923	0.926	0.942	0.765
PEE	0.889	0.906	0.924	0.753
SOI	0.875	0.879	0.910	0.668
TSF	0.892	0.893	0.921	0.699

TABLE 2: Convergent Validity

EFE, Effort Expectancy; FAC, Facilitating Conditions; FEF, Financial and Economic Factors; MLP, Mobile Loan Payment Efficiency; PEE, Performance Expectancy; SOI, Social Influence; TSF, Technology and Security Factors

Source: Author

Figure 2 represents the measurement model results for the study.

FIGURE 2: Measurement Model Results

EFE, Effort Expectancy; FAC, Facilitating Conditions; FEF, Financial and Economic Factors; MLP, Mobile Loan Payment Efficiency; PEE, Performance Expectancy; SOI, Social Influence; TSF, Technology and Security Factors; USS, User Satisfaction

Source: Author

Discriminant Validity Accessing Using HTMT

The heterotrait-monotrait ratio of correlations (HTMT) was analyzed to assess discriminant validity between the model's constructs. Acceptable discriminant validity is indicated by HTMT values less than 0.85 or 0.90; a more conservative threshold of 0.85 is advised for conceptually separate constructs, while 0.90 is appropriate for constructs that are more closely related (Henseler et al., 2015).

The majority of HTMT values in this study were below the recommended cutoff, but several construct pairs exceeded the 0.90 threshold, including FAC-TSF (0.954), MLP-USS (0.951), TSF-USS (0.967), FAC-SOI (0.892), FAC-USS (0.897), and SOI-USS (0.909). While such high correlations suggest conceptual closeness and raise potential concerns about discriminant validity, this overlap is theoretically expected: for instance, USS is closely tied to perceptions of security (TSF) and payment efficiency (MLP) in mobile loan systems. Importantly, other validity measures - such as strong factor loadings, acceptable AVE values, and high composite reliabilities - confirm the constructs' reliability and practical distinctiveness. In contrast, lower HTMT values among other pairs (FEF-PEE = 0.533, EFE-FEF = 0.638, PEE-FAC = 0.545) further demonstrate discriminant validity across the broader measurement model. Thus, despite some high HTMT ratios, the overall evidence supports the adequacy of construct reliability and validity.

The data in Table 3 indicates discriminant validity between model's constructs for the study.

	EFE	FAC	FEF	MLP	PEE	SOI	TSF	USS
EFE								
FAC	0.718							
FEF	0.638	0.889						
MLP	0.677	0.858	0.828					
PEE	0.765	0.545	0.533	0.630				
SOI	0.827	0.892	0.825	0.830	0.631			
TSF	0.689	0.954	0.881	0.909	0.556	0.896		
USS	0.801	0.897	0.850	0.951	0.823	0.909	0.967	

TABLE 3: Heterotrait-Monotrait Ratio-Matrix

EFE, Effort Expectancy; FAC, Facilitating Conditions; FEF, Financial and Economic Factors; MLP, Mobile Loan Payment Efficiency; PEE, Performance Expectancy; SOI, Social Influence; TSF, Technology and Security Factors; USS, User Satisfaction

Source: Author

Testing Model Fit

The standardized root mean square residual (SRMR), which is frequently used in partial least squares structural equation modeling (PLS-SEM) to evaluate model fit, is less than 0.08 (Henseler et al., 2015). Although there are no hard-and-fast cut-off values for discrepancy measures like d_ULS and d_G, they should typically be as minimal as feasible, with higher values possibly indicating model misspecification. The chi-square statistic is frequently utilized in PLS-SEM for completeness, but because of different assumptions, it is not a critical measure of fit, even though it is frequently employed in covariance-based SEM. Although lower normed fit index (NFI) values are typical in PLS-SEM, the NFI has a traditional threshold of 0.90 for good fit (Bentler and Bonett, 1980).

A variety of indices determined from both the saturated and estimated models were investigated in order to evaluate the general model fit. The saturated model's SRMR was 0.058, while the estimated model was 0.066. Both values fall below the generally recognized cutoff point of 0.08, which suggests that the model fits the measured correlation matrix fairly well. The estimated model's discrepancy measures, such as d_ULS and d_G, were marginally higher (d_ULS = 3.216; d_G = 1.624) than the saturated model's (d_ULS = 2.494; d_G = 1.563), while remaining within an acceptable range. These numbers show that the actual and model-implied correlation matrix data approximate each other to a moderate extent.

The chi-square values were 2267.191 for the saturated model and 2307.857 for the estimated model. Although chi-square is traditionally used in covariance-based SEM, in PLS-SEM, it is generally reported for completeness, not as a strict measure of fit. Finally, the NFI values were 0.784 (saturated model) and 0.780 (estimated model), which are below the conventional cut-off of 0.90 for good fit.

With partially less support from NFI, the model generally exhibits an acceptable degree of fit based on SRMR criteria. The model's structural validity is supported by the disparity in indices (d_ULS, d_G) and chi-square values, which indicate that it appropriately approximates the data.

Table *4* represents the data of model fit evaluation for the study.

Model fit indices (SRMR)	Original sample (O)	Sample mean (M)	95%	99%
Saturated model	0.058	0.040	0.047	0.050
Estimated model	0.066	0.046	0.056	0.060
d_ULS				
Saturated model	2.494	1.211	1.603	1.819
Estimated model	3.216	1.621	2.299	2.666
d_G				
Saturated model	1.563	1.011	1.290	1.415
Estimated model	1.624	1.024	1.304	1.432
Chi-square				
Saturated model	2267.191			
Estimated model	2307.857			
NFI				
Saturated model	0.784			
Estimated model	0.780			

TABLE 4: Model Fit

SRMR, Standardized Root Mean Square Residual; d_ULS, Unweighted Least Squares discrepancy; d_G, Geodesic discrepancy; NFI, Normed Fit Index

Source: Author

Hypothesis Testing Result

Based on RQ1 - What are the key factors that influence USS toward MLP in banking and microfinance institutions in Battambang Province? - the results presented in Table 5 on hypothesis testing provide important information about the structural relationships influencing MLP. Five of the tested hypotheses showed statistical significance PEE (PEE → USS, $\beta = 0.331$, $t = 7.257$, $p < 0.001$); TSF (TSF → MLP, $\beta = 0.238$, $t = 1.987$, $p = 0.047$; TSF → USS, $\beta = 0.460$, $t = 6.434$, $p < 0.001$); USS (USS → MLP, $\beta = 0.406$, $t = 3.054$, $p = 0.002$); and FEF (FEF → MLP, $\beta = 0.148$, $t = 2.095$, $p = 0.036$). This means that users who believe that mobile loan repayment helps them save time, reduce effort, and complete transactions more smoothly report significantly higher satisfaction. Specifically, PEE - explicit perceived usefulness - strongly boosts satisfaction. Security features such as OTPs, biometric logins, and system reliability play a crucial role. When users feel the system is safe and dependable, they are not only more satisfied but also more efficient in making loan payments. Satisfaction directly translates into more efficient payment behavior. In essence, when users feel happy and confident with the platform, they repay loans more smoothly. Practical economic benefits - such as lower transaction costs or reduced travel expenses - also support loan payment efficiency, though their effect is smaller compared to satisfaction or security.

Figure 3 presents the bootstrapping results used to determine whether the estimated relationships between the study's constructs are statistically significant.
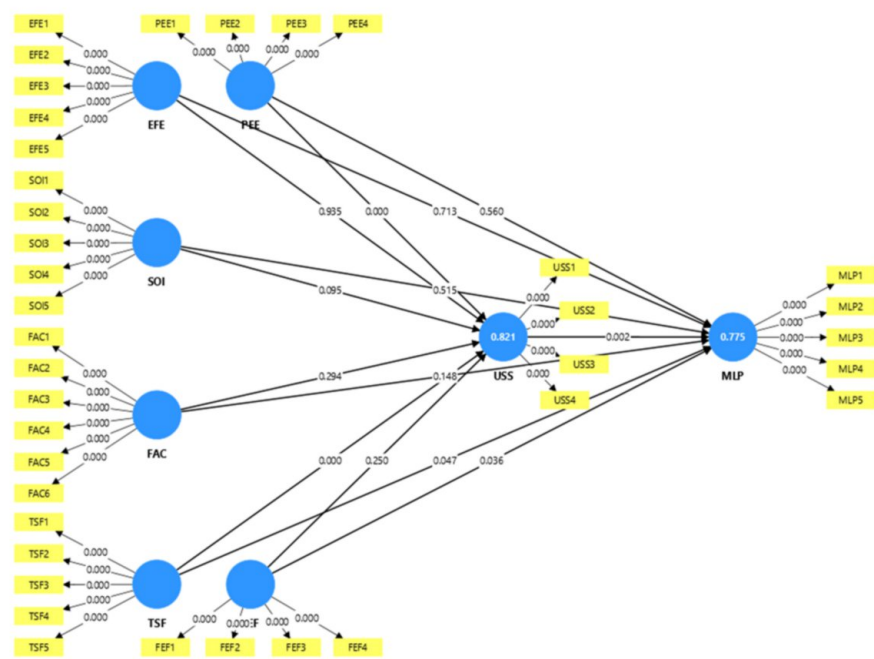
FIGURE 3: Bootstrapping Results

EFE, Effort Expectancy; FAC, Facilitating Conditions; FEF, Financial and Economic Factors; MLP, Mobile Loan Payment Efficiency; PEE, Performance Expectancy; SOI, Social Influence; TSF, Technology and Security Factors; USS, User Satisfaction

Source: Author

The analysis revealed several non-significant relationships, indicating that these constructs did not meaningfully predict USS or MLP (PEE → MLP: β = 0.036, t = 0.584, p = 0.560), (EFE → USS: β = −0.004, t = 0.082, p = 0.935) and (EFE → MLP: β = −0.019, t = 0.368, p = 0.713). Similarly, (SOI → MLP: β = 0.044, t = 0.652, p = 0.515), (FAC → USS: β = 0.074, t = 1.049, p = 0.294), (FAC → MLP: β = 0.104, t = 1.448, p = 0.148) and (FEF → USS: β = 0.085, t = 1.150, p = 0.250). This suggests that Cambodian borrowers no longer see ease of use, peer opinions, or basic access to technology as important drivers of their experience. Smartphones, mobile banking, and digital agent services are already part of everyday life, so users treat them as standard features rather than sources of satisfaction. In this context of growing digital maturity, people care less about whether the system is easy to access or influenced by others and more about whether it is fast, secure, and trustworthy. In short, the basics are taken for granted, and the decisive factors that shape satisfaction and repayment efficiency are performance, trust, and security.

Table 5 summarizes the hypothesis testing results, providing important insights into the structural relationships among the variables.

Hypothesis	Total effects	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P-values	Decision
H1	PEE → USS	0.331	0.332	0.046	7.257	0.000	Significant
	PEE → MLP	0.036	0.035	0.061	0.584	0.560	Not Significant
H2	EFE → USS	-0.004	-0.007	0.050	0.082	0.935	Not Significant
	EFE → MLP	-0.019	-0.020	0.052	0.368	0.713	Not Significant
H3	SOI → USS	0.109	0.108	0.065	1.669	0.095	Significant
	SOI → MLP	0.044	0.045	0.068	0.652	0.515	Not Significant
H4	FAC → USS	0.074	0.075	0.071	1.049	0.294	Not Significant
	FAC → MLP	0.104	0.106	0.072	1.448	0.148	Not Significant
H5	TSF → USS	0.460	0.457	0.071	6.434	0.000	Significant
	TSF → MLP	0.238	0.228	0.120	1.987	0.047	Significant
H6	FEF → USS	0.085	0.088	0.074	1.150	0.250	Not Significant
	FEF → MLP	0.148	0.149	0.071	2.095	0.036	Significant
H7	USS → MLP	0.406	0.412	0.133	3.054	0.002	Significant

TABLE 5: Results of Hypothesis Testing

H, Hypothesis; EFE, Effort Expectancy; FAC, Facilitating Conditions; FEF, Financial and Economic Factors; MLP, Mobile Loan Payment Efficiency; PEE, Performance Expectancy; SOI, Social Influence; TSF, Technology and Security Factors; USS, User Satisfaction

Source: Author

The effect sizes show that EFE ($f^2 = 0.000$, p = 0.996), FAC ($f^2 = 0.006$, p = 0.690), EFE ($f^2 = 0.012$, p = 0.660), and SOI ($f^2 = 0.017$, p = 0.442) have negligible and non-significant impacts on USS. By contrast, PEE ($f^2 = 0.317$, p = 0.002) and TSF ($f^2 = 0.256$, p = 0.001) have moderate-to-large and significant effects, confirming their central role in shaping USS. USS itself, finally, exerts a very strong effect on MLP ($f^2 = 2.491$, p = 0.002), highlighting its role as the decisive driver linking system performance and security to loan payment outcomes. What really mattered were performance benefits - such as speed and convenience - and strong security features, which had a big impact on how satisfied people felt.

Table 6 presents the effect size value of the constructs of the study.

Path	Effect size (f^2)	t-values	p-values
EFE → USS	0.000	0.005	0.996
FAC → USS	0.006	0.399	0.690
FEF → USS	0.012	0.440	0.660
PEE → USS	0.317	3.148	0.002
SOI → USS	0.017	0.769	0.442
TSF → USS	0.256	3.194	0.001
USS → MPL	2.491	3.040	0.002

TABLE 6: Effect Size

EFE, Effort Expectancy; FAC, Facilitating Conditions; FEF, Financial and Economic Factors; MLP, Mobile Loan Payment Efficiency; PEE, Performance Expectancy; SOI, Social Influence; TSF, Technology and Security Factors; USS, User Satisfaction

Source: Author

The model exhibits high predictive relevance (Q2 = 0.809 and 0.708, p < 0.001) and strong explanatory and predictive power, explaining 71.3% of the variance in USS and 81.8% in MLP (R^2 = 0.713 and 0.818). Robustness is also confirmed by model fit indicators, with estimated SRMR values of 0.066 and saturated SRMR values of 0.058 both below the 0.08 cut-off. These results highlight the importance of technological quality, user-perceived benefits, and financial sustainability in fostering the efficacy of mobile loan payment, whereas infrastructure support, peer pressure, and ease of use seem to have less of an impact in this regard.

Table 7 presents the R^2 adjusted values, sample means, Q^2 predictive relevance, and corresponding t- and p-values for USS and MLP quality criteria.

Quality criteria	R^2 adjusted	Sample mean (M)	Q^2 predict	t-values	p-values
USS	0.713	0.714	0.809	11.811	0.000
MLP	0.818	0.822	0.708	24.868	0.000

TABLE 7: R-Square

USS, User Satisfaction; MLP, Mobile Loan Payment Efficiency

Source: Author

In summary, this hypothesis testing revealed that PEE, TSF, and FEF significantly enhance USS and MLP. USS plays a strong mediating role, with the model explaining 71.3% of variance in satisfaction and 81.8% in payment efficiency. In contrast, EFE, SOI, and FAC showed no significant effects in the reasons of digital finance systems become normalized to borrowers. The model demonstrates strong predictive relevance, high explanatory power, and good fit.

Multi-Group Analysis Results - Gender Differences

Based on RQ2 - How do gender-based differences influence the perceptions and experiences of banking and microfinance institution operators and customers regarding MLP? - this study employed both MICOM (Measurement Invariance of Composite Models) and multi-group analysis to examine these differences (Henseler et al., 2016)

Three constructs - FEF, FEF, and SOI - showed full invariance in the MICOM results, suggesting that respondents who were male and female had comparable perceptions of these constructs' composition, means, and variance. However, no invariance was discovered for FAC, PEE, or TSF, indicating that men and women may perceive or understand these constructs differently. For USS, partial invariance was noted.

Table 8 represents data of the measurement invariance of composite models for the study.

Construct	Compositional invariance (p-value)	Mean difference (p-value)	Variance difference (p-value)	Invariance status
EFE	0.772	0.134	0.458	Full Invariance
FAC	0.135	0.128	0.222	No Invariance
FEF	0.683	0.170	0.486	Full Invariance
PEE	0.065	0.169	0.125	No Invariance
SOI	0.361	0.436	0.648	Full Invariance
TSF	0.102	0.098	0.399	No Invariance
USS	0.599	0.043	0.124	Partial Invariance

TABLE 8: Effect Sizes and Significance of MICOM Results (Gender Groups)

EFE, Effort Expectancy; FAC, Facilitating Conditions; FEF, Financial and Economic Factors; PEE, Performance Expectancy; SOI, Social Influence; TSF, Technology and Security Factors; USS, User Satisfaction; MICOM, Measurement Invariance of Composite Models

Source: Author

The multi-group analysis comparing male and female respondents on the structural paths within the MLP model presented in Table 9 reveals that, overall, there are no statistically significant gender-based differences in most direct and indirect relationships, except for one. In particular, female users have a significantly stronger path from USS to MLP (β = 0.928) than male users (β = 0.772), with a permutation p-value of 0.035, suggesting a significant gender difference. This difference can be contextualized by Cambodia's cultural and economic landscape. Women in Cambodia play an essential role in household financial management and microenterprise ownership. Yet, despite their economic importance, women often exhibit lower confidence in using digital financial services and face systemic barriers such as limited financial literacy and unequal access to credit. This implies that payment behavior is more significantly influenced by women's satisfaction with the mobile system. Nevertheless, based on some discernible variations in path coefficients, none of the other direct paths (EFE, FAC, FEF, PEE, SOI, TSF → USS) or indirect paths (EFE, FAC, FEF, PEE, SOI, TSF → MLP via USS) exhibit statistically significant differences between genders (p-values > 0.05). For instance, although males (β = 0.388) were more affected by PEE than females (β = 0.211), the difference was not statistically significant (p = 0.085). Similarly, FEF influenced satisfaction and MLP more among females, but the differences were also non-significant.

In conclusion, although both male and female users benefit similarly from most model factors, USS has a notably stronger influence on MLP for women, underlining the importance of enhancing user experience specifically for female consumers.

Table 9 presents the statistically significant gender-based differences in direct and indirect relationships between constructs.

Direct effects					
Path	Male (β)	Female (β)	(β) Differences	Mean differences	Permutation p-value	Significance
EFE → USS	-0.041	0.095	-0.136	0.003	0.209	Not significant
FAC → USS	0.018	0.171	-0.152	0.002	0.333	Not significant
FEF → USS	0.033	0.233	-0.2	-0.004	0.231	Not significant
PEE → USS	0.388	0.211	0.177	-0.002	0.085	Not significant
SOI → USS	0.166	-0.015	0.181	0.003	0.213	Not significant
TSF → USS	0.474	0.382	0.092	0.003	0.563	Not significant
USS → MPL	0.772	0.928	-0.157	-0.003	0.035	Significant
Indirect effects					
Path	Male (β)	Female (β)	(β) Differences	Mean differences	Permutation p-value	Significance
EFE → MLP	-0.031	0.088	-0.119	0.003	0.191	Not significant
FAC → MLP	0.014	0.158	-0.144	0.001	0.281	Not significant
FEF → MLP	0.026	0.216	-0.191	-0.004	0.174	Not significant
PEE → MLP	0.299	0.196	0.103	-0.002	0.233	Not significant
SOI → MLP	0.129	-0.014	0.142	0.003	0.249	Not significant
TSF → MLP	0.366	0.354	0.011	0.001	0.942	Not significant
USS → MLP	-0.031	0.088	-0.119	0.003	0.191	Not significant
Specific direct effects					
Path	Male (β)	Female (β)	(β) Differences	Mean differences	Permutation p-value	Significance
SOI → USS → MLP	0.129	-0.014	0.142	0.003	0.249	Not significant
TSF → USS → MLP	0.366	0.354	0.011	0.001	0.942	Not significant
EFE → USS → MLP	-0.031	0.088	-0.119	0.003	0.191	Not significant
FAC → USS → MLP	0.014	0.158	-0.144	0.001	0.281	Not significant
FEF → USS → MLP	0.026	0.216	-0.191	-0.004	0.174	Not significant
PEE → USS → MLP	0.299	0.196	0.103	-0.002	0.233	Not significant

TABLE 9: Multi-Group Analysis Result – Gender Differences

Significance rule: $p < 0.05$ → Significant difference between groups; $p \geq 0.05$ → No significant difference

Source: Author

Qualitative Finding: User Experience With Mobile Loan Payment System

Based on RQ3 - What are the primary benefits and challenges faced by customers when using mobile loan payment system, particularly in terms of speed, security and trust? - this qualitative study explored the experiences of 30 customers using mobile loan payment system in Battambang Province, Cambodia. All of the participants, who were specifically chosen based on their age, gender, income, and place of business - rural (Ek Phnom district) or urban (Battambang town) - actively used savings and loan accounts for business. This study sought to understand the perceived advantages and difficulties of mobile loan payment system through in-person interviews, with a focus on operational speed, security, and trust - three interconnected aspects that turned out to be crucial to user experience.

Speed of Operation: Enhancing Convenience, but Not Equally for All

Among the highest valued aspects of the mobile loan payment system was frequently referred to as speed. The ease of doing financial transactions without having to go to a physical bank branch at any time or place was highlighted by users. This was especially valuable for vendors and small business operators with time-sensitive responsibilities. Faster loan repayments, reduced waiting times, and the ability to manage multiple transactions daily were all seen as major benefits:

"*It is much faster than I have to go to the bank like I used to... I use it to repay every time... just one click and the money is transferred. I can do it from home - it only takes one minute.*" (P1)

The majority of respondents additionally pointed out how the system facilitates prompt repayments alongside reduces the waiting times, particularly for people with hectic schedules or in emergency situations. These reasons motivated them to rely on this technology-based service. One interviewee noted that mobile loan repayments were faster than other alternatives, including in-person payments. Even though app performance was generally comparable, some vendors had to install several mobile QR apps in order to satisfy client requests. In cases of insufficient funds, users could even use the app to temporarily borrow money from relatives, which they described as a seamless and fast process:

"*Repaying loans through mobile apps is faster than other methods or going in person. Compared to other apps, they're about the same. Sometimes, I need to have several mobile QR apps for different customers. And if I don't have enough money in my account, I just borrow from relatives via the app-it's very fast. It is an excellent tool.*" (P5)

Some respondents voiced concerns despite the largely positive opinions. Some people complained about frequent delays, particularly when moving money between banks. Due to their lack of technical expertise, people who were not comfortable using digital tools seemed more likely to have sluggish transactions. These results imply that although speed of mobile loan payment system is generally regarded as a significant advantage, its efficacy varies based on system configuration, institutional infrastructure, and users' level of digital literacy. Elderly users or those using outdated phones often perceived the system as slow or difficult to use:

"*When transferring between different banks, it takes a long time... when I'm in a rush, it becomes slow. But it doesn't happen all the time. Maybe it is because I am older and I am not good with the app - I often have to call my child to help me.*" (P10)

Users also reported issues with app malfunctions, poor internet connections, and the requirement for regular app updates to maintain security, all of which could cause transactions to lag. Additionally, some people wanted obvious confirmation messages for every transaction and voiced concerns that operations that are too quick could jeopardize security. However, most users agreed that the high operating speed greatly increased loan payment efficiency and saved time.

Security and Operational Challenges

User perceptions of mobile loan payment system's security varied considerably. Concerns regarding the user protection level, which was frequently regarded as moderate or low, were voiced by numerous participants. This concern originated primarily from an absence of comprehension about legal protections and technical procedures. Some users, however, expressed more faith in the system, pointing to features like one-time passwords and personal PIN codes as efficient security measures:

"*I think that the legal and technical protections are solid... I feel very safe when using it. It requires a password every time whenever I log in and log out, so no one else can access my account.*" (P4)

Other users stressed that individual actions, like appropriately safeguarding devices and not disclosing passwords to the public, also contribute to the system's security. A small number of participants noted they had never encountered any security issues, though they admitted to limited understanding of technical safeguards:

"*I haven't faced any issues yet... I think it's safe to some extent, but someone could still hack in if I am not careful, like losing my phone or unintentionally sharing my banking PIN. But if I get more used to using it, especially for payments and transfers, it would work better for me.*" (P10)

Nevertheless, a small percentage of participants reported feeling anxious as a result of their poor digital literacy, particularly when utilizing smartphones and mobile apps, particularly when conducting financial transactions. The absence of straightforward communication from banks concerning security procedures was one of the main concerns brought up. When technical issues occurred within the app, users were left uncertain about the reliability of transactions. Some even reported problems such as mistakenly transferring money to the wrong account and receiving delayed support from their banks:

"I just recently got a smartphone; therefore, the phone and money transfer features are both completely new to me... Sometimes, I'm scared I'll lose money when I send it, and it disappears without confirmation. One time, I transferred money to the wrong person, and the bank didn't help me in time. They additionally charged me an administration fee to resolve it, asserting that it was to maintain the confidentiality of the client." (P7)

Trust and Operational Challenges

The trust of consumers in the mobile loan payment system is still varied and context-dependent, even with its growing adoption. Many participants described mobile loan payment system as a useful, dependable, and convenient financial tool, indicating an overall degree of trust in the company. The system's ease of use, service quality, and capacity to facilitate regularly and monthly transactions effectively were frequently associated with trust. Some users mentioned that their confidence was largely boosted by their own experiences or by others' successful use. Others trusted the system because of the banks' technological prowess and reputation:

"I trust on the mobile loan payment system because it is a good option for various financial operations like loan payments and quick transfers. It feels reliable-I've used it for a long time and think it's secure. Because it's easy to use and dependable, my family and I are happy with the app." (P13)

"I believe the apps created by established banks are trustworthy. These institutions are well-known and have been around for many years. I also trust on their security policies and their commitment to not deceiving consumers." (P9)

Some participants did, however, continue to show hesitancy and caution when utilizing mobile loan payment system. Some said they were only going to use the system with family members' support or assurance, particularly to make sure they were safe when making financial transactions. Many were more careful when applying mobile loan payment system in business contexts, where greater accuracy and higher financial risks are necessary, even though they felt at ease using it for personal purposes. This implies that trust is not entirely generalized throughout all transaction types and is frequently linked to particular use cases:

"I saw people promoting the mobile loan payment system and explaining how to transfer and pay, and I noticed others were starting to use it, so I decided to try it too. But I'm still hesitant. I do not fully trust it yet and do not understand all its functions. I use it only because my younger sibling assured me it's safe... I do not dare process large amounts or use it for my business yet." (P12)

The results also showed that outside assistance, particularly from colleagues or family members, commonly had an impact on the initial adoption of mobile loan payment system. This suggests that the user's confidence is still growing and that they might need direct help or social confirmation. Overall, even though a large number of consumers indicated some level of trust in mobile loan payment system, this confidence is frequently conditioned and has a narrow focus.

Interconnection Between Speed, Security, and Trust

According to the results of the Pearson correlation analysis, there are statistically significant and strong positive relationships among the three key variables: speed, security, and trust in the context of mobile loan payment system. Speed and security have a highly significant positive correlation ($r = .841$ with a p-value <.001). The measurement's reliability is confirmed by the correlation's 95% CI, which spans from .776 to .888. Likewise, there is a strong and highly significant relationship among speed and trust ($r = .836$, p-value <.001). This relationship's CI depends between .779 and .883. With a Pearson correlation coefficient of $r = .877$ and a p-value <.001, the most significant connection was discovered between trust and security, suggesting that users are more inclined to trust an appliance if they believe it to be secure. The reliability of this finding is further supported by the CI for this relationship, which ranges from .824 to .916. These findings support the interdependence of speed, security, and trust-essential traits that greatly enhance user happiness and involvement with mobile devices loan repayment technologies.

Table *10* represents the value of correlation between Speed, Security, and Trust

Correlation pair	Pearson r	Significance (p)	95% Confidence interval (CI)	Interpretation
Speed and Security	.841	.000	.776, .888	Very strong, positive correlation
Speed and Trust	.836	.000	.779, .883	Very strong, positive correlation
Security and Trust	.877	.000	.824, .916	Very strong, positive correlation

TABLE 10: Pearson Correlation Showing Interconnection Between Speed, Security, and Trust

Source: Author

Based on the RQ1 results, the two most important predictors of USS in mobile loan payment systems in Battambang's banking and microfinance context are PEE and TSF. The UTAUT, which highlights the importance of performance benefits in promoting technology adoption, is in line with these findings (Rahi et al., 2019). Users in this study viewed mobile platforms as performance - enhancing tools, particularly for saving time, reducing effort, and enabling seamless transactions, aligning with the prior research by (Trachuk and Linder, 2017) (Wu et al., 2023) (Linh, 2025).

The significant effects of TSF on USS (β = 0.460, p < 0.001) presented that security features like biometric authentication, OTPs, and app trustworthiness have a major impact on users' trust and continued use of mob aligned with the previous reaserch (Almaiah et al., 2022) (Koswara, 2024) (Rahman et al., 2024). The participants' emphasis on trust and safety - evident in both the statistical and qualitative findings - echoes the conclusions of (Omowole et al., 2024) (Anagreh et al., 2024) (He and Soun, 2025), who assert that without secure infrastructure, USS, and adoption cannot be sustained.

These patterns are not unique to Cambodia. For instance, as digital adoption rises, rural Indian mobile banking users show similar preferences, placing a higher value on dependability and trust than usability (Mohapatra et al., 2020). Similar to this, research in Nigeria and Kenya has revealed that, as a result of pervasive worries about fraud and technical literacy, perceived functionality and safety control USS in mobile payments system (Bankole et al., 2011) (Aron, 2018). After becoming accustomed to basic usage, users turn their attention from functionality features to operation and data protection, even in relatively developed digital marketplaces like Malaysia and Indonesia (Almaiah et al., 2022) (Sroeurn and Kohsuwan, 2025). Consequently, the robust impact of PEE and TSF in Battambang is consistent with more general findings from around the world, indicating that performance optimization and trust-building are globally applicable tactics for fintech success, particularly in low-trust or a transition financial environment (Un and Ngoy, 2024).

Conversely, this investigation revealed that EFE, SOI, and FAC were not considered significantly different, suggesting that this likely reflects the increasing digital maturity in Cambodia. Since most borrowers are already accustomed to smartphones, mobile banking, and e-wallet services, ease of use is regarded as a standard feature rather than a source of satisfaction. As digital platforms become more commonplace, aligned with UTAUT extensions and evidence from other emerging markets (de Sena Abrahão et al., 2016), users will place a higher value on technical dependability and performance than on perceived ease of use or peer pressure aligning with (Liao and Ho, 2021). Because loan repayment is a personal financial matter, social pressure has little impact, and users tend to rely on institutions such as banks and MFIs rather than peers for trust aligning with (Ly and Ly, 2022). In addition, FAC like network coverage, agent services, and smartphone access are now common, so they no longer influence user perceptions strongly, this implies that the system's value and consistency become more important to seasoned users, who are less impacted by infrastructure support (Qadri, 2023) (Kim et al., 2025).

These findings indicate that once digital finance becomes normalized, traditional drivers such as ease of use, social influence, and infrastructure lose relevance, while security, trust, and performance emerge as the primary factors affecting satisfaction and payment efficiency. This finding is also consistent with findings from digital finance studies conducted in South Africa, the Philippines, and Vietnam, which found that once a platform acquaintance had been developed, digitally literate users relied fewer on recommendations from peers and help features (Be, 2025) (Cadungog-Uy and Flores, 2024).

The importance of perceived utilitarian and security in influencing user behavior is highlighted by the model's high explanatory power (R^2 = 0.713 for USS and 0.818 for MLP). In order to maintain long-term engagement, fintech platforms must make investments in system resilience, such as preserving transaction accuracy, reducing downtime, and safeguarding sensitive data (Rahi et al., 2019) (Chamboko, 2024). These technical investments are equally emphasized in fintech models across Southeast Asia and Sub-Saharan Africa, suggesting that technological reliability is a cross-contextual driver of trust and usage retention (Kim et al., 2025).

The statistical analysis in RQ2 through multi-group analysis revealed that gender plays a nuanced role in shaping perceptions and experiences with MLP. While most direct and indirect paths in the model showed no statistically significant differences between men and women, one relationship stood out clearly: the path from USS to loan payment efficiency was significantly stronger for female users ($\beta = 0.928$) compared to male users ($\beta = 0.772$, $p = 0.035$). This suggests that women's loan payment behavior is more strongly driven by how satisfied they feel with the mobile system.

This finding resonates with Cambodia's cultural and economic landscape, where women are central to financial management. Women lead around 62% of microenterprises and represent roughly 65% of microfinance borrowers (Alliance for Financial Inclusion, 2024). Despite this economic role, prior studies and international assessments note that Cambodian women often face barriers to digital finance adoption, including lower levels of financial literacy, weaker confidence in technology use, and heightened concerns about fraud or hidden costs (Women's World Bank, 2024) (Cadungog-Uy and Flores, 2024). Satisfaction, especially when shaped in perceptions of trust, security, and reliability, may therefore carry greater weight for women, providing both practical assurance and emotional confidence in payment systems.

These results also align with international research. Similar gendered dynamics have been documented in Uganda, Nepal, and Peru, where female users demonstrated higher sensitivity to platform reliability and customer support in digital finance contexts (Asongu and Odhiambo, 2017). In developing country contexts, women's financial adoption decisions are often influenced by emotional reassurance and consistent service quality (Norng, 2022) (An et al., 2025). In the Cambodian contexts, initiatives such as the "Let's Talk Money: Little by Little" campaign and literacy programs spearheaded nearly 10,000 women, highlighting ongoing efforts to close these confidence and knowledge gaps (Visa, 2022).

Although other predictors - such as PEE, TSF, and FEF - did not show statistically significant gender differences, subtle variations in path coefficients suggest differing orientations. For example, men placed slightly more emphasis on PEE, while women appeared more influenced by financial security and consistency, though these effects were not significant. This suggests that as digital systems become more normalized, gender differences may not manifest across all constructs but remain important in areas tied to trust and user experience.

In conclusion, the findings underscore that while men and women share broadly similar expectations of mobile loan payment platforms, female users place a stronger premium on satisfaction as a bridge to loan payment efficiency. This highlights the importance of designing gender-responsive fintech solutions in Cambodia. Strategies such as simplifying interfaces, embedding visible security features, providing reassurance through consumer support, and offering women-centered digital literacy training could strengthen women's trust and satisfaction, thereby enhancing payment efficiency.

The qualitative results in RQ3 also confirm that Battambang citizens value speed, security, and trust beyond other factors when it involves mobile loan payment platforms. Speed was consistently cited as a top benefit, aligning with findings of (Sroeurn and Kohsuwan, 2025), (Calderon, 2025), and (León, 2021), who reported that fast transaction processing drives perceived efficiency and user retention. This is consistent with observations in countries like Vietnam, Bangladesh, and Pakistan (Rahman et al., 2024), where real-time transaction functionality increases satisfaction and lowers repayment delays.

However, security concerns and gaps in digital literacy remain. As confirmed in findings, users lacking digital safety knowledge are more prone to error (Ahmad et al., 2021) and insecurity (An et al., 2025). Similar fears of data breaches, app misuse, and account lockouts were voiced by participants in this study, especially those less confident in handling mobile apps independently. This reflects findings in comparisons across nations where operational adoption of fintech in Southeast Asian countries and current studies in Cambodia is hampered by a lack of digital education (Linh, 2025) (Rahman et al., 2024) (He and Soun, 2025) (Sroeurn and Kohsuwan, 2025).

It became evident that trust in mobile loan payment systems is both multifaceted and conditional, often depending on institutional reliability and past experience. This is in line with (Mer and Virdi, 2021) and (Anagreh et al., 2024), who revealed that transparent systems, user support, and consistent service delivery are required to gain trust (Nelloh et al., 2019). These constructs are not isolated but rather reinforce each other, as evidenced by the strong correlations between speed and ($r = 0.841$) and security and trust ($r = 0.877$, $p < 0.001$). This supports the claim by Aron and Wang that enhancing platform security not only reduces risk but also fosters enduring user loyalty in fintech markets (Aron, 2018) (Wang et al., 2025) (Be, 2025).

Beyond geographical comparisons, this study examined the factors shaping USS and efficiency in mobile loan payment systems within Battambang's banking and microfinance sector. Three major insights emerge. First, PEE and TSF proved to be the strongest predictors of satisfaction. For users, speed, accuracy, and trust/reliability are not luxuries but essential expectations. Security features - ranging from biometric

authentication to transparent app design - directly influence trust, echoing a broader reality across emerging markets: fintech adoption is sustained only when platforms deliver both efficiency and safety.

Second, EFE, SOI, and FAC were found to be non-significant. This result reflects Cambodia's growing digital maturity, where smartphones, mobile banking, and e-wallets are now everyday tools. Ease of use, peer pressure, and basic infrastructure no longer drive satisfaction; they are assumed as the baseline. Instead, the focus has shifted toward system resilience, institutional trust, and reliability. This shift reflects findings in other countries where digital finance has moved from novelty to normalization.

Third, the gender analysis highlights a subtle but important distinction. Women's payment efficiency was more strongly tied to their satisfaction with mobile loan systems, reflecting their central role in household and microenterprise finance, alongside lingering gaps in digital confidence and financial literacy. For women, assurance of safety, trustworthiness, and service quality carry greater weight than for men. This finding underscores the value of gender-responsive fintech design - through intuitive interfaces, confidence-building support, and targeted literacy programs that empower women not just as users but as decision-makers in Cambodia's financial ecosystem.

Finally, qualitative findings reinforced these themes. Users consistently emphasized speed, trust, and security as the most decisive aspects of mobile loan payment systems. While efficiency was praised, concerns about fraud, app misuse, and limited digital literacy surfaced repeatedly, especially among less confident users. Trust, in this context, was shown to be layered-built not only on technology itself but also on institutional reliability and past experiences.

In short, these results point to a broader conclusion: in Cambodia, as in many emerging economies, the future of mobile loan payment depends less on making platforms easy to use and more on making them trustworthy, reliable, and responsive to diverse user needs. Gender-focused studies could further investigate why satisfaction matters more for women in Cambodia financial behavior. Do confidence-building interventions narrow this gap, or does the difference persist even as literacy improves? Comparative studies with other Southeast Asian contexts would add valuable nuance.

Meta-Inference of Quantitative and Qualitative Findings

A logical comprehension of the main factors influencing USS and MLP in Battambang is provided by the combination of quantitative and qualitative data. PEE and TSF were found to be the most significant predictors by quantitative analysis, which was corroborated by qualitative data. Speed and security have been frequently highlighted by participants as being essential to their use of mobile platforms. The model's high explanatory power (R^2 = 0.713 for satisfaction and 0.818 for efficiency) is reinforced by these personal experiences, demonstrating that perceived value and safety are functional factors that influence platform achievements rather than merely being personal views.

Whereas the association between speed and satisfaction (r = 0.841) confirmed PEE as an adoption driver, qualitative insights further demonstrated how authentication security, applications accuracy, and institutional trust illustrate TSF's significant impact (β = 0.460, p < 0.001). Gender-based analysis added nuance: although most constructs showed no significant gender differences, female users demonstrated a stronger satisfaction-to-efficiency link (β = 0.928 vs. 0.772; p = 0.035), aligning with qualitative themes of greater emotional reliance on usability and consistency. According to interview data, experienced users depend less on external support, which reinforces trends in digital growth and explains why EFE, SOI, and FAC were not significant in quantitative results. Qualitative data, at the same time, exposed issues like contingent trust, digital illiteracy, and lockout fears that are frequently ignored by statistics alone.

In summary, the results show that trust, security, and efficiency are universal and interconnected pillars of digital financial satisfaction. This comprehensive data provides beneficial implications for fintech design in emerging markets and validates UTAUT constructs in the Cambodian context.

Conclusions

Utilizing both quantitative and qualitative data, this study investigated the major factors influencing user satisfaction and mobile loan payment efficiency (MLP) in Battambang's banking and microfinance institutions. The findings support the applicability of the UTAUT model in this situation by highlighting performance expectancy as well as technological and security factors as the most important predictors of satisfactions. Speed, security, and trust were the main factors that users valued in mobile platforms, and these factors were found to be highly connected with system effectiveness and user loyalty. These results align with global trends seen in emerging and developing digital markets. A stronger satisfaction-to-efficiency relationship was found among female users, according to gender-based analysis, indicating that emotional assurance and reliable service quality are especially important for women. This may be a result of seasoned consumers becoming more digitally literate and less reliant on outside assistance or peer pressure, if other factors were not significant. These findings were corroborated by qualitative insights,

which also identified other issues like conditional trust and gaps in digital literacy, underscoring the necessity of continuous consumers education and support systems. In summary, the findings' convergence validates that MLP adoption and continued use depend heavily on performance, security, and trust.

Based on findings, several key actionalbe implications emerge: First, banks and fintech providers should strengthen security and transparency by priotizig robust authentication (OTP, biomatrics) adopt transparent fee and data protection policies. Visible safeguards and institutional reliability are essential for building user trust and sustaining engagement. Second, improving system speed, stability, and error-free processing must be optimized for transection performance. Seamless performance not only enhances satisfaction but also directly supports repayment efficiency by addressing users' concerns about safety and usability. Third, policymakers, banks and microfinance institutions should expand training programs to promote digital and financial literacy that empower less tech-savvy users-especially women and rural borrowers-to use mobile financial tools confidently, safely, and effectively. Such initiatives can close confidence gaps and strengthen long-term adoption. Lastly, for advancement policy and regulation, working toward harmonized standards is priority for digital banking and fintech services in Cambodia to reduce fragmentation and ensure consistency across providers. Clear guidelines will enhance consumer protection and support sector-wide growth. Longitudinal research study should be conducted to monitor how user behavior and trust evolve over time, including changes in gender-based patterns and responses to platform updates. Instantly, these strategies can help fintech providers in Cambodia and similar emerging markets foster inclusive, secure, and performance-driven mobile loan ecosystems.

Appendices

Table *11* represents the questions used for collecting the data in the research process.

Constructs	Items	Questions	Sources
Performance Expectancy	PEE1	Mobile loan payment is an innovative solution that simplifies loan repayments.	(Naruetharadhol et al., 2021)
	PFE2	M-App loan payment improves user expecting by enabling faster transactions.	
	PEF3	M-App loan payment helps me complete loan transactions efficiently.	
	PEF4	Since using M-App loan payment, my business has experienced increased financial stability.	
Effort Expectancy	EFE1	Learning to use M-App loan payment is simple and easy to understand.	
	EFE2	The M-App loan payment application has an attractive and user-friendly design.	
	EFE3	I can easily navigate and use M-App loan payment services.	
	EFE4	Accessing M-App loan payment services is quick and hassle-free.	
	EFE5	M-App loan payment efforts convenient and user-friendly mode in the digital era.	
Social Influence	SOI1	Using M-payment functions because of encouragement from friends, siblings, parents, etc.	(Mallat, 2007)
	SOI2	M-App loan payment is compatible with other mobile financial services.	
	SOI3	The frequent use of M-App loan payment in the community and area where one lives encourages its usage.	
	SOI4	M-App loan payment services remain accessible regardless of my location.	
	SOI5	The frequent use of M-App loan payment functions to where user lives encourages well its adoption.	
Facilitating Condition	FAC1	Regulations on agent authorization improve accessibility and compliance in M-App loan payment services.	(Naruetharadhol et al., 2021)
	FAC2	M-App loan payment is supported by advanced technology for smooth transactions.	
	FAC3	The risk of unauthorized access to my payment information is low when using M-App loan payment.	
	FAC4	I have reviewed and accepted the privacy policy of M-App loan payment services.	
	FAC5	The internet connection is secure and stable for Mobile-App loan payment transactions.	
	FAC6	Offering clear policies to implementing agents enhances services for M-App loan payment users.	
Technological and Security Factors	TSF1	I trust that M-App loan payment follows legal and technological safeguards to protect users.	
	TSF2	I consider M-App loan payment a reliable and secure financial service.	
	TSF3	Making transactions by using M-App loan payment provide the safety way for me.	
	TSF4	Using M-App loan payment serves as confidential tools for financial transactions.	

	TSF5	Encryption technology strengthens the security of M-App loan payment transactions.	(Hampshire, 2017)
Financial and Economic Factors	FEF1	Using M-App loan payment increases awareness of the risks of overspending and excessive borrowing.	
	FEF2	Lower expenses on M-App loan payment services help businesses grow.	
	FEF3	Setting reasonable service fees improves usability and compliance with M-App loan payment services.	
	FEF4	Government support for training and providing knowledge about loans and mobile repayments helps increase the number of users of this service.	
User Satisfactions	USS1	M-App loan payment can provide quality options for transactions.	(Mallat, 2007) (Hampshire, 2017)
	USS2	M-App loan payment transactions connected to internet services are initiated and completed very quickly.	
	USS3	M-App loan payment can be effective if customers have financial literacy, technological development, and government support, helping to reduce overspending or borrowing beyond capacity, which can lead to financial anxiety.	
	USS4	The M-App loan payment system becomes more effective to enhance satisfaction and regular usage when it delivers high-quality and convenient services.	
Mobile Loan Payment Efficiency	MLP1	The use of M-App loan payment is effective in increasing speed, reducing costs, and ensuring accurate, convenient, and uninterrupted transactions.	(Naruetharadhol et al., 2021)
	MLP2	M-App loan payment is easy to use, requires little learning time, and can be used effectively through simple technology.	
	MLP3	I intend to use M-App loan payment services because people in my community encourage and support the use of this technology.	
	MLP4	Using M-App loan payment services becomes easier and more effective when supported by secure technology, product education, customer assistance, and service delivery systems from banks or financial institutions.	
	MLP5	The M-App loan payment system becomes more effective when it offers high security, uses modern technology, and helps build user trust, thereby promoting regular usage.	

TABLE 11: Research Questionnaire

EFE, Effort Expectancy; FAC, Facilitating Conditions; FEF, Financial and Economic Factors; MLP, Mobile Loan Payment Efficiency; PEE, Performance Expectancy; SOI, Social Influence; TSF, Technology and Security Factors; USS, User Satisfaction

Source: Author

Additional Information

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All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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