User acceptance determinants in m-banking adoption

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ABSTRACT

Purpose: This study investigates the factors influencing the adoption of mobile banking (m-banking) in Nepal. It seeks to identify the key determinants of user acceptance in a context where concerns about safety and trust persist.

Design/Methodology/Approach: Questionnaires were used to gather data from 240 respondents out of a total sample size of 300. Regression, ANOVA, post-hoc analysis and other descriptive and inferential statistics were used to examine the relationships between perceived risk, trust, convenience, relative benefits and m-banking adoption in Nepal.

Findings: Perceived risk was found to have a significantly negative relationship with m-banking adoption. Relative advantages showed a strong positive relationship with adoption. However, trust had a negligible impact and convenience did not demonstrate statistical significance. Age and education significantly affected user acceptability with users over 50 and those with advanced degrees showing higher acceptance.

Conclusion: The study suggests focusing on the relative benefits of mobile banking and addressing perceived risk in order to increase users' confidence. The findings suggest that trust may not be a significant factor and convenience's role remains uncertain. Banks should adapt their strategies to accommodate customers of various ages and educational levels.

Practical Implications: The findings guide financial institutions and regulators to improve m-banking adoption. Implementing user-friendly, low-risk, low-cost financial services and financial literacy programs can enhance user acceptance. This study applies the technology acceptance model to Nepal and emphasizes the need for a national strategy to promote formal financial services including m-banking. It helps understand technology adoption in emerging economies.

Keywords: *Convenience, Financial services, Mobile banking, Perceived risk, Relative advantages, Trust.*

1. INTRODUCTION

Globalization dynamics and the rapid advancement of information and communication technologies (ICT) have resulted in a major change in the banking sector. The development and widespread use of digital banking as well as the rapid rise in the global user base of electronic payment systems are clear indicators of this disruptive process (Karki, Magar, Devkota, Parajuli, & Paudel, 2021). Mobile banking (m-banking) is a system that enables users to undertake various financial transactions using cell phones, mobile devices or digital accessories (Bangens & Soderberg, 2008). It's different from e-payments which are similar to credit or debit card payments made through EFTPOS (Electronic Funds Transfer at Point of Sale) and performed online or in person using a mobile device. Initially, mobile banking services were provided through short message services (SMS) known as SMS banking (Lee, 2009). Mobile banking was originally introduced by European banks in 1999 when cell phones with WAP (Wireless Application Protocol) capability first became available. Mobile banking has gained popularity in regions with limited or no traditional banking infrastructure notably in distant and rural areas. Customers frequently have to travel long distances to access bank branches which is particularly common in countries with high rates of unbanked citizens (Ghimire, Dahal, Rai, & Upadhyay, 2023; Hye, 2022; Sultana, 2009). Mobile banking offers numerous advantages. Its usage remains a subject of debate among educated people and professionals due to the associated transactional risks (Tiwari, Buse, & Herstatt, 2006).

Laxmi Bank was the first in Nepal to provide mobile banking introducing SMS banking in 2004. It introduced Nepal's first mobile banking service named 'Mobile Khata' in May 2012. M-banking increasingly influences consumer behavior, offering benefits like ubiquity, immediacy, local relevance, seamless connectivity and simplified authentication methods. These advantages complement traditional banking benefits such as aligning with customer needs, leveraging distribution channels, enhancing user experiences and generating income for institutions as well as indirect tax revenues for the government (Chowdhury & Ahmed, 2011; Dipendra Karki, Dahal, Bhattarai, & Gnawali, 2023). Furthermore, mobile banking can enhance low-income individuals' access to essential financial services by reducing the distance and waiting times to retail bank offices (CGAP, 2006). However, the continuing discussion about the introduction of mobile banking has been influenced by issues about transactional risks. The global expansion of the mobile sector provides a remarkable opportunity to deliver financial and social services through mobile networks with the potential to access m-banking for sixty-one percent of people worldwide through over 4 billion cellular networks (Sultana, 2009). Adopting technology in the financial market is crucial in an era of exponential small business growth to achieve desired outcomes and facilitate business expansion (Dahal, 2021; Karki et al., 2021). According to Bhandari et al. (2021), private banks perform better than public banks in Nepal in adopting new technology and enhancing the quality of their services resulting in higher customer satisfaction.

Mobile banking provides banks with several advantages such as lower interaction costs and 24/7 support which increases banking efficiency. It represents a novel electronic distribution channel that improves convenience and adds value for banks and customers (Taghavi-Fard & Torabi, 2010). Many people view mobile banking as a safe, adaptable and practical choice despite the arguments made by skeptics who draw attention to worries about security, usability and the possibility of fraud linked with activities conducted online (Chowdhury & Ahmed, 2011). Cost and accessibility are additional elements that can impact mobile banking adoption. Consequently, it demands a comprehensive analysis to identify the adoption factors. Mobile banking was anticipated to transform banking by making transactions more accessible for clients and banks and branchless banking was found to be 19% cheaper than regular banking (McKay & Pickens, 2010). Many developed countries have adopted mobile banking allowing people to check account balances, transfer payments and pay bills using mobile devices. The rapid rise in mobile subscribers is reported by the Ministry of Information and Communication. Nepalese banks are not benefiting significantly from m-banking despite the increasing availability of mobile phones. There is a knowledge gap on the factors impacting m-banking usage in Nepal since the percentage of individuals who use m-banking is very low.

2. LITERATURE REVIEW

Technology adoption comprises four essential elements: perceived risk, trust, convenience and relative advantage. Mobile banking offers comfort and accessibility, especially for users in developing economies with limited opportunities for traditional banking services (Karjaluoto, Mattila, & Pento, 2002). However, a lack of knowledge, technological proficiency and cultural sensitivity have impeded the development of mobile banking (Laforet & Li, 2005). Investor sentiment is a critical factor that influences customer behaviours related to m-banking usage and these factors include cost, use, self-efficacy and credibility (Dahal, 2022; Karki, 2017; Luarn & Lin, 2005). In a study by Laukkanen, Sinkkonen, and Laukkanen (2008), the researchers aimed to enhance the understanding of resistance towards online banking by examining different forms of resistance. The results of the study showed that there were significant differences between the three groups with rejecters showing the most varied resistance to different obstacles. In contrast, postpones showed the least amount of resistance among all the groups at the same time.

Ramdhony and Munien (2013) investigated   the variables influencing the acceptance and usage of m-banking services in Mauritius. According to the study, adoption was not significantly impacted by gender, age or income. At the same time, factors such as convenience, compatibility and banking needs are crucial in determining the usage of m-banking services. Additionally, the research reported that perceived security risk and reliability were the major problems with m-banking use. Rajbhandari, Khanal, Parajuli, and Karki (2020) indicate that adopting Industry 4.0 which involves transforming industrial processes while integrating technological advancements has been difficult for Nepal. Several models and theories have been developed to enhance knowledge of the factors affecting the use of technology in financial services.

Technology Acceptance Model (TAM): TAM is an expansion of Davis (1989) Theory of Reasoned Action (TRA). TAM is concerned with technology adoption and replaces TRA with perceived ease of use (PEOU) and perceived usefulness (PU). PEOU is a user's assessment of a technology or system's usability. PU is the user's assessment of the technology's potential to improve productivity. It assesses whether users think the technology will be useful. Several characteristics were emphasized as important factors influencing the adoption of technology such as mobile banking. Numerous scholars have used the TAM model to study critical issues connected to mobile banking acceptance and usage typically generating favorable results that show a relationship between variables such as PU and PEOU. Jeong and Yoon (2013) used the TAM model to determine how customers receive m-banking facilities. The study investigated the relationship between PEOU, PU, Perceived Credibility (PC) and Perceived Self-Efficacy (PSE). PC measures the user's faith and trust in the technology. PSE is the user's belief in their technology skills. It measures whether people trust their IT skills. The study revealed that PU, PC, PSE and PEOU substantially influenced mobile banking adoption. The findings demonstrated that perceived usefulness was essential among the other characteristics to motivate customers to adopt m-banking services.

Theory of Reasoned Actions (TRA): TRA is a popular social-psychology paradigm that examines the factors affecting intentionally planned behavior. TRA was proposed in 1975 and later extended in 1980 by Ajzen and Fishbein (1980). It states that a person's Subjective Norm (SN) and attitude towards engaging in the behavior (ATB) both have an impact on their behavioral intention (BI) to carry out a specific activity. The three main concepts in the theory are behavioural intentions, attitude and subjective norms. According to the TRA, perspective refers to a person's beliefs about manners. In contrast, personal criteria refer to individuals' expectations regarding whether significant others believe they should or should not engage in the performance (Ajzen & Fishbein, 1980). It is crucial to note that the TRA is a standard model that does not specify the exact beliefs underlying a given behaviour. Ajzen and Fishbein (1980) proposed a solution to this problem: identify the most widely held beliefs in the population by using salient beliefs from a representative group of the population. The TRA was used several times successfully to predict behavioral intentions. For example, Fredricks and Dossett (1983) used the TRA to predict educational outcomes in their study.

Innovation Diffusion Theory (IDT): This model was established by Rogers (1995) and focuses on the adoption of innovations. Innovation denotes a new concept, action or tool while diffusion refers to transferring new technology through communication channels to individuals who use novel information systems. Five key characteristics of innovations identified by IDT include comparative advantage, observability, complexity, compatibility and trainability. In information systems, these traits have a vital effect on the diffusion and acceptance of innovations (Rogers, 1995). These variables may initially appear distinct and unrelated but they are interconnected regarding data systems. Many scholars contend that the TAM and IDT are conceptually interrelated. According to Moore and Benbasat (1991), there are parallels between the relative advantages hypothesis from IDT and the PU factor in TAM as well as the complexity factor in IDT and the PEU factor in TAM. IDT theory is considered the most appropriate when examining how technologies are adopted in academic settings (Medlin, 2001).

Unified Theory of Acceptance and Use of Technology (UTAUT): This theory was put forth by Venkatesh, Morris, Davis, and Davis (2003) and seeks to enlighten individual intents to use technology and how unique characteristics can affect technology adoption. Eight existing models and theories of information systems including TAM, TRA, IDT, Theory of Planned Behavior (TPB) and Combined TPB (CTPB) were critically reviewed to improve the UTAUT. The UTAUT emphasizes that factors like PEOU and PU can impact technology usage but may vary based on gender, age and prior technical experience (Venkatesh et al., 2003). It posits that these individual traits and the voluntary nature of technology use mitigate the impact of fundamental constructs. However, the UTAUT has not been without criticism. According to Van Raaij and Schepers (2008), there is insufficient data to provide precise results which implies that factual findings in research investigations are not assured. Bagozzi (2007) also criticized the theory pointing out that it was complex and confusing for researchers and readers. Inadequate comprehension of the theory's multiple variables and contributing components may result in misunderstandings. According to these developed theories, such as TAM, TRA, IDT, UTAUT, TPB and CTPB as well as past reviews, the primary components of technology adoption are perceived risk, trust, convenience and relative advantages. These factors significantly impact customers' decisions to use mobile banking.

2.1. Perceived Risk

According to Ajzen (1991), individual usage decision-making is affected by the beliefs and feelings of people in their social circle, including family, social groups, social class, and culture. The opinions of society members play a role in shaping consumer intentions to use mobile banking. Security and privacy are major concerns when it comes to using mobile banking. Hartmann (1999) highlights security as a significant problem consumers face during online transactions while Bestavros (2000) notes that customers are hesitant to give personal details digitally due to privacy concerns. Consumer trust is vital to m-banking adoption (Gu, Lee, & Suh, 2009). Daniel (1999) also emphasizes the importance of security and privacy concerns in consumers' web-based services. Banks need to establish consumer trust to provide secure online services leading to improved customer service and satisfaction. The cost-benefit trade-off is another critical factor influencing the usage of mobile banking technology. Technological advancements often incur operational expenses, investment costs and usage costs (Daniel, 1999). In the context of India, Qu (2008) emphasizes how the cost of mobile phones affects the adoption of mobile banking. Many studies have identified channel costs or financial costs as independent variables. This study seeks to address the knowledge gap on mobile banking in Nepal by identifying the factors that influence the adoption of mobile banking in this country.

H_1: Perceived risks show a significantly negative relationship with the usage of m-banking in Nepal.

2.2. Trust

The banking industry has been significantly affected by the accelerated growth of information technology, particularly the inception of m-banking. Prior studies have highlighted the effectiveness of m-banking in enabling financial trades and mitigating the pandemic's adverse effects (Karki, 2022; Luarn & Lin, 2005; Mattila, 2003). It is crucial to make clients aware of the advantages of m-banking due to its innovative nature. Research suggests that an educated community adopts new technologies (Mattila, 2003). Understanding consumer behavior patterns has become increasingly important for service providers as financial markets evolve, competition increases and technology advances. Devkota et al. (2023) employed cognitive behavioral theory to analyze the impact of industry-related beliefs, values and perceptions on individuals' behaviors and choices.

Studies have indicated that electronic banking users particularly internet banking users tend to have higher education levels and professional occupations (Jayawardhena & Foley, 2000). They discovered that individuals using technology-based services such as e-banking and ATMs tend to embrace e-banking services. However, individuals in rural areas who have never used ATMs or mobile phones are more hesitant to conduct financial transactions through mobile phones. This highlights the importance of technology readiness in rural populations to successfully adopt mobile financial services. According to Laforet and Li (2005), ignorance of the advantages of m-banking was one of the key obstacles to its usage in China. M-banking users in China were typically younger individuals with less education than those in Western countries (Karjaluoto et al., 2002). Chinese customers tend to be more traditional and less impacted by technological improvements since they prefer cash transactions and show less faith in the conventional financial system. According to Heinonen (2004), some customers prefer direct interactions with bank clerks rather than using mobile banking or other technological solutions. These examples demonstrate the result of consumers' level of education on the usage of m-banking although the specific impact in Nepal is not well established. Information about technological innovations is essential to customer usage trends (Rai, Dahal, & Ghimire, 2023; Zhou, Lu, & Wang, 2010). Previous studies have shown that information regarding online services influences the usage of new services (Jun & Cai, 2001). M-banking is a novel idea for Nepalese bank users; therefore, banks should create awareness to facilitate adoption.

H_2: Trust shows a significantly positive association with the use of m-banking in Nepal.

2.3. Convenience

Customers are increasingly inclined to embrace new technologies that are user-friendly, easy to learn and require minimal mental and physical effort to operate. Adoption is less likely when technology is complex and users struggle to understand and manage it (Davis, 1989). Ease of use is particularly crucial for influencing adoption in India because many people have limited experience with complex technology (Bradley & Stewart, 2003; Eriksson, Kerem, & Nilsson, 2005; Kolodinsky, Hogarth, & Hilgert, 2004). In Nepalese, firms' technical success was closely connected with their technological and inventive performance (Dahal, Bhattarai, & Karki, 2020). Furthermore, technology compatibility with users' needs is crucial for adoption. Users mostly tend to adopt m-banking if it

aligns with their banking requirements. The likelihood of adoption increases when technology is competitive and offers optimal solutions for clients (Agarwal & Prasad, 1998).

H₃: Convenience holds a positively significant relationship with the usage of m-banking in Nepal.

2.4. Relative Advantages

The preference to employ innovations is driven by the user's view of their usefulness in their daily lives. Several studies have highlighted the significance of PU as a critical element in using electronic services (Dahal, Ghimire, & Joshi, 2023; Hernandez & Mazzon, 2007; Tan & Teo, 2000; Wang, Wang, Lin, & Tang, 2003). When customers believe that m-banking technology offers them higher-quality services than traditional banking methods, they tend to embrace and use new technology. Tan and Teo (2000) studied the factors influencing customers' intentions to adopt online banking facilities. The research documented that perceived usefulness significantly influenced users' attitudes towards online banking indicating its importance in technology adoption. According to Wang et al. (2003), one important factor in Taiwanese technology adoption is the perceived value of mobile banking services. Similarly, Hernandez and Mazzon (2007) researched internet banking adoption in Spain and proved that perceived usefulness significantly influenced users' attitudes and intentions towards using electronic banking services. These studies collectively emphasize that consumer' perceptions of the relative advantages and benefits of m-banking technology are crucial to their acceptance and adoption of the new technology. When consumers recognize the added value and improved service quality associated with m-banking, they are more inclined to embrace and accept it as a preferred banking option.

There is a study gap since mobile banking is still unpopular especially in Nepal despite the widespread usage of mobile phones and their potential to revolutionize financial services. The reasons behind the lower adoption of mobile banking and the factors hindering its usage remain unclear. This research intends to examine these variables and recommend encouraging mobile banking adoption in Nepal. Bridging this research gap can improve financial inclusion and efficiency in the banking sector.

H₄: Comparative advantage has a significantly positive relationship with the usage of m-banking in Nepal.

2.5. Conceptual Framework

The reviews indicate that the dependent variable (mobile banking adoption) is affected by the four independent factors (perceived risk, convenience, trust and relative advantages). Figure 1 shows a study's conceptual framework.
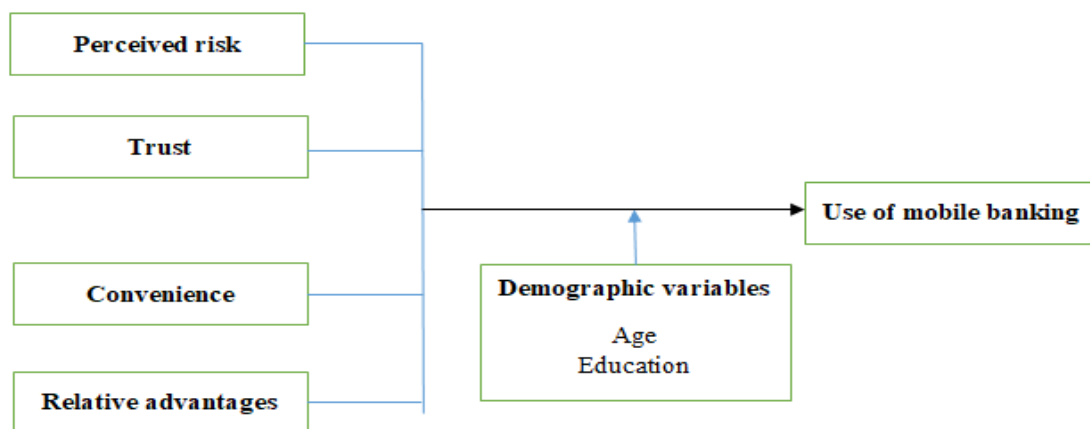

Figure 1. Conceptual framework.

3. RESEARCH METHOD

This study adopts a descriptive and causal-comparative research design using a quantitative approach. A purposive sampling technique was used to choose respondents from the pool of customers and employees of commercial banks in Nepal considering the difficulty in identifying individuals with knowledge of mobile banking. The data collection instrument is a questionnaire that includes personal information and responses using a 5-point Likert scale. A response rate of approximately 80 percent was achieved with 240 responses from a sample

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size of 300. The questionnaire was shared with experts for feedback and relevance to assure the validity, correctness and meaningfulness of research-based conclusions (Mugenda & Mugenda, 1999). Ambiguous questions were discarded and harmonized to enhance validity. Cronbach's alpha test was used to assess the reliability (Nunnally, 1978) with a value above 0.6 considered reliable for further analysis. Both descriptive and inferential statistics were employed to analyze the data. Descriptive statistics were used to derive insights about how respondents viewed the variables of interest in the conceptual framework. Inferences were made at the 1 percent and 5 percent levels of significance.

3.1. Model Specification

Hair, Black, Babin, Anderson, and Tatham (2005) proposed multiple regression analysis to analyze the relationship between endogenous and exogenous factors. Masinge (2010) used the TAM Model to demonstrate that perceived risk, utility, trust and ease of use influence consumers' m-banking adoption. Cheah (2011) used a model that took into account several variables that affected behavioral attitudes towards using m-banking including perceived risk (PR), relative advantages (RA), perceived ease of use (PEOU), perceived usefulness (PU), and personal innovativeness (PI). This study used a linear multiple regression model using ordinary least squares (OLS) in order to determine the major factors influencing the adoption of mobile banking and assess the extent of those factors' effects.

$$UMB = \alpha_1 + \beta_1 PR + \beta_2 T + \beta_3 C + \beta_4 R \qquad (1)$$

Equation 1 argues that the adoption or usage of mobile banking is a function of Perceived Risk (PR), Trust (T), Convenience (C) and Relative Advantage (R) where α_1 = The usage of mobile banking in the absence of perceived risk, trust, convenience and relative advantage variables and β_1, β_2, β_3, β_4 are the respective slope coefficients of the variables.

4. DATA ANALYSIS AND RESULTS

The results provide valuable insights into the participants' demographic characteristics and adoption rates of mobile banking. Young adults are the most active mobile banking users with 46.6% of respondents aged 18–30. The smallest category was 51 plus at 4.7%. Males participated at 58.75% and females at 41.25%. 51.7% of the user group has graduated. Mobile banking is more prevalent among educated people. This result aligns with the findings of Maharjan et al. (2022) who established a relationship between education levels and content knowledge, thus influencing consumption behaviors. 31.3% of the survey participants were students. People working in the service sector were 28.3%. Students and service workers use mobile banking increasingly. Out of the total participants, 82.5% of respondents used mobile banking which shows the general acceptability and popularity of mobile banking technology among the surveyed population in Nepal.

Table 1. Distribution of responses by influencing factors (N = 240).

Factors/Components		Min.	Max.	Mean	Std. dev.
Perceived risk	Performance risk	1	5	3.69	1.075
	Security risk	1	5	3.75	1.158
	Financial risk	2	5	4.06	0.880
	Time risk	1	5	3.26	0.698
Trust	Ability	1	5	3.27	0.885
	Integrity	2	5	3.82	0.747
	Benevolence	2	5	3.70	0.851
Convenience	Perceived usefulness	2	5	4.33	0.634
	Perceived ease of use	1	5	3.80	0.854
Relative advantages	Perceived cost savings	1	5	2.81	0.761
	Perceived time saving	2	5	4.34	0.771

The survey results in Table 1 reveal how perceived risk, trust, convenience and relative advantages affect Nepalese mobile banking usage. In terms of perceived risk, it is evident that performance risk influences mobile banking adoption with an average mean of 3.69 on a Likert scale of 5 points. Mobile banking servers must be efficient to build user trust. Security risk with an average mean value of 3.75, also matters. Mobile banking

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security must address users' concerns about fraud and security breaches. Financial risk has a significant impact on the adoption of mobile banking, with an average mean value of 4.06. This highlights the need to minimize account abuse and transaction errors. Users' decisions are also influenced by time risk which has an average mean value of 3.26. This indicates that ensuring efficient navigation and reducing delays are critical to the adoption of mobile banking.

Regarding trust, ability's average mean value of 3.27 shows its importance in mobile banking usage. The mobile banking service provider's competence and reliability are vital to users. Integrity with an average mean score of 3.82 also shows the need for honest transactions to develop user confidence. The average mean score of 3.7 for benevolence shows the importance of service providers offering receptivity and empathy towards users extending beyond profit objectives to build trust. Perceived usefulness has a significant impact on the convenience dimension demonstrated as by its mean average value of 4.33. Mobile banking users believe it improves their banking experience and performance. Perceived ease of use is essential with an average score of 3.80. The final variable influencing the relative benefits dimension is perceived cost savings which has an average mean value of 2.81. Transaction costs such as bank and cell network fees have an impact on customers' decisions when it comes to using mobile banking. A mean score of 4.34 indicates that users' perception of time savings is an important factor behind their use of mobile banking. These statistics show that mobile banking usage in Nepal is multifaceted.

Table 2. The correlation coefficient between variables on usage of mobile banking (UMB).

Variables	Correlation coefficient with UMB	
Performance risk	-0.938[**]	
Security risk	-0.896[**]	
Financial risk	-0.917[**]	
Time risk	-0.882[**]	
Perceived risk (PR)		-0.948[**]
Ability	0.026	
Integrity	-0.034	
Benevolence	-0.092	
Trust (T)		0.019
Perceived usefulness	-0.901[**]	
Perceived ease of use	-0.817[**]	
Convenience (C)		0.875[**]
Perceived cost savings	0.897[**]	
Perceived time saving	0.873[**]	
Relative advantages (R)		0.885[**]

Note: [**] Level of significance at 1 percent (two-tailed).

Table 2's correlation results revealed a substantial negative link between overall perceived risks and mobile banking usage with a correlation value of -0.948. This association was statistically significant at the 1% level. This shows that the likelihood of using m-banking increases as perceived risk decreases. Therefore, the first hypothesis, H_1 is supported. On the other hand, overall trust and m-banking adoption exhibited a weak positive association with a correlation value of 0.019. This connection was also shown to be statistically insignificant. Hence, hypothesis H_2 is rejected. The findings revealed a positive association between overall convenience and m-banking usage with a correlation value of 0.875. These findings suggest that as the perceived convenience of mobile banking increases, individuals tend to adopt m-banking services. Similarly, the results indicated a positive relationship between the overall relative advantages and m-banking adoption with a correlation value of 0.885. This suggests that as individuals perceive more significant relative benefits from using m-banking, they are more motivated to accept and use these services.

Table 3. Estimated regression results of the usage of mobile banking (UMB) on study variables.

Variables	Unstandardized coefficients (β)	Std. error	Standardized coefficients (β)	t	Sig.
Constant	5.942	0.391	-	15.199	0.00
Perceived risk (PR)	-0.962	0.059	-0.693	-16.311	0.00
Trust (T)	0.026	0.058	0.011	0.455	0.650
Convenience (C)	-0.117	0.088	-0.121	-1.325	0.198
Relative advantages (R)	0.402	0.081	0.436	4.95	0.00

A regression model was proposed in considering Table 3's findings to examine the relationships between the adoption of m-banking and the influencing factors: perceived risk (PR1), trust (T2), convenience (C3) and relative benefits (R4). The statistical equation is derived as below:

$$UMB = 5.942 - 0.962\,PR_1 + 0.026\,T_2 - 0.117\,C_3 + 0.402\,R_4 \quad (2)$$

The regression coefficient for perceived risk (PR1) is -0.962 which supports Masinge (2010) results of a negative link between perceived risk and the adoption of m-banking. The negative coefficient indicates that the average influence on adopting m-banking decreases as perceived risk increases. A regression coefficient of 0.026 for trust (T2) indicates a positive link with m-banking use that is not statistically significant. This result contrasts with a prior study by Cheah (2011) who established a positive effect of trust using m-banking. Although the coefficient lacks statistical significance in this study, the direction of the relationship aligns with Cheah's findings indicating a potential influence of trust on mobile banking usage. Similarly, the convenience (C3) regression coefficient is -0.117 suggesting it is negatively related to m-banking adoption. However, this coefficient does not maintain statistical significance. This result supports the previous findings that emphasize the importance of convenience in m-banking usage despite its lack of significance. In contrast, the regression coefficient for relative advantages (R4) is 0.402 and is statistically significant. This supports previous research highlighting the positive impact of comparative advantages on adopting and recommending m-banking. The considerable coefficient indicates that a gain in perceived relative benefits is associated with a substantial rise in the overall effect of recommending mobile banking to others.

These regression results highlight the significance of perceived risk, convenience, trust and relative advantages in adopting m-banking. The results support the previous findings. The negative coefficient for perceived risk aligns with Masinge's research while the positive coefficient for relative advantages supports prior literature. Although the coefficients for trust and convenience lack statistical significance, their directions of influence correspond to previous studies.

Table 4. Model summary for predicting the use of mobile banking by study variables.

R	R-square	Adjusted R-square	Std. error of the estimate
0.968	0.937	0.935	0.284

As shown in Table 4, the regression model yielded compelling results indicating a strong and significant association between the factors used in the research. R-Square (coefficient of determination) of 0.937 implies that the independent elements in the model explained 93.7% of mobile banking variability. The model is robust and predictive with a high R-squared value. It suggests that perceived risk, convenience, trust and relative advantage explain a large percentage of mobile banking usage variation. The model's adjusted R-square of 0.935 also indicates its validity. Adjusted R-squares account for the model's predictors and provide a more conservative estimate of explanatory power. The model's conclusions are trustworthy since the adjusted R-squared value reaffirms the vital link between the independent and dependent variables. Additionally, the low standard error of the estimate (0.284) suggests that the predicted values from the regression model are close to the dependent variable's actual values. This indicates a robust model fit and strengthens the statistical significance and robustness of the findings.

Further analysis involved conducting an Analysis of Variance (ANOVA) test followed by a post-hoc analysis to determine specific group differences in m-banking adoption. As illustrated in Table 5, no significant differences in acceptance levels were found between users aged 18 to 30 and those aged 30 to 50 (p-value = 0.276). However, when these age groups were compared to those over 50, significant differences in m-banking adoption

occurred (p-value = 0.000). This research implies that users over the age of 50 have different perspectives and degrees of acceptance than those who are younger. This result aligns with prior studies by Venkatesh et al. (2003) who found that age differences can influence the degree of acceptability in m-banking adoption. As a result, banks targeting different age groups of m-banking customers may need to tailor their strategy to account for these differences.

Table 5. Post-hoc analysis: Multiple comparisons of m-banking adoption by age and education.

Demographic variables		Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
(I) Age						
18-30 (1)	2	-0.135	0.1108	0.276	-0.306	0.114
30-50 (2)	3	-0.563*	0.1365	0.000	-0.811	-0.104
Above 50 (3)	1	0.709*	0.1417	0.000	0.238	1.058
(I) Education						
Undergraduate (1)	2	0.038	0.1236	0.842	-0.166	0.245
Graduate (2)	3	-0.406*	0.1036	0.000	-0.677	-0.125
Postgraduate (3)	1	0.356*	0.1310	0.002	0.121	0.701

Note: * Level of significance at 1 percent (two-tailed).

According to the post-hoc analysis (see Table 5), there were no statistically significant differences in m-banking usage between undergraduate and graduate users (p = 0.842). However, postgraduate or higher-level education was associated with considerable differences in m-banking adoption compared to undergraduates (p-value = 0.000) and graduate-level users (p-value = 0.003). This suggests that users with postgraduate or advanced degrees perceive and embrace m-banking differently than users with undergraduate or graduate degrees. This finding corroborates the findings of Jayawardhena and Foley (2000) who argued that internet banking consumers tend to be more educated. Based on these findings and statistical analyses, the study concludes the hypothesis testing as follows:

Table 6. Summary of hypotheses testing.

Hypotheses	Contents of Hypotheses	Findings
H_1	Perceived risks show a significantly negative relationship with the use of m-banking in Nepal.	Accepted
H_2	Trust shows a significantly positive relationship with the use of m-banking in Nepal.	Rejected
H_3	Convenience holds a positively significant relationship with the use of m-banking in Nepal.	Rejected
H_4	Relative advantage has a significantly positive relationship with the use of m-banking in Nepal.	Accepted

Table 6 presents a summary of the results of the study's hypothesis testing. It is demonstrated that perceived risk and relative advantages have statistically significant and robust relationships with mobile banking adoption in Nepal.

5. CONCLUSION

This study has addressed the research questions regarding the influencing factors on the usage of m-banking in Nepal. The quantitative analysis documented that perceived risk and relative advantages significantly influence mobile banking usage. Mobile banking services' acceptance in Nepal was influenced positively by comparative advantages and convenience but negatively by perceived risk. The study contradicted previous studies by finding no relationship between trust and m-banking. The results align with prior research concerning the negative relationship between perceived risk and the usage of mobile banking (Ajzen, 1991; Bestavros, 2000; Daniel, 1999; Gu et al., 2009) as well as the positive relationship between relative advantages and adoption (Hernandez & Mazzon, 2007; Tan & Teo, 2000; Wang et al., 2003). The statistically significant coefficients in the

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regression model suggest that individuals perceiving tremendous relative advantages are more inclined to use and recommend m-banking. However, the findings contradict the prior literature in terms of the significance of trust (Cheah, 2011; Jayawardhena & Foley, 2000; Laforet & Li, 2005) and convenience (Bradley & Stewart, 2003; Eriksson et al., 2005; Kolodinsky et al., 2004).

A clear relationship between trust and mobile banking usage in Nepal will require more investigation even if the direction of effect is consistent with previous studies. This is indicated by the lack of statistical significance. The lack of statistical significance implies that convenience may not be a significant factor contrary to better expectations. Therefore, additional study is required to examine these issues in the particular context of Nepal and understand how they affect the use of m-banking. The ANOVA test indicates that m-banking users over 50 and those with a postgraduate or advanced degree have higher user acceptability than younger users. This result is consistent with previous studies showing that differences in age and education can affect user acceptability and behavior (Jayawardhena & Foley, 2000; Venkatesh et al., 2003). Therefore, banks targeting various types of users may need to adapt their strategies to account for these distinctions. The country's financial inclusion rate is still lower than the regional average despite an increase in financial institutions and technology particularly in telecommunications. This study found that consumer awareness and the creation of user-friendly, low-risk and low-cost financial services particularly mobile banking can increase the adoption of financial services. Theoretically, this study advances information technology acceptance research by conclusively demonstrating the Technology Acceptance Model's (TAM) applicability in an alternative setting. The government should create a national financial education strategy as a matter of policy to educate people about formal financial services, including mobile banking. Mobile banking literacy programs for users are crucial and regulations should protect m-banking customers.

INSTITUTIONAL REVIEW BOARD STATEMENT
The Ethical Committee of the Nepal Commerce Campus, Nepal has granted approval for this study (Ref. No. 916/080/081).

TRANSPARENCY
The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

COMPETING INTERESTS
The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS
All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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