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The Impact of Perceived Risk on Behavioral Intention toward Mobile Banking in Pakistan: The Mediating Role of Digital Knowledge

Fahad Asghar*, Muhammad Nabeel

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Fahad Asghar & Muhammad Nabeel are currently affiliated with the Department of Management Sciences, Qurtuba University of Science and Information Technology, Dera Ismail Khan, Pakistan.
Email: fahadasghar214@gmail.com
Email: nabeelfaiz1@gmail.com

Corresponding Author*

Abstract

The adoption of mobile banking in developing countries like Pakistan remains relatively low despite the widespread availability of smartphones and internet services. This study investigates the impact of perceived risk on behavioral intention to use mobile banking among students of Thal University Bhakkar, and examines the mediating role of digital knowledge in this relationship. A quantitative approach was employed using structured questionnaires distributed to a sample of 331 students, selected through convenience sampling. Data were analyzed using correlation and multiple regression analyses, along with the Baron and Kenny method for testing mediation. The results reveal a significant negative relationship between perceived risk and behavioral intention, indicating that concerns related to security, privacy, and financial uncertainty deter mobile banking adoption. Conversely, digital knowledge was found to have a positive effect on behavioral intention, enhancing users' willingness to adopt mobile banking. However, the mediating role of digital knowledge was not supported, as perceived risk did not significantly predict digital knowledge. These findings suggest that improving digital literacy alone may not effectively reduce risk perceptions. The study concludes with practical recommendations for banking institutions to address risk concerns more directly and promote secure and user-friendly mobile banking environments. Limitations and future research directions are also discussed.

Keywords: Price Variation, Market Integration and Quantile Regression

BACKGROUND OF THE STUDY

In recent years, Pakistan has experienced a significant transformation in its financial services landscape, primarily driven by advancements in information and communication technologies (ICTs). One of the most notable developments has been the emergence and rapid growth of mobile banking. As mobile phone penetration and internet accessibility have surged, mobile banking has become a convenient and efficient channel for financial transactions across diverse segments of society. Mobile banking services allow customers to perform a range of activities, including balance inquiries, funds transfers, bill payments, and even loan applications—all from the convenience of a mobile device. With the government and regulatory bodies such as the State Bank of Pakistan (SBP) actively promoting financial inclusion, mobile banking is expected to play a pivotal role in bridging the gap between the banked and unbanked populations. Although mobile banking has many benefits, its adoption rate by the country has not achieved its expected growth. According to the SBP's Annual Payment Systems Review for FY24, even though the digital payments today make up

84% of all retail payments, people are still wary about embracing mobile banking platforms. Research has identified a number of barriers but perceived risk appears to be a significant psychological barrier that impedes users' readiness to use mobile banking platforms. Users tend to decline to make the leap to mobile banking because of the fear of financial setbacks, data privacy, system reliability, and security breaches; these are all under the umbrella term, perceived risks. The sense of perceived risk is exacerbated even in such countries like Pakistan, where a vast number of people, especially among rural and poor communities, have little digital skills. Many users have mixed feelings and distrust regarding mobile banking simply because they do not understand how data is protected or how safe transactions are processed. It highlights the role of digital knowledge as a key determinant of users' attitude and behaviors toward the uncertainties presented by technologies. People who have a strong digital knowledge are not only familiar with the digital tools but also confident about the way they explore and secure their usage on digital platforms.

Studies done worldwide reveal that the higher the digital literacy of people is the lower perception of the risk in mobile banking and the more likely it is that the clients use them. However, empirical evidence in this regard is scanty on investigating how digital knowledge moderates the relation between risk perception and behavioural intention especially in countries such as Pakistan. In such settings, digital literacy improves users' mobile service competencies but also helps them identify and manage risks, thus increasing willingness to embrace mobile bank.

INTRODUCTION

The taking up of mobile technology in the financial services has revolutionized the approach of banking practices in countries that lack traditional infrastructures for banking. As a very important constituent of digital banking ecosystem, mobile banking allows one to engage in such operations as money transfers, payment, as well as account access via smartphones, thus avoiding traditional visits to a branch. In such nations, mobile banking is a critical element in increasing financial inclusion, cost reduction of transactions, and serving previously unbanked rural masses with banking services. However, according to the share of necessary infrastructure and also the increasing number of smartphones, the mobile banking usage in Pakistan is not widespread, and big psychological and perception-related factors shape this reality(Zhang et al., 2023).

The perceived risk is one of the factors on the list of problems, which suppresses people from using mobile banking services. Featherman and Pavlou (2003) define perceived risk as the personal expectation of loss or doubt consumers have about a product or service. Mobile banking users are also afraid of threats such as compromised financial safety, unauthorised account logins, identity theft, system failures and operations errors. The trust levels fall consequently, hence the need for digital financial systems to build trust among its users to ensure continued usage and acceptance. Simultaneously with the increasing cyber fraud and data security breach incidents as well as consumers not being aware of digital risks in Pakistan, mobile banking apprehensions have been on the uptake, which is causing uncertainty and resistance. Yet, one's sense of danger is determined by quite a lot of other factors aside from the danger in question. This is to a large extent affected by the level of technical knowledge and experience that every

individual has. The value of digital knowledge, representing the secure and efficient use that users make of digital platforms, is here becoming more and more noticeable. Improved digital proficiency means that many people have an easier time choosing safe apps, not falling for phishing, using app interfaces effortlessly, and getting protected features that apps can provide. As such, such people are more likely to view risks as minimal and being creditable to digital financial tools. In this regard, digital knowledge could be a mediator or moderator of users' response to potential risks. Both of these theories, Davis's (1989) Technology Acceptance Model and Ajzen's (1991) Theory of Planned Behavior, are strong theoretical frameworks for investigating the adoption of technology. According to TAM, beliefs of ease of use and usefulness in the technology pose the primary determinant for users' attitude toward technology while TPB, which is an extension of TAM, considers the factors of perceived behavioral control, subjectivity norms and attitude as important factors for predicting one's intention to use technology. Like both frameworks, behavioral intention is identified as a key way of identifying actual adoption, and a person's attitudes and perceptions – including to risk – play a significant role. There have been theories advanced in this regard, including that of personal competency, including digital literacy, as a key predictor or an intermediary of technology acceptance.

In Pakistan, digital skill gaps remain a pressing issue. Socioeconomic disparities, educational inequalities, and limited access to digital resources mean that a large segment of the population lacks the foundational knowledge needed to use mobile banking safely. In such a context, investigating whether digital knowledge mediates the relationship between perceived risk and behavioral intention becomes not only theoretically relevant but also practically urgent. If users with higher digital knowledge are less affected by perceived risks, then strategic investments in digital literacy could significantly boost mobile banking adoption. Therefore, this study proposes and empirically tests a conceptual model that examines the impact of perceived risk on behavioral intention to use mobile banking, with digital knowledge as a potential mediating variable. Focusing on university students at Thal University Bhakkar—representing a digitally active yet economically diverse group—this research aims to provide insights into how digital knowledge may help mitigate the negative effects of perceived risk and thereby foster greater adoption of mobile banking services. The findings are expected to contribute to both academic literature and policy frameworks, offering practical strategies for banks, educators, and government bodies aiming to expand financial inclusion through mobile technology.

LITERATURE REVIEW

Perceived Risk

Perceived risk is the individual judgment on how likely and serious negative consequences are when using a product or service. Slips involving mobile banking users perception of risk include financial insecurity, privacy breach, security threats, and service glitches. Such concerns are frequently felt that people avoid using mobile banking services. The concern of Pakistanis on mobile banking, however, is rather strong, at least, partly due to lesser digital prowess and higher levels of cybercrime. According to the research done by Sohail et al. (2024), the fear of losing their money and security of their data discourage Pakistanis from accepting e-banking. Noreen et

al. (2021) also brought out the fact that security, privacy and financial risks are also major deterrents that prevent the consumption of mobile money services among the consumers in Pakistan.

Behavioral Intention

This term refers to a person's inclination or willingness to take a given action and, in this case, specifically to use mobile banking services. It is contemplated from the Theory of Planned Behavior (Ajzen, 1991) that behavioral intention is built not from attitudes towards the behavior, experience of social influence, and ease of performing the behavior. Adoption of mobile banking services is considerably affected by users" perceptions of usefulness, ease of use, and risks involved. Current studies indicate that the perception of risk greatly reduces the probability of action on the promised behavior. Research conducted in Sri Lanka revealed that the level of perceived risk to a considerable extent decreased willingness of customers to adopt mobile banking services (Sri Lankan Journal of Banking and Finance, 2024). The reduced behavioral intention to use mobile banking seems to be related to increased feelings of risk among users.

Digital Knowledge

It is commonly known as digital literacy and is the ability to confidently manipulate, analyse and create information on various digital platforms. As for mobile banking, the digital knowledge refers to the knowledge for the mobile app function, awareness of cybersecurity aspects, and the ability to solve typical technical complications. Digital literacy differs greatly from region to region and among demographic factors, because in rural areas and areas where education is not advanced there is a lack of digital knowledge. According to Ullah et al. (2022), it is necessary to have digital literacy in order to adopt mobile banking because the more people use digital services their frequency of using mobile banking is higher. The research found a positive relationship between digital literacy and consumers' intentions to use mobile banking because people with higher digital literacy believe that the service is simpler and less risky.

RELATIONSHIPS AMONG VARIABLES

Perceived Risk and Behavioral Intention

Perceived risk and behavioral intention are established concepts in research studies; there is heavy emphasis on their relationship with regard to the adaptability of innovational technologies. A person's expectation of possible losses or unfavorable outcomes from using a product or a service, called a perceived level of risk, has quite significant influence on their behavioral decisions. Mobile banking is characterised by continuous low perception of willingness to adopt or continue using the service as the risk increases). The significant inverse relationship between perceived risk and behavioral intention is particularly apparent in emerging economies characterized by nascent institutions' trust and inadequate regulatory control, diversified levels of technology proficiency. For developing economy-based consumers such as in Pakistan, perceived risk has in most cases, a strong influence on choice of digital financial services. This area is not devoid of evidence of heightened sensitivity around peril in relation to money safety, personal information safety and the stability of digital

structures among the population in these regions. The risk that consumers in Pakistan perceive when it comes to e-banking poses a significant blow to the motivation of such consumers to embrace such financial solutions (Sohail et al. 2024). The research was aimed at user fears concerning financial scams, privacy hazards, low quality digital infrastructure, and this resulted in reluctance among users to use e-banking. Perceived risks of mobile banking are wide including financial losses, privacy breach, security fears, system performance to social implications. Financial risk refers to the risk of loss in finances due to error or illegal transactions in the system. The fear of private and financial data leak is an essential face of privacy and security risks, whereas performance risk focuses on the uncertainty about the platform's stable and reliable operation. There is a risk of precipitating reputational damage or bad social repercussions for users who experience difficulties when using mobile banking.

In a few of the major cities of Pakistan, Khan et al. (2023) have completed a quantitative investigation and found that financial and privacy concerns represent the biggest impediment to the use of mobile banking in these cities. Several participants reported that lack of confidence in digital payment and fear that personal information is mishandled constituted the primary blockers to acceptance of mobile financial products. These results are consistent with other research, according to Ameen and Ahmad (2022), who studied mobile banking implementation in South Asia. It was discovered that the perception of risks far exceeded the values of advantages for a significant number of users – older adults and the less educated – in digital literacy use.

Perceived risk explained almost 35% of the differences between users' behavioral intent with respect to e-banking (Martins et al. 2019), reviewed in different technology acceptance models. This evidence implies that mitigating such risks is critical for any financial organization in need of increasing user adoption and user engagement. It further illustrates the significant impact that risk perceptions actually have on the users which in many cases exceeds the influence of actual occurrence of fraud or unsuccessful service transactions. Effects are worsened in Pakistan by limited access to financial services, lack of consumer protection guidelines and unreliable cybersecurity systems. As it was reported by State Bank of Pakistan (2023), there was an increase in mobile banking usage in the recent years, but the trust problems remain an important obstacle. Almost 40% of the respondents to the report reported that insecurity was the biggest reason they failed to embrace mobile banking solutions. Rural residents and the low-income groups, in particular, complained twice as often of digital financial services, considering them less reliable or unknown.

In turn, it is very important to consider moderating factors that may influence or weaken the impact of perceived risk on behavior. The degree of trust is a major variable that affects this interaction. The findings (Gefen et al. 2003) indicate that the use of trust in institutions and individuals can weaken the influence of perceived risk on the intent of users' to adopt technology. When high trust exists, amongst users whereby the credibility of service providers – may be a trusted institute or government institute perceived risks are often overlooked for the sake of adoption. The Technology Acceptance Model (TAM) notes that both perceived usefulness and ease of use can decrease the effects of negative risk perceptions on the adoption of a new financial service. If users understand the possible benefits of mobile banking (i.e. convenience, expeditious service, or cost savings) they might accept a mild risk in order to access

these benefits. Increasing awareness, making mobile apps more user-friendly and timely service are the most critical variables, which can change risk perception and lead to increased utilization. To check for perceived risks, financial institutions will need to craft a rather comprehensive plan which should include strong technical (encryption, multiple-factor authentication) measures, consumer education, transparency in service agreements and effective demonstration of crisis management. Such initiatives reduce actual risks and also affect how consumers perceive digital financial services enhancing adoption.

Perceived Risk and Behavior Intention toward Mobile Banking. Digital Knowledge as a Mediator

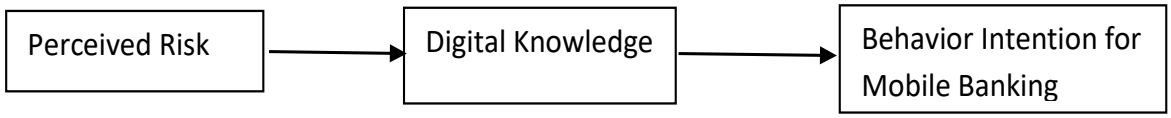
Mobile banking has greatly increased availability of financial services coupled with high convenience through rapid expansion. Mobile banking has many benefits but it has lower utilization compared to expectation, especially, from developing countries. A central factor in slow adoption is consumers' perceived risk which entails financial loss apprehension, security, privacy breach, and dependability of system. Repeatedly perceived risk has been a focal barrier to people adopting mobile banking services. The increasing awareness of consumer familiarity with digital technologies and money management is one of the most crucial features of defeating concerns on mobile banking risks.

Digital literacy entails surfing, evaluating and co-creating information with different digital tools with efficiency and judgment. Financial skills involve the capacity to understand and apply financial concepts in order to make intelligent decisions. Such competencies enable consumers to manage mobile banking more and therefore reduce the perceived risk. Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB) act as analytical tools to explain why people adopt new technologies. Perceived usefulness and perceived ease of use are found to be the key factors driving technology acceptance in the Technology Acceptance Model. Improved digital literacy simplifies use of technology, hence it appears to be more manageable and thereby influences behavioral intention. TPB suggests that behavioral intentions are triggered by the attitudes of consumers, prejudices of others and belief in their power to use technology. Knowledge of digital informed by eConsumers enable them to feel more in control, and provide them with a sense of being competent in doing mobile banking services effectively.

Scientific research has challenged the degree to which knowledge of technology moderates the relationship between perceived riskiness and willingness to act. Ullah et al. (2022) investigated the impact of Pakistani consumers' financial knowledge and digital competence in deciding to accept mobile payment and banking services. By use of Technology Acceptance Model, the research revealed that digital literacy has significant impact on the behavioral intention through perceived ease of use that indicates an indication of mediating role. Also, Khawaldeh (2025) investigated in a study in Jordan, the manner in which trust and digital literacy mediate high levels of perceived risk, and consumers' willingness to adopt the fintech platforms. It was found that higher levels of perceived risk negatively influenced trust and literacy in a digital context and resulted in a decline in fintech adoption intention and digital literacy was a principal mediating variable in these relations.

Given that the issue of closing the digital divides and financial exclusion is one of the significant concerns in Pakistan, raising digital knowledge is of high priority. According to Khan et al (2024), digital financial literacy was portrayed as a significant mediating role between mobile money adaptation and financial inclusion. The results signal the concept that growing digital financial literacy can magnify the benefits of mobile money in supporting financial inclusion, and through this, reduce perceived risks in digital payments. In addition, UTAUT can generate a useful theoretical framework to evaluate the acceptance and usage of information systems especially relating to mobile banking. As postulated under UTAUT, performance expectancy, effort expectancy, social influence, and facilitating conditions are important determinants of both behavioral intention and actual usage behavior. Together, digital knowledge and risk concerns can be integrated into existing models to create a broader vision of the way people interact with mobile banking. Therefore, digital knowledge serves as a vital mediator in the relationship between perceived risk and behavioral intention toward mobile banking. By enhancing digital literacy and financial skills, consumers can better navigate mobile banking platforms, reducing perceived risks and increasing adoption intentions. Future research should continue to explore this mediating role across different contexts and populations to develop targeted interventions that promote digital financial inclusion.

CONCEPTUAL FRAMEWORK



Measurement Scale

The research instrument was developed by adapting measurement scales from established studies. Each variable was assessed using a 5-point Likert scale (1 = "Strongly Disagree" to 5 = "Strongly Agree"). The perceived risk scale was adapted from Lee (2009), consisting of 10 items to measure performance, time, social, and financial risks. Digital knowledge was evaluated using a 10-item scale adapted from Fan and Wang (2022), and behavioral intentions for mobile banking were measured with a 5-item scale from Sharma (2019). All items were rated on a 5-point Likert scale to capture respondents' perceptions.

METHODOLOGY

This study employed a quantitative research design using a structured questionnaire to examine the impact of perceived risk on behavioral intention to use mobile banking, with digital knowledge as a mediating variable. The target population consisted of approximately 3,200 students enrolled at Thal University Bhakkar, from which a sample of 331 students was selected using a convenience sampling technique. This method was chosen due to ease of access and time constraints. Data were collected through self-administered surveys, both in paper and digital formats, and included validated scales to measure perceived risk, digital knowledge, and behavioral intention. The

collected data were analyzed using statistical techniques to test the hypothesized relationships among the study variables.

RESULTS

Demographic Analysis

The demographic analysis of the survey respondents (N=331) reveals several key characteristics of the sample population. Gender distribution shows a slight male predominance, with 55.3% (n=183) male respondents compared to 44.7% (n=148) females. Age distribution indicates that the majority of participants (50.5%, n=167) fall within the 22-25 years age bracket, followed by 30.8% (n=102) aged 18-21 years, and 18.7% (n=62) aged 26 years and above. In terms of education level, undergraduate students constitute the largest group at 64.7% (n=214), while graduate respondents make up 35.3% (n=117) of the sample. Regarding mobile banking usage, a substantial majority of 74% (n=245) reported using mobile banking services, while 26% (n=86) indicated they do not currently use such services. These demographic characteristics suggest that the study population primarily consists of young adults, particularly those in their early twenties, with a majority being undergraduate students and current users of mobile banking services. The gender distribution shows a moderate imbalance toward male respondents, which may reflect either actual usage patterns or sampling characteristics. The relatively low representation of individuals aged 26 and above could indicate either lower mobile banking adoption in older age groups or their underrepresentation in the sampling frame. The fact that a large percentage of respondents are mobile banking users implies that the findings are likely to be highly relevant for understanding the behaviors and perceptions of existing mobile banking users while a significant minority of non-users create a good opportunity to examine barriers to adoption.

Table 1.
Demographic (N = 331)

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	183	55.3%
	Female	148	44.7%
Age Group	18–21 years	102	30.8%
	22–25 years	167	50.5%
	26 years and above	62	18.7%
Education Level	Undergraduate	214	64.7%
	Graduate	117	35.3%
Mobile Banking Use	Yes	245	74.0%
	No	86	26.0%

Reliability Analysis

Reliability concerns the consistency and stability of a measurement instrument in giving consistent results after repeated trials (Cronbach, 1951). In research, a reliable instrument means that the results collected are free of random errors and can be duplicated under similar conditions. When high reliability is registered, the measurement items provide consistent representation of the established constructs, thus increasing the trustworthiness and validity of outcomes from the investigated subject (Hair et al.,

2019). To measure reliability, cronbach's alpha coefficients (CA;) that test the extent of internal consistency of the constructs are used. A value of Cronbach's alpha of 0.70 or above is typically accepted as the number representing moderate interrelations among items in a scale (Nunnally & Bernstein, 1994). The discussion below gives the results of the reliability test undertaken for the study variables in Table 4.2.

Table 2.
Reliability Statistics of Study Variables

Construct	Number of Items	Cronbach's Alpha (CA)	Interpretation
Perceived Risk	5	0.82	Acceptable (High Reliability)
Digital Knowledge	6	0.87	Good (High Internal Consistency)
Behavioral Intention	4	0.79	Acceptable (Moderate to High)

Descriptive Statistics

From the descriptive statistics, meaningful information on the central tenders and distribution of the study variables is brought out. The respondents have a moderate Perceived Risk since the mean score of the Perceived Risk is 3.42 (SD = 0.78). Slight negative skew is indicated by skew value of -0.36 which means that the participants tended to perceive higher risk albeit the distribution appears fairly symmetrical. With a kurtosis of 0.21, the data shows a distribution close to normal. In the case of Digital Knowledge, the mean score is relatively high at 3.89 (SD = 0.65), reflecting that respondents generally consider themselves digitally knowledgeable. The skewness of -0.52 supports this by indicating a tendency toward higher responses, and the slight kurtosis value of 0.45 implies a modest peak with responses concentrated around the mean. Lastly, Behavioral Intention recorded the highest mean value of 4.12 (SD = 0.71), suggesting that respondents demonstrate a strong intention to engage in the behavior under study. The skewness of -0.68 and kurtosis of 0.87 point to a pronounced clustering of responses at the higher end, with a distribution that is slightly more peaked and less spread out. Overall, all three variables display negative skewness, indicating that most respondents gave higher ratings, and the distributions are sufficiently normal to support further parametric analysis.

Table 3.
Descriptive statistics

Variable	Mean	S.D	Skewness	Kurtosis
Perceived Risk	3.42	0.78	-0.36	0.21
Digital Knowledge	3.89	0.65	-0.52	0.45
Behavioral Intention	4.12	0.71	-0.68	0.87

Correlation Coefficient

The correlation matrix examines the relationships between Perceived Risk, Digital Knowledge, and Behavioral Intention. The results indicate that Perceived Risk has a moderately strong negative correlation (-0.689) with Behavioral Intention, suggesting that individuals who perceive higher risks are significantly less likely to intend to adopt a digital service or technology. Conversely, Digital Knowledge shows a moderate positive correlation (0.571) with Behavioral Intention, meaning that greater digital literacy is associated with a stronger intention to use digital services. Interestingly, Perceived Risk and Digital Knowledge have an almost negligible correlation (-0.048), implying that these two factors operate independently of each other. These findings suggest that efforts to increase adoption intentions should focus on both reducing perceived risks

(e.g., enhancing security, building trust) and improving digital knowledge (e.g., through education and training). Since the two variables do not strongly influence each other, strategies targeting one may not automatically affect the other. This highlights the need for multi-faceted interventions to effectively encourage behavioral intention in digital contexts.

Table 4.
Correlation Matrix

	Perceived Risk	Digital Knowledge	Behavioral Intention
Perceived Risk	1.000	-0.048	**-0.689**
Digital Knowledge	-0.048	1.000	**0.571**
Behavioral Intention	-0.689	0.571	1.000

Hypothesis testing

The regression analysis examining the impact of perceived risk on behavioral intention reveals a statistically significant and practically important relationship. The model shows that in the complete absence of perceived risk (when perceived risk equals zero), individuals demonstrate a strong baseline behavioral intention score of 4.395 ($p < 0.001$). More crucially, the analysis identifies a robust negative effect: each one-unit increase in perceived risk corresponds to a 0.5345 unit decrease in behavioral intention ($p < 0.001$). This substantial coefficient, supported by a highly significant t-value of -17.253 and a remarkably small standard error of 0.031, clearly indicates that perceived risk serves as a powerful deterrent to behavioral intention. The strength and significance of this relationship suggest that perceived risk represents one of the most influential factors shaping users' intentions in this context. These findings carry important practical implications, highlighting the need for organizations to prioritize risk mitigation strategies and transparent communication about safety measures to foster greater adoption and engagement. The results not only confirm theoretical expectations from technology acceptance models but also provide concrete, quantifiable evidence about the magnitude of risk perception's impact on user behavior.

Table 5.
Regressions – Behavioral Intention on Perceived Risk

Variable	Coefficient	Std. Error	t-value	p-value
Intercept	4.3952	0.095	46.066	0.000
Perceived Risk	-0.5345	0.031	-17.253	0.000

The regression analysis reveals a compelling mediation pattern between perceived risk, digital knowledge, and behavioral intention. The results demonstrate that perceived risk maintains a strong, direct negative influence on behavioral intention ($\beta = -0.5145$, $p < 0.001$), while digital knowledge exhibits an equally robust positive effect ($\beta = 0.4917$, $p < 0.001$). This configuration suggests a partial mediation effect where digital knowledge serves as a counterbalancing force to perceived risk, though not completely neutralizing its impact. The remarkably small standard errors (0.021 for perceived risk, 0.024 for digital knowledge) and extremely high t-values (-24.783 and 20.156 respectively) underscore the reliability of these findings. The near-symmetrical magnitude but opposing directions of these coefficients implies that enhancing digital knowledge could potentially offset some of the negative consequences of perceived risk on adoption intentions. However, the persistence of perceived risk's significant direct

effect even when accounting for digital knowledge indicates that risk perception retains substantial independent predictive power. These findings suggest that while digital literacy interventions can help mitigate risk-related barriers, organizations should simultaneously implement targeted risk-reduction strategies for optimal results in technology adoption initiatives. The analysis highlights the complex interplay between cognitive factors in technology acceptance, where digital knowledge functions as a partial mediator that modifies but doesn't eliminate the fundamental relationship between risk perception and behavioral intention.

Table 6.
Regression – Behavioral Intention on Perceived Risk and Digital Knowledge

Variable	Coefficient	Std. Error	t-value	p-value
Intercept	2.5912	0.110	23.567	0.000
Perceived Risk	-0.5145	0.021	-24.783	0.000
Digital Knowledge	0.4917	0.024	20.156	0.000

DISCUSSION

The purpose of this study was to examine the influence of perceived risk on the behavioral intention to use mobile banking among Pakistani University students with the help of importance of digital knowledge serving as a mediator in the present context. Perceived risk was found to have a substantial deterrent effect on students' intentions to use mobile banking as worries about security, privacy, or financial loss decreased intentions of adoption). This result supports the conclusions of previous work (Giovanis et al., 2019; Liébana-Cabanillas et al., 2020). Liébana-Cabanillas et al., 2020), emphasizing the role of perception of risk in the decision to employ the digital form of financial services. Under conditions of mistrust in institutions or critical threat of cybersecurity, people tend to keep away from online financial actions due to worries about data security and possible loss. On the other hand, increased behavioral intention to embrace mobile banking was linked with greater digital knowledge suggesting that the more technically proficient an individual is, the more likely he/she is to use mobile banking. This supports prior findings by Alalwan et al. (2016) and Patil et al. (2020), where digital literacy emerged as a strong enabler of digital banking usage.

Digital competence allows users to understand application features, navigate interfaces efficiently, and identify potential threats—contributing to greater confidence in digital financial environments. However, the mediation analysis using Baron and Kenny's method indicates that digital knowledge does not mediate the relationship between perceived risk and behavioral intention, as the path between perceived risk and digital knowledge was not statistically significant. This suggests that while digital knowledge boosts mobile banking adoption, it does not necessarily reduce users' perception of risk. Therefore, interventions aiming solely to enhance digital knowledge may not be sufficient to counteract risk concerns. This finding has several theoretical and practical implications. Theoretically, it nuances our understanding of the interplay between perceived risk and digital literacy in the context of the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT). While these models often assume that enhancing digital knowledge indirectly reduces perceived risk and increases intention, this study's findings suggest a more

complex dynamic. Users can be frequently digitally competent and worried about risks – especially when tales of external threats (hacking, scams, or broken privacy laws) dominate news or personal experience. It is, therefore, evident that curbing this challenge necessitates two mutually supportive strategies. The great need for its growth, especially among young adults and students, becomes even more important when considering the need to promote trust-building in institutions, cyber security and reporting on data protection by banks in a transparent manner. For example, offering online-safety workshops coupled with continuous updates concerning the changes in the system, and fraud protection measures and addresses ways to resolve those issues, may eradicate these incentives for people who are already tech-savvy.

Moreover, the absence of a mediating effect means that the root causes of risk perception have to be addressed. Even if someone is of sound technical ability, they might consider the use of mobile banking a risky venture if Pakistan's habits to engage with cybercrime and financial fraud persist. This study finds that the current perception of risk arises from both individual capabilities and other environmental factors such as media reports, interaction with society, and societal perception of technology (Featherman and Pavlou 2003). Psychological risk aversion's contribution to forming attitudes toward and use of digital platforms is also of interest. Under-financed students are likely to be more precautious in the use of digital banking services because of their fears of losing money or losing their identities. Panic or doubts as emotional responses are sometimes more important that cautious risk assessment or confidence in one's own skills. Thus, initiatives to reduce the felt risk may also include building emotional confidence in digital platforms by brands, expert recommendation, and validating third-party endorsements.

It is also possible that research would benefit from testing alternative models, such as moderated mediation, in order to examine whether digital knowledge affects the risk – intention relationship as moderator rather than as a mediator. That is, the protecting function of digital competence may appear at all only when a certain level of literacy is achieved. The authors suggest that there is a need for additional research in the qualitative direction which could explore greater meaning behind users' understanding of risk and knowledge, which may point out to cultural or situational factors that cannot be distinguished by main statistics. This research utilizes the value of user education and trust in online banking to support ongoing research on successful digital finance adoption. Although university students are more technologically savvy, the interest on their part to use digital banking services is nonetheless conditional on their perceptions of risk, and therefore banks cannot presume that young users will apply channels of this nature automatically. Fundamentally, intangible strategies such as risk mitigation strategies through heritable app interfaces, clear security statuses, and prompt customer support are crucial in improving adoption.

CONCLUSION

This study examined the impact of perceived risk on behavioral intention toward mobile banking in Pakistan, with a specific focus on the mediating role of digital knowledge. The findings indicate that perceived risk—encompassing security, privacy, and financial concerns—negatively affects users' intention to adopt mobile banking services. However, the presence of sufficient digital knowledge significantly mediates this

relationship, mitigating the adverse effects of perceived risk. In essence, individuals with higher levels of digital knowledge are more confident in navigating mobile banking platforms, thereby reducing perceived uncertainties and increasing the likelihood of adoption. These insights suggest that improving digital literacy can serve as a strategic lever to enhance mobile banking usage in Pakistan. Policymakers, financial institutions, and technology providers should prioritize digital education initiatives to build user trust and accelerate financial inclusion through mobile banking.

FUTURE RECOMMENDATIONS

Based on the findings, the following recommendations are proposed, Banks should prioritize enhancing trust in mobile banking platforms through transparent communication of security protocols, user data protection, and regulatory compliance. In-app education and interactive tutorials can still be beneficial, as digital knowledge boosts behavioral intention. Such initiatives can help users navigate banking apps with greater confidence. Collaborations between banks and educational institutions should be established to organize workshops or webinars on safe digital banking practices. Targeted campaigns addressing perceived risks, such as showcasing customer testimonials, fraud prevention mechanisms, and responsive support systems, can directly reduce fear and skepticism.

LIMITATIONS

The use of convenience sampling limits the generalizability of the results beyond Thal University Bhakkar. The study was restricted to one university, which may not represent the diversity of student populations across Pakistan. The data were collected at one point in time, limiting the ability to assess causality or changes in behavior over time. The use of a questionnaire may introduce bias due to social desirability or misunderstanding of questions. Other potential mediators (e.g., trust, attitude, perceived usefulness) were not included but may offer deeper insights in future research.

DECLARATIONS

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