EXPLORING THE FACTORS INFLUENCING MOBILE BANKING ADOPTION AMONG SRI LANKAN UNDERGRADUATES: THE MODERATING ROLE OF FINANCIAL LITERACY

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Abstract

This study investigates the factors influencing mobile banking adoption among Sri Lankan undergraduates, with a specific focus on the moderating role of financial literacy. It extends the Technology Acceptance Model by incorporating "Financial Literacy" as both an antecedent and a moderator to explore the impact of perceived ease of use, perceived usefulness, compatibility, perceived risk, and social influence on behavioral intention. Data were collected from a sample of 300 undergraduates across the state universities in Sri Lanka using a structured online questionnaire and analyzed through structural equation modeling technique. The findings reveal that perceived usefulness, perceived risk, compatibility, and financial literacy significantly influence the behavioral intention to adopt mobile banking, while perceived ease of use and social influence do not have a direct impact. Moreover, financial literacy moderates the relationships between perceived ease of use, perceived risk, and behavioral intention, emphasizing its critical role in mitigating risks and enhancing the ease of technology adoption. These results provide valuable insights for banking sector stakeholders, highlighting the importance of secure, user-centric mobile banking solutions tailored to meet the financial literacy levels and preferences of young, tech-savvy users. The study also emphasizes the need for targeted awareness campaigns and financial education programs to promote mobile banking adoption. Accordingly, the study contributes to the literature on mobile banking and financial literacy, offering practical implications for improving financial inclusion in developing countries.

Keywords: Financial Literacy, Mobile Banking Adoption, Technology Acceptance Model

Introduction

Mobile banking is a significant technological advancement in the banking industry, offering benefits such as cost and time savings, improved accessibility, and faster service delivery, while helping banks remain competitive (Andalib Touchaei & Hazarina Hashim, 2024; Ahmadi Danyali, 2018). Initially introduced by European banks in 1999, mobile banking has been widely adopted by Sri Lankan banks. Despite its advantages, the adoption of mobile banking in Sri Lanka remains limited, with fewer customers using mobile banking compared to traditional banking. While mobile phone subscriptions have increased significantly in Sri Lanka over the past two decades, this rise in mobile phone usage has not translated into widespread mobile banking adoption. Commercial bank customers remain unaware of the benefits of mobile banking, such as profitability, convenience, security, and wider customer reach (Olabode, 2024; Ravichandran et al., 2016).

The high penetration of mobile phones in Sri Lanka, even among lower-income populations, has not been enough to drive mobile banking adoption, particularly due to a lack of awareness, technology infrastructure, and security concerns (Seneviratne, 2016; Jayasiri et al., 2015). In 2009, Sri Lanka had 21 million residents and 14 million mobile subscriptions. By 2023, mobile subscriptions had grown to 29 million, with mobile broadband users increasing from 91,000 in 2009 to 19 million by 2023. Although some research has explored behavioral intentions to adopt mobile banking in developing countries, there remains a gap in studies applying the Technology Acceptance Model (TAM) in the Sri Lankan context. This study addresses this gap by combining TAM with the Theory of Perceived Risk to examine mobile banking adoption among Sri Lankan undergraduates in government universities.

Understanding the factors influencing mobile banking adoption will help identify drivers and barriers to its use. This insight is crucial for Sri Lankan banks to capture new customers and remain competitive by addressing the needs of both potential and existing users. For bank managers, identifying the factors influencing mobile banking adoption can inform better planning and marketing strategies to increase the number of users and promote the broader acceptance of mobile banking services (Danyali, 2018).

The rest of the paper is structured as follows: Section 2 reviews the literature on TAM and financial literacy and presents our conceptual model and hypotheses. Section 3 outlines the research methodology. Section 4 presents the empirical findings. Section 5 discusses the results, implications, limitations, and areas for future research. Finally, section 6 concludes the study.

Literature Review

Mobile Banking Applications

Mobile banking refers to the use of mobile devices, such as smartphones and tablets, to access a variety of financial services, allowing customers to perform banking transactions and manage their accounts anytime and anywhere via mobile communication technologies (Van Zanden, 2023; Pousttchi & Schurig, 2004). This technological advancement has transformed the banking landscape by providing customers with unprecedented convenience and flexibility, eliminating the need to visit physical bank branches. Banks are increasingly adopting mobile banking as a strategic initiative to enhance customer engagement and improve service delivery. By leveraging mobile devices, financial institutions can offer a more personalized banking experience, foster customer loyalty, and streamline operations. Features such as mobile check deposits, fund transfers, and real-time transaction alerts contribute to a more interactive and user-friendly banking environment (Aboelmaged & Gebba, 2013).

As a subset of electronic banking, mobile banking expands upon traditional internet banking by incorporating unique features tailored to the mobile experience. These may include location-based services, biometric authentication for enhanced security, and integration with other mobile applications, such as budgeting tools or financial planning resources (Laukkanen & Pasanen, 2008). By offering these specialized features, mobile banking not only meets the evolving demands of tech-savvy consumers but also positions banks to compete effectively in a rapidly changing financial landscape.

Technology Acceptance Model (TAM)

TAM is a widely used framework that explains the factors influencing users' acceptance and adoption of technology. At its core, TAM posits that two primary factors—perceived usefulness (PU) and perceived ease of use (PEOU)—directly impact users' attitudes toward a technology, which in turn shape their intention to adopt it. Perceived usefulness refers to the extent to which users believe that using the technology will enhance their performance or meet their needs, while perceived ease of use reflects the degree to which they perceive the technology as effortless to operate (Davis et al., 2024; Ayoobkhan, 2018).

Over time, TAM has undergone several modifications and extensions to increase its applicability across different technological contexts and systems. Researchers have introduced new variables such as social influence, perceived risk, and facilitating conditions to improve its predictive power and relevance in modern technological environments (Lee et al., 2003; Chuttur, 2009). For instance, in the context of mobile banking, variables like trust and compatibility have been integrated into TAM to better capture the nuances of users' decision-making processes. These modifications have expanded TAM's utility beyond its original scope, allowing it to explain technology adoption in a variety of sectors, including healthcare, education, and e-commerce. By incorporating additional factors that account for the evolving complexities of digital technologies, TAM continues to be a robust model for understanding user behavior in diverse contexts.

Financial Literacy

Financial literacy plays a crucial role in improving individuals' financial well-being by providing them with the knowledge and skills necessary to manage their finances effectively, make informed decisions about savings and investments, and navigate complex financial products. Individuals who possess strong financial literacy are better able to plan for long-term financial goals, such as retirement, home ownership, and education, while also avoiding common financial pitfalls, such as excessive debt and high-interest loans (Lusardi, 2015). On the other hand, inadequate financial literacy can result in poor financial decisions, such as mismanaging credit, failing to save for emergencies, or misunderstanding investment risks, leading to financial instability and increased debt. The lack of understanding about basic financial principles—such as interest rates, inflation, and compound interest—can further exacerbate these challenges (Kulathunga et al., 2020).

Educated individuals are more adept at understanding financial risks and opportunities, as well as evaluating diverse financial products such as loans, insurance, and investment options. This enhanced knowledge not only increases their ability to assess the costs and benefits of financial decisions but also builds their confidence in making sound financial choices (Starcek & Studies, 2013). As a result, financial literacy not only contributes to

individual financial security but also fosters overall economic resilience by promoting responsible financial behavior on a larger scale.

Financial Literacy and Behavioral Intention to Adopt Mobile Banking

Financial literacy plays a critical role in shaping the intention to adopt mobile banking, particularly among younger users, as it directly influences their perceptions of both the risks and benefits associated with mobile banking (Ulun & Nuray, 2012). Individuals with higher financial literacy tend to have a better understanding of the security features, fees, and long-term benefits, which reduces their apprehension about potential risks and increases trust in mobile banking services. Moreover, the educational level of users has been found to enhance their behavioral intention to use mobile banking. More educated individuals are more likely to understand the advantages of mobile banking and to effectively navigate its features (Dineshwar & Steven, 2013).

Financial literacy also shapes how users perceive the overall usefulness of mobile banking, especially when it comes to managing savings goals and leveraging prior experience with financial apps. Users with higher levels of financial literacy are more likely to see mobile banking as a tool that enhances their ability to achieve financial objectives, such as budgeting or tracking expenses, leading to a stronger intention to adopt these services (Bayuk & Altobello, 2019). Additionally, prior experience with financial technologies, such as budgeting apps or online banking platforms, can reinforce positive perceptions of mobile banking's ease of use and practicality, further driving adoption. Accordingly, we hypothesize that:

H1: Financial literacy significantly influences the behavioral intention to adopt mobile banking.

Perceived Ease of Use

Perceived ease of use has been consistently found to positively influence the intention to adopt mobile banking. Numerous studies have highlighted that when users perceive mobile banking applications as easy to navigate and intuitive, their likelihood of adoption increases significantly (Zhang et al., 2018; Akturan & Tezcan, 2012). For undergraduate users, simplicity and user-friendliness are particularly important, as these users may lack extensive financial knowledge or prior experience with financial technologies (Madumanthi & Nawaz, 2016). The more effortless users find the interface, the more likely they are to feel comfortable using mobile banking, reducing any anxiety associated with its adoption. Accordingly, it is hypothesized that:

H2: Perceived ease of use influences the behavioral intention to adopt mobile banking.

Moreover, financial literacy plays a key role in moderating this relationship. Users with higher financial literacy may be more adept at recognizing the benefits of user-friendly mobile banking interfaces, while those with lower literacy might struggle even with simple platforms. Thus, financial literacy strengthens the positive impact of perceived ease of use on adoption intentions. Based on this, we hypothesize that:

H3: Financial literacy moderates the relationship between perceived ease of use and behavioral intention to adopt mobile banking.

Perceived Usefulness

Perceived usefulness is a critical factor influencing users' intention to adopt mobile banking. When users believe that mobile banking will enhance their financial management, improve convenience, and boost overall performance, they are more inclined to adopt it (Zhang et al., 2018; Chung & Kwon, 2009). Mobile banking's ability to provide immediate access to account information, facilitate faster transactions, and streamline financial processes makes it an attractive option, particularly for users seeking efficiency and time savings (Madumanthi & Nawaz, 2016). The perceived practical benefits, such as managing accounts on-the-go, reduce the effort required to complete financial tasks, thereby increasing adoption rates. Accordingly, it is hypothesized that:

H4: Perceived usefulness influences behavioral intention to adopt mobile banking.

To drive this perception, managers should focus on communicating the tangible benefits of mobile banking, such as security, speed, and accessibility, to improve its perceived usefulness (Farah et al., 2018). Additionally, financial literacy plays a moderating role, as users with higher financial literacy are more likely to understand and appreciate the advantages mobile banking offers. Based on this, we hypothesize that:

H5: Financial literacy moderates the relationship between perceived usefulness and behavioral intention adopt mobile banking.

Perceived Risk

Perceived risk, which encompasses financial, privacy, and performance risks, plays a significant role in shaping users' behavioral intention to adopt mobile banking. Financial risks include concerns about unauthorized transactions or potential monetary loss, while privacy risks involve apprehensions about data security and personal information breaches. Performance risks relate to fears that the mobile banking system may malfunction or fail to meet users' expectations (Martins et al., 2014). These perceived risks create barriers to adoption, as users hesitate to engage with mobile banking due to uncertainties about the platform's reliability and security. Addressing these risks is crucial for encouraging broader adoption, particularly in retail banking, where customers demand high levels of security and seamless transactions. By effectively communicating the safety measures, encryption protocols, and customer protection policies in place, banks can alleviate these concerns and build trust. Moreover, financial literacy moderates this relationship, as users with higher financial literacy may better understand risk mitigation strategies, leading to more confidence in adopting mobile banking. Based on this, we hypothesize that:

H6: Perceived risk influences behavioral intention to adopt mobile banking.

H7: Financial literacy moderates the relationship between perceived risk and behavioral intention to adopt mobile banking.

Social Influence

Social influence is a crucial factor in shaping behavioral intentions toward mobile banking, as it can significantly enhance users' perceived advantages while simultaneously reducing their perceived risks (S. Yang et al., 2012). When individuals observe their peers, family members, or colleagues positively engaging with mobile banking, they are more likely to perceive it as beneficial and trustworthy. This social validation can be especially influential for users who are uncertain about the technology or have limited experience with online banking, as the endorsement from trusted social circles can help to alleviate fears and concerns (Madumanthi & Nawaz, 2016).

The significance of social influence grows in contexts where users lack familiarity with mobile banking features and functionalities. In such cases, users often rely on the experiences and opinions of others to guide their decisions. As a result, recommendations and endorsements from knowledgeable individuals can help boost confidence and encourage adoption. Furthermore, financial literacy acts as a moderating factor in this dynamic. Users with higher financial literacy are better equipped to critically evaluate social influences, discerning which recommendations are valuable and applicable to their own financial situations. This understanding can enhance their ability to integrate social influence into their decision-making processes regarding mobile banking adoption. Accordingly, we hypothesize that:

H8: Social influence influences behavioral intention to adopt mobile banking.

H9: Financial literacy moderates the relationship between social influence and behavioral intention to adopt mobile banking.

Compatibility

Compatibility, which refers to how well mobile banking aligns with users' values, lifestyles, and specific financial needs, plays a pivotal role in influencing behavioral intention to adopt such technologies. When mobile banking services are perceived as compatible with a user's daily routines and financial practices, satisfaction and adoption rates significantly increase (Lin, 2011; Makanyeza, 2017). For instance, users who prioritize convenience and accessibility in their financial management are more likely to embrace mobile banking solutions that enable easy transactions and real-time access to account information.

Furthermore, the alignment of mobile banking with users' values, such as sustainability or social responsibility, can enhance its appeal. Users who seek banking solutions that resonate with their personal beliefs are more inclined to adopt mobile banking if they perceive these services as reflecting their values. Additionally, compatibility is enhanced when mobile banking applications offer features that cater to users' specific needs, such as budgeting tools, expense tracking, or tailored financial advice, thus increasing perceived usefulness.

Financial literacy serves as a moderating factor in this relationship. Users with higher financial literacy are often better at assessing how well mobile banking aligns with their financial goals and lifestyle preferences. They are more likely to recognize the benefits that compatible banking solutions offer, thus reinforcing their intention to adopt mobile banking. Accordingly, we hypothesize that:

H10: Compatibility influences behavioral intention to adopt mobile banking.

H11: Financial literacy moderates the relationship between compatibility and behavioral intention to adopt mobile banking.

These hypothesized relationships are shown in Figure 1.

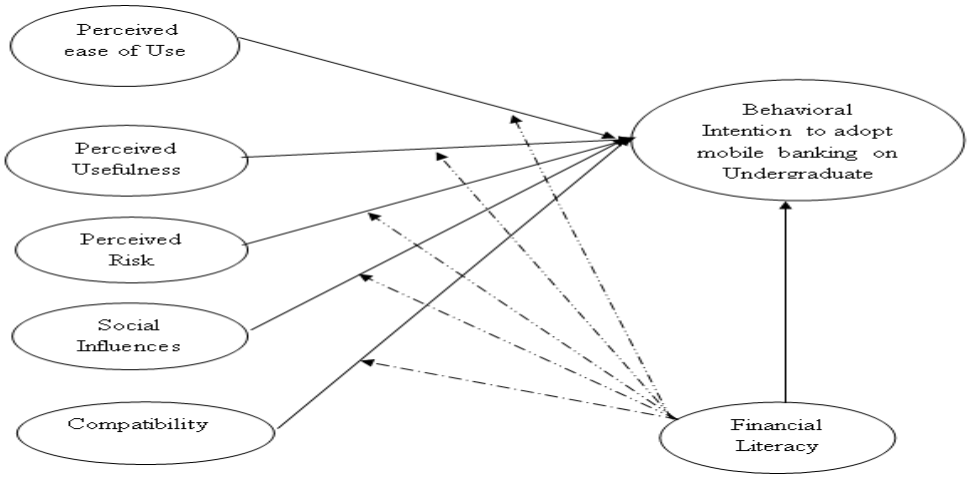

Figure 1: Conceptual framework.

Methodology

The study population includes undergraduates from government universities in Sri Lanka, focusing on their behavioral intentions toward mobile banking apps, regardless of whether they currently use such applications. A convenient sampling technique, a non-probability method, was employed to gather data from easily accessible respondents. Data were collected from a sample of 300 undergraduates across 14 state universities in Sri Lanka using a structured online questionnaire distributed through platforms such as WhatsApp and Facebook. The questionnaire contained 40 questions, divided into three sections: demographic information, variables related to the conceptual framework, and hypotheses. A five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) was used to measure respondents' attitudes. The data analysis was conducted using SPSS (Version 21) to confirm data suitability for structural equation modeling (SEM) and describe the demographic profile of respondents. Confirmatory factor analysis (CFA) was performed to assess the reliability and validity of the scales. The proposed hypotheses were analyzed using SEM via Smart PLS 3.2.8. Moderation analysis was also performed to assess the moderating effect of financial literacy on the model.

Results and Discussion

Assessment of Measurement Model

The Smart PLS model assessment began with evaluating the reliability and validity of the relationships between the endogenous and exogenous variables. As shown in Table 1, reliability was confirmed based on composite reliability, with values ranging from 0.826 to 0.888, indicating strong reliability. Of the 27 indicators, four had slightly lower outer loadings (0.672, 0.695, 0.693, 0.664), while the remaining indicators contributed significantly to construct reliability. Convergent validity was established using Average Variance Extracted (AVE), with values between 0.526 and 0.779, exceeding the minimum required for robust PLS models. Discriminant validity was confirmed through cross-loadings, where each indicator's outer loading on its related construct was higher than on other constructs. Discriminant validity was also assessed using the Fornell-Larcker Criterion. As shown in Table 2, the bold diagonal values are higher than the corresponding values in the rows below, confirming discriminant validity.

Table 1: Standardized loadings, reliability and validity measures

Variable	Standard Loadings	t-Statistics	Composite Reliability	AVE
Perceived Risk (PR)			0.869	0.526
PR_1	0.672	8.566		
PR_2	0.695	9.486		
PR_3	0.780	11.495		
PR_4	0.781	10.272		
PR_6	0.723	9.109		
PR_7	0.693	6.973		
Perceived Usefulness (PU)			0.888	0.615
PU_1	0.737	17.709		
PU_2	0.763	26.466		
PU_3	0.842	37.569		
PU_4	0.863	64.240		
PU_5	0.703	12.442		
Perceived Ease of Use (PEU)			0.876	0.779
PEU_3	0.892	45.019		
PEU_4	0.873	33.145		
Social Influence (SI)			0.826	0.543
SI_1	0.734	16.632		
SI_2	0.751	18.902		
SI_3	0.734	13.925		
SI_4	0.728	15.423		
Compatibility (COM)			0.878	0.706
COM_1	0.785	21.325		
COM_2	0.873	41.166		
COM_3	0.860	41.094		
Financial Literacy (FL)			0.843	0.575
FL_1	0.792	30.626		
FL_3	0.664	12.953		
FL_4	0.812	31.048		
FL_5	0.755	24.728		
Behavioural Intention (BI)			0.885	0.719
BI_1	0.846	39.600		
BI_2	0.826	33.858		
BI_3	0.871	63.930		

Source: Analyzed Statistical Output from Field Survey

Table 2: Discriminant validity test on Fornell-Larcker criterion

	BI	COM	FL	PEU	PR	PU	SI
BI	0.848						
COM	0.616	0.840					
FL	0.602	0.679	0.758				
PEU	0.426	0.688	0.554	0.883			
PR	0.197	0.142	0.160	0.084	0.725		
PU	0.551	0.611	0.530	0.542	0.048	0.784	
SI	0.413	0.629	0.448	0.549	0.127	0.343	0.737

Note: Bold values on the diagonal represent the square root of AVE for each construct.
Source: Analyzed Statistical Output from Field Survey

Hypothesis Testing

We used structural equation modeling with the Smart PLS 3.2.8 software to test and analyze the hypothesized relationships in our model. The coefficient of determination (R^2) measures the model's goodness of fit, indicating how well the independent variables explain the variance in the dependent variable. The model explains 56% of the variance in undergraduates' behavioral intention to use mobile banking, reflecting moderate predictive power. The results of the hypothesis tests for direct relationships are summarized in Table 3 and Figure 2. Financial Literacy significantly influences behavioral intention to use mobile banking *($\beta = 0.216$, $t = 3.305$, $p = 0.001$)*, which supports H1. Perceived Ease of Use did not significantly influence behavioral intention *($\beta = -0.038$, $t = 0.628$, $p = 0.530$)*, leading to the rejection of H2. Perceived Usefulness *($\beta = 0.188$, $t = 2.583$, $p = 0.010$)* and Perceived Risk *($\beta = 0.160$, $t = 3.885$, $p = 0.000$)* both had significant impacts, supporting H4 and H6. However, Social Influence did not show a significant effect on behavioral intention *($\beta = 0.100$, $t = 1.709$, p*

= 0.087), leading to the rejection of H8. Finally, Compatibility had a significant influence on behavioral intention *(β = 0.243, t = 3.023, p = 0.003)*, supporting H10.

Table 3: Results of the direct relationship in the model

Hypothesis	Path	Path Coefficient	t-statistic	p-value	Decision
H1	FL→BI	0.216	3.305	0.001	Supported
H2	PEU→BI	-0.038	0.628	0.530	Rejected
H4	PU→BI	0.188	2.583	0.010	Supported
H6	PR→BI	0.160	3.885	0.000	Supported
H8	SI→BI	0.100	1.709	0.087	Rejected
H10	COM→BI	0.243	3.023	0.003	Supported

Source: Analyzed Statistical Output from Field Survey

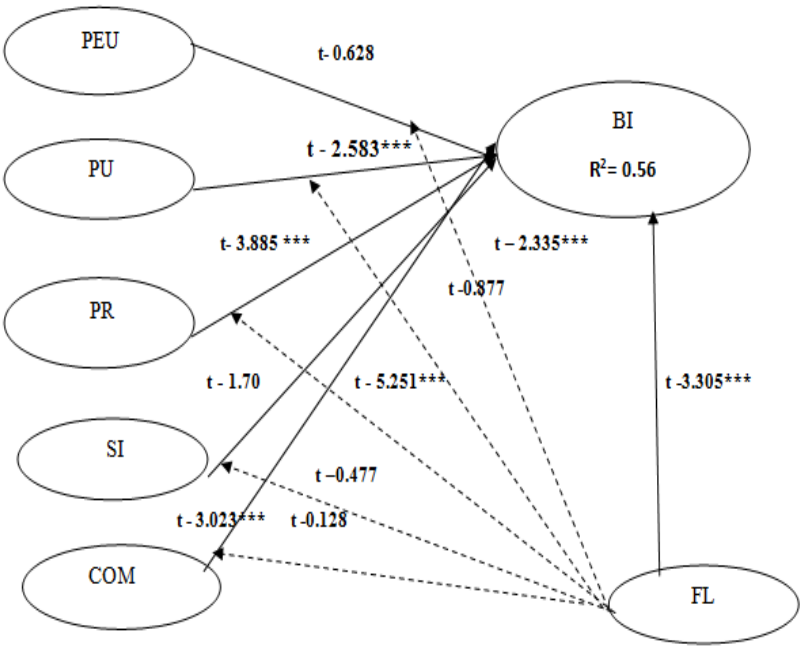

Figure 2: Structural Equation Model with path coefficient

*Note: t= t-statistics, ***Significance at p <0.01 level, R^2 = Coefficient of Determination, PEU= Perceived Ease of Used, PU= Perceived Usefulness, PR= Perceived Risk, SI= Social Influence, COM= Compatibility, FL= Financial Literacy, BI= Behavioral Intention.*

This study also examined the moderating role of FL on the relationships between exogenous variables - PEU, PU, PR, SI, COM and BI to use mobile banking. Moderation analysis was conducted using Smart PLS software with two-way interaction tests. As shown in Table Out of the five hypotheses involving moderating effects, only two were supported, as follows. Financial literacy was found to moderate the relationship between perceived ease of use and behavioral intention *(β = −0.170, p = 0.020)*. The interaction effect indicated that higher FL strengthens the positive relationship between PEU and BI, suggesting that undergraduates with higher FL are more likely to adopt mobile banking when they perceive it as easy to use. Similarly, financial literacy moderated the relationship between perceived risk and behavioral intention *(β = −0.204, p = 0.000)*, indicating that a high level of FL reduces the negative impact of perceived risk on mobile banking adoption, supporting H7. However, no significant moderating effect of financial literacy was found in the relationships between perceived usefulness and BI *(β = −0.067, p = 0.380)*, social influence and BI *(β = −0.027, p = 0.477)*, or compatibility and BI *(β = −0.015, p = 0.898)*, leading to the rejection of H5, H9, and H11.

Accordingly, this study supports the idea that FL plays a crucial role in better financial decision-making (Hastings & Mitchell, 2020; Lusardi, 2015), and higher FL was found to strengthen the relationship between PEU and BI while reducing PR's negative impact on BI. Undergraduates, who are generally tech-savvy, were

less concerned about the ease of use and social influence, likely due to their familiarity with technology. This finding aligns with studies by Kim & Kang (2012), who reported that perceived ease of use did not directly impact smartphone banking adoption. The study's results also resonate with prior research showing that PU, PR, and compatibility significantly influence mobile banking adoption (Chitungo & Munongo, 2013; Cheah et al., 2011). Users are motivated to adopt mobile banking when they find it advantageous and aligned with their lifestyle, while concerns about security risks negatively influence BI (Kazi & Mannan, 2013).

Table 4. Results of moderating effects

Hypothesis	Path	Path Coefficient	t- statistic	p-value	Decision
H3	PEU×FL→BI	0.170	2.335	0.020	Supported
H5	PU×FL→BI	-0.067	0.877	0.380	Rejected
H7	PR×FL→BI	-0.204	5.251	0.000	Supported
H9	SI×FL→BI	-0.027	0.477	0.634	Rejected
H11	COM×FL→BI	-0.015	0.128	0.898	Rejected

Source: Analyzed Statistical Output from Field Survey

Conclusions and Implications

This study investigated the factors influencing mobile banking adoption among undergraduates in Sri Lanka. Perceived usefulness, perceived risk, compatibility, and financial literacy were found to significantly influence behavioral intention, while perceived ease of use and social influence were insignificant. Financial literacy moderated the relationships between perceived ease of use, perceived risk, and behavioral intention. This study highlights the importance of secure, useful, and compatible mobile banking services to drive adoption among undergraduates. The banking sector has been transformed by technology, and mobile banking is essential for financial inclusion. Banks can benefit from this study by tailoring services to the needs of tech-savvy users. For instance, perceived risk was identified as the most influential factor, suggesting the need for secure mobile banking applications. Developers should enhance security features and communicate these improvements to customers. Perceived usefulness can be promoted through educational campaigns highlighting the benefits of mobile banking. Banks should continue innovating to introduce features that cater to the evolving needs of users. Although PEU and SI were not significant for this sample, these factors may still influence less tech-savvy or uneducated groups. Thus, managers should tailor their strategies according to different consumer segments. FL is another key determinant, as users seek cost-efficient solutions. Managers should consider reducing transaction fees and making mobile banking more affordable to attract a broader user base. Compatibility also emerged as a significant factor, implying that mobile banking apps should be adaptable to different lifestyles and user preferences.

Limitations and Future Research Directions

The scope of the study was limited to undergraduates in Sri Lanka, and broader insights could be gained by including non-student populations or expanding to other regions. Additionally, while this study focused on six predictors, other factors such as trust, convenience, and relative advantage may also influence BI and should be explored in future research. Due to confidentiality laws, access to detailed data on mobile banking users was restricted. Future studies could examine the effect of demographic variables such as age, gender, and income on mobile banking adoption, which would provide further insights. Including a wider range of universities and conducting studies on non-internet users could also provide a more comprehensive understanding of mobile banking adoption across different segments.

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