

# **Digital Financial Inclusion or Digital Divide? Determinants of Internet Banking Adoption Among Commercial Bank Customers in Sri Lanka: Evidence from the Batticaloa District**

**M. B. M. Irshad**

Department of Management and Information and Technology  
South Eastern University of Sri Lanka  
mbmirshad@seu.ac.lk

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## **Abstract**

The adoption of online banking by customers in Sri Lanka – notably in the outlying districts – is disproportionately low even as there is exponential development in digital banking globally. This paper examines the factors influencing the adoption of internet banking by commercial bank clients in the Batticaloa district of Sri Lanka, with wider implications for the country’s digital financial inclusion strategy. The study is a quantitative cross-sectional survey on 298 validated replies of active internet banking users. The Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) guided five distinct constructs: convenience, reliability, accessibility, security and awareness. Data was examined using Pearson correlation and multivariate linear regression with IBM SPSS Statistics 26. Convenience was the strongest predictor of consumer adoption ( $\beta = 0.291$ ,  $p < 0.001$ ), followed by accessibility to the internet ( $\beta = 0.182$ ,  $p < 0.01$ ), reliability ( $\beta = 0.178$ ,  $p < 0.01$ ) and awareness ( $\beta = 0.158$ ,  $p < 0.01$ ). Security perceptions were positively linked with adoption but were not a predictor of adoption behavior in the regression model ( $p = 0.317$ ) suggesting a mediated or contextual influence. The model explained a large amount of variance ( $R^2 0.67$ ,  $F 119.27$ ,  $p < 0.001$ ). The study adds crucial post-pandemic empirical evidence from an under-represented ethno-linguistic minority district of Sri Lanka and contributes to the conversation on digital justice in developing countries. The implications of the findings are for bank strategy, policy formulation for the national digital transformation and TAM/UTAUT literature in non-metropolitan Sri Lankan contexts.

**Keywords:** *Digital financial inclusion, Internet banking adoption, customer behavior, digital financial inclusion, digital divide, Sri Lanka Batticaloa.*

## **1. Introduction**

The global banking industry is undergoing an unprecedented digital change. Internet banking is defined broadly as the supply of banking products and services through electronic channels such as web portals and mobile applications and has changed the way

financial institutions and their consumers interact (Yaseen & El Qirem, 2018; Alalwan et al. 2018). An industry assessment by Deloitte (2024) indicates that more than 70% of consumers in North America and Europe are active in internet banking, while adoption rates in emerging markets such as Southeast Asia and Africa are around 15–20% annually.

This trend has escalated considerably after the pandemic: the COVID-19 issue has resulted in a structural change in consumer preferences, with limited physical access to bank branches forcing millions of previously adverse clients to adopt digital channels (Kumara & Silva, 2023).

Sri Lanka launched online banking in 1999. As of the end of 2023, there are 24 licensed commercial banks (LCBs) and six licensed specialist banks that operate through 2,929 branches island-wide (Central Bank of Sri Lanka [CBSL], 2023). By end 2021, the country had reached four million online banking subscribers (CBSL, 2021). This number increased significantly during the COVID-19 pandemic era. Based on the Department of Census and Statistics (DCS) national ICT penetration data, internet usage among Sri Lankans has increased from 34.1% (2019) to about 52.6% (2022), with mobile internet subscribers topping 18 million (DCS, 2022). Nonetheless, in spite of this development the share of banking clients actively using internet banking services is still significantly low. According to the CBSL (2022) data, over-the-counter transactions continue to dominate, while the spread of internet banking outside Western Province is hampered by infrastructural disparities, digital literacy gaps and trust deficiencies.

This discrepancy is starkly obvious in the Batticaloa region—a majority Tamil-speaking district in the Eastern Province that suffered lengthy infrastructural underdevelopment in the aftermath of the three-decade long civil strife. Despite post-war reconstruction and ICT growth efforts under the National ICT Strategy (2024), the uptake of internet banking in the district is understudied. Most of the available Sri Lankan research has been done either in the Western Province or at a national aggregate level (Kariyawasam & Jayasiri, 2016; Dasanayaka & Mahesh, 2016; Mangalee & Wijenayake, 2017). Thus, there is a

considerable geographic and demographic gap in literature.

This study fills this gap by empirically investigating the factors of online banking uptake by commercial bank clients in the district of Batticaloa. Five constructs are studied based on the Technology Acceptance Model (TAM; Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh et al., 2003). These include convenience, reliability, accessibility to internet infrastructure, security perceptions and awareness. The study findings are relevant not only to Batticaloa but to Sri Lanka as a whole, as the country is pursuing the digital economy agenda and the Banking regulator CBSL is implementing measures to enhance financial inclusion and it is strategically vital to understand the behavioral drivers of adoption in outlying regions.

## **1.1 Research Problem and Justification**

Yet, despite the widespread availability of online banking services and various national digital initiatives, empirical research continuously demonstrates a substantial urban–rural and center–periphery adoption divides in Sri Lanka (Rathnayake & Silva, 2023; Rathnayake & Ranasinghe, 2021). Data for the post-pandemic period (2023) from CBSL indicates that although the absolute number of internet banking users has risen, the depth of engagement in terms of frequency, transaction value and feature utilization remains low among non-metropolitan clients. Conflicting findings in previous studies (Dasanayaka & Mahesh, 2016; Mangalee & Wijenayake, 2017) on the predominance of particular criteria (usefulness vs. ease-of-use vs. security) highlight the necessity for contextually anchored research. Batticaloa’s distinctive socio-economic and infrastructural

characteristics makes it an excellent, but so far overlooked, site for such investigation.

## **1.2 Research Questions and Objectives**

The study is based on the following specific questions which are (1) What is the impact of the Convenience of Internet banking on customer adoption in Batticaloa district? (2) What is the impact of the Reliability of Internet banking on customer adoption in Batticaloa district? (3) What is the impact of the Accessibility of Internet banking on customer adoption in Batticaloa district? (4) What is the impact of the Security and Privacy of Internet banking on customer adoption in Batticaloa district? (5) What is the impact of Awareness of Internet banking on customer adoption in Batticaloa district? and objectives which are as follows: (1) to measure the impact of convenience on internet banking adoption, (2) to measure the impact of reliability on adoption, (3) to measure the impact of internet accessibility on adoption, (4) to measure the impact of security perceptions on adoption, and (5) to measure the impact of customer awareness on adoption of internet banking services.

## **1.3 Research Questions and Hypotheses**

Hence, five research questions (Section 1.2) were formulated and each research question tested a directional hypothesis (H1-H5) (Section 2.4) to ascertain whether there exists a statistically significant positive relationship between each independent variable (convenience, reliability, accessibility, security, awareness) and the dependent variable (customer adoption of internet banking).

## **2. Literature Review**

### **2.1 Theoretical Foundations**

Research on technology adoption rests on a solid theoretical heritage. Davis (1989) developed the Technology Acceptance Model

(TAM) which focuses on perceived usefulness and perceived ease of use as the main factors that influence the adoption of information system. TAM has been extensively used in the context of internet banking in the world (Pikkarainen et al., 2004; Jayasiri et al., 2016; Hussain et al., 2021). The Theory of Reasoned Action (Fishbein & Ajzen, 1975) and the Theory of Planned Behavior (Ajzen, 1991) locate adoption within a framework of attitudes, subjective norms and behavioral intents, expanding TAM by including social effects. The Diffusion of Innovation theory (Rogers, 1962) proposes that perceived relative advantage, compatibility, and trialability are adoption mediators – constructs that are directly applicable to the novelty setting of online banking in peripheral markets (Al-Rahmi & Yahya, 2019).

The most integrative framework is the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh et al., 2003), which synthesizes eight previous models into four main predictors (performance expectancy, effort expectancy, social influence, and facilitating factors). UTAUT has shown to have better explaining power in multi-country studies of internet banking (Venkatesh & Bala, 2008). Its constructs are closely mapped with the variables investigated in this study. Convenience refers to performance expectancy, accessibility and reliability relate to facilitating factors, and awareness relates to social influence processes. The present study is based on the combined theoretical basis of TAM and UTAUT.

### **2.2 Key Determinants of Internet Banking Adoption**

Across several markets, convenience is one of the most consistently supported predictors of adoption, such as 24/7 availability, transaction speed, and elimination of

geographical limitations (Lichtenstein & Williamson, 2006; Wang & Liu, 2022; Suleman et al., 2022). In instance, Nayanajith et al. (2021) observed that in Sri Lanka, convenience was the main factor driving customers to opt for digital channels over physical ones, particularly for everyday chores like bank transfers and energy bill payments.

Reliability, which includes system availability, transaction accuracy, and consistent service performance, is a critical factor in both initial acceptance and sustained use (Al-Ajam & Nor (2013), Ayoobkhan, (2018), Singh & Agarwal, (2023). Frequent service downtimes and transaction processing mistakes were shown to be significant impediments of adoption in rural Sri Lankan contexts (Rathnayake & Ranasinghe, 2021), a conclusion especially poignant for Batticaloa's traditionally less-reliable digital infrastructure.

Availability of internet infrastructure is a structural enabling condition (Venkatesh et al. 2003). Brown and Gupta (2023) stated that rural populations with poor broadband penetration have much lower rates of internet banking adoption, but Wong et al. (2021) showed that better mobile internet access in underserved areas can greatly minimize adoption obstacles. According to DCS (2022) data, national internet penetration has improved post-pandemic, although the quality of connectivity and ownership of devices is unevenly dispersed. Lower rates were recorded for the Eastern Province than the national average.

In the literature on adoption, security perceptions have yielded inconsistent results. Perera and Perera (2021) reported that the most important obstacle to adoption in Sri Lanka was security concerns, including fear of fraud and identity theft, however Ravichandran & Madana (2016) found that users were generally satisfied with existing security measures. This contradiction points

to the mediated effect of security on customer behavior, mainly through trust, which is modulated by customer experience, bank reputation, and awareness of security features (Sarma & Ahmed, 2023). These findings provide context for the non-significant direct effect of security shown in the present investigation.

Awareness has been more emphasized in the post-pandemic literature such as understanding about the characteristics, benefits, and operational procedures of internet banking. Awareness is important in emerging digital banking markets, as noted by Tan and Lee (2024) and consistent with Premarathne & Gunatilake (2016) who reported that although there is high nominal awareness, there are adoption gaps among Sri Lankans because of the difference between awareness of the existence of the service and awareness of its practical operational benefits.

### **2.3 Post COVID-19 Context**

The COVID-19 epidemic is a structural inflection point for the internet banking uptake generally and in the case of Sri Lanka in particular. Internet banking transactions increased by 46% YoY in 2020–2021 because to limitations on physical banking access during the pandemic, according to data from CBSL (2021). Kumara and Silva (2023) identified pandemic-induced first-time online banking users as a unique group whose continuing involvement in the post-pandemic period is vitally dependent on the quality of the post-onboarding experience, convenience, and reliability of service. The analysis, based on 2025 data and conducted in 2025, reflects trends in adoption in this post-pandemic equilibrium, making it particularly relevant for banks looking to consolidate digital gains made during the pandemic and extend them to underserved districts.

## 2.4 Hypotheses and Conceptual Framework

Based on literature and empirical studies, the following conceptual model and hypotheses have been developed (Figure 1)

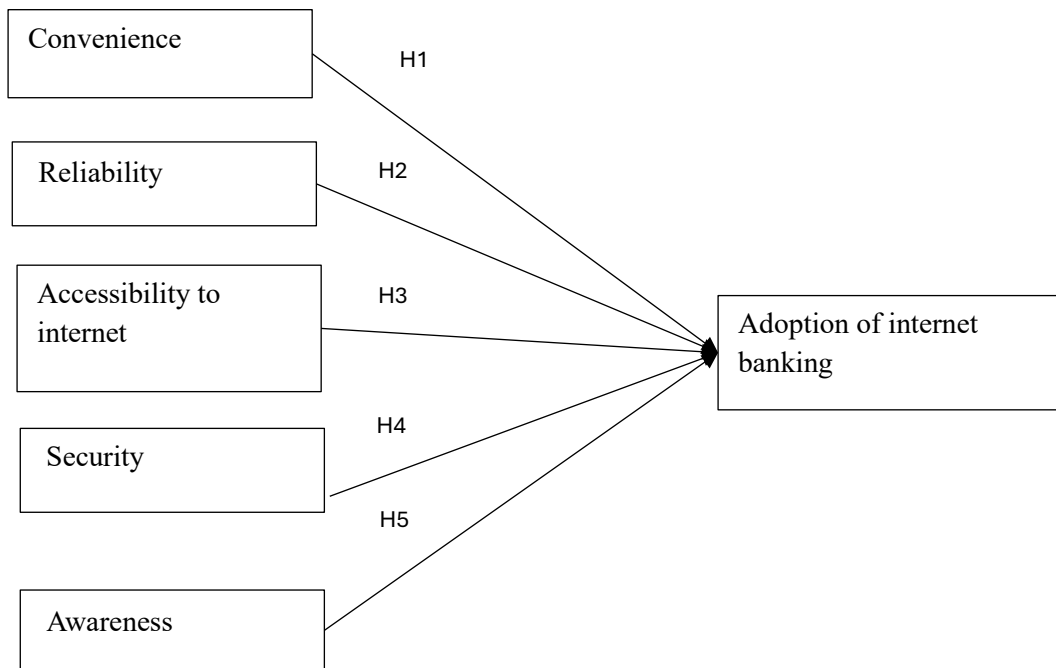


Figure 1: Conceptual Model

H1: There is a positive relationship between convenience and customer adoption of Internet banking.

H2: There is a positive relationship between reliability and customer adoption of Internet banking.

H3: There is a positive relationship between accessibility to Internet and customer adoption of Internet banking.

H4: There is a positive relationship between security and customer adoption of Internet banking.

H5: There is a positive relationship between customers' awareness and customer adoption of Internet banking.

## 3. Methodology

### 3.1 Research Design and Philosophy

The study adopted a quantitative cross-sectional survey approach. This design aligns with the positivist epistemological tradition and is suited for testing pre-specified hypotheses about connections between variables (Bryman, 2016). This design is consistent with the mainstream approach in online banking adoption research (Venkatesh et al., 2003; Al-Ajam & Nor (2013) and permits statistical inference and replication.

### 3.2 Population, Sampling, and Data Collection

The target population was active online banking customers of licensed commercial banks in Batticaloa area. Given the absence of a full list of Internet banking users, a convenience sample was used. Considering the criteria for regression analysis (Hair et al.,

2019), a sample size of 310 respondents was selected with at least 10 observations per predictor variable. Data was collected via an online survey (Google Forms: n = 258) and a structured paper questionnaire (n = 52) administered in late 2024 and early 2025. Of the 310 distributed instruments, 298 were kept after excluding 12 replies with missing or inconsistent data (response rate: 96.1%).

The survey instrument consisted of two parts: (1) demographic profile, and (2) five-point Likert scale items (1=Strongly Disagree to 5=Strongly Agree) evaluating the five independent factors and the dependent variable (consumer adoption). Items were selected from previously validated instruments (Davis, 1989; Venkatesh et al., 2003; Perera & Perera, 2021) and tailored to the context of Sri Lanka. The pilot study with 50 participants had a Cronbach's Alpha of 0.931 for 17 items, indicating strong internal consistency (Cronbach, 1951).

### 3.3 Analytical Strategy

Data was examined using IBM SPSS Statistics 26. The sample was described by

descriptive statistics. Pearson correlation analysis was used to analyze bivariate relationships among all constructs. Multiple linear regression was used to examine the independent predictive contribution of each variable to customer adoption. Multicollinearity was tested using Variance Inflation Factors (VIF) and Tolerance settings. Hypothesis testing was done at 5% level of significance ( $\alpha = 0.05$ ).

## 4. Results and Discussion

### 4.1 Respondent Profile

The overall demographic profile of the 298 respondents is given in Table 1. The sample was a little female (56.7%), youthful (74.8% between 18-35 years old) and well qualified (73.2% with undergraduate or postgraduate credentials). Most respondents were employees (52%) or students (33.2%) and income levels ranged across all four brackets, demonstrating the economic variety of the district.

**Table 1. Demographic Profile of Respondents (N = 298)**

Variable	Category	Frequency	Percentage (%)
Gender	Female	169	56.7
	Male	129	43.3
Age Group	18–25	119	39.9
	26–35	104	34.9
	36–45	51	17.1
	Above 45	24	8.1
Education	O/L	21	7.0
	A/L	59	19.8
	Undergraduate	90	30.2
Occupation	Graduate	128	43.0
	Employed	155	52.0
	Student	99	33.2
Income (LKR/month)	Freelance	44	14.8
	< 20,000	94	31.5
	20,000–40,000	46	15.4
	40,000–70,000	86	28.9
Marital Status	> 70,000	72	24.2
	Married	168	56.4
	Single	130	43.6

*Note. Source: Survey data, 2024.*

## 4.2 Reliability and Validity

All structures were shown to have internal consistency. The overall Cronbach's Alpha for the instrument was 0.931 (17 items), which was over the generally accepted criterion of 0.70 (Cronbach, 1951; Nunnally, 1978). Alphas for individual measures varied from .84 to .93. This shows high evidence of reliability of the scale. The instrument was based on well-known theoretical frameworks (TAM, UTAUT) and validated prior measures, which supported the construct validity.

## 4.3 Descriptive Statistics and Correlation Analysis

Table 2 shows the descriptive data and the Pearson correlation matrix. All five independent variables were positively and strongly linked with customer adoption ( $p < 0.001$ ). Convenience had the strongest zero order association with adoption ( $r = 0.666$ ) followed by accessibility ( $r = 0.603$ ), reliability ( $r = 0.599$ ), awareness ( $r = 0.594$ ) and security ( $r = 0.511$ ). These correlations show the directed hypotheses  $H_1$ - $H_5$  at the bivariate level.

**Table 2. Descriptive Statistics and Pearson Correlation Matrix**

Variable	Mean	SD	CONV	REL	ACC	SEC	AWAR	ADOPT
Convenience (CONV)	3.98	0.72	1.000					
Reliability (REL)	3.87	0.68	0.621**	1.000				
Accessibility (ACC)	3.79	0.75	0.593**	0.614**	1.000			
Security (SEC)	3.71	0.81	0.541**	0.572**	0.563**	1.000		
Awareness (AWAR)	3.83	0.69	0.605**	0.598**	0.567**	0.554**	1.000	
Customer Adoption (ADOPT)	3.92	0.73	0.666**	0.599**	0.603**	0.511**	0.594**	1.000

Note. \*\* Correlation significant at the 0.01 level (2-tailed). Source: SPSS output, 2024.

## 4.4 Regression Analysis

Multiple linear regression was conducted using customer adoption as the dependent variable and the five constructs as the independent predictors. The whole model was statistically significant ( $F(5, 292) = 119.27, p < 0.001$ ) and explained 67% of the variance in customer adoption ( $R^2 = 0.670$ , Adjusted  $R^2 = 0.664$ ), indicating a good model fit. Collinearity statistics were within acceptable ranges (Tabachnick & Fidell, 2007), with all VIF values below 3.0 and Tolerance values over .37, precluding worries over unstable estimations.

Full regression coefficients are shown in Table 3. Convenience ( $\beta = 0.291, p < 0.001$ ) was the largest independent predictor, which is consistent with prior research stressing the

significance of transactional ease in adoption decisions (Wang & Liu, 2022; Nayanajith et al. (2021)). The second and third strongest predictors were accessibility ( $\beta = 0.182, p = 0.002$ ) and reliability ( $\beta = 0.178, p = 0.003$ ), respectively, highlighting the significance of digital infrastructure quality, particularly in a district such as Batticaloa, where connectivity and service reliability have typically been lower than the national average. Awareness ( $\beta = 0.158, p = 0.008$ ) was a significant fourth predictor, indicating that knowledge campaigns and focused communication techniques have important adoption-enhancing potential. Security ( $\beta = 0.054, p = 0.317$ ), although significantly correlated with adoption in bivariate analysis ( $r = 0.511$ ) was not a significant independent predictor.

**Table 3. Multiple Regression Results: Predictors of Customer Adoption**

Variable	B	SE	$\beta$ (Beta)	t	p-value	Tolerance	VIF
(Constant)	0.000	0.040	—	0.000	1.000	—	—
Security (SEC)	0.054	0.054	0.054	1.002	0.317	0.543	1.842
Reliability (REL)	0.178	0.060	0.178	2.980	0.003**	0.449	2.226
Accessibility (ACC)	0.182	0.058	0.182	3.162	0.002**	0.482	2.073
Convenience (CONV)	0.291	0.066	0.291	4.438	0.000***	0.372	2.686
Awareness (AWAR)	0.158	0.059	0.158	2.689	0.008**	0.465	2.149

Note. Dependent Variable: Customer Adoption.  $R^2 = 0.670$ ; Adjusted  $R^2 = 0.664$ ;  $F(5,292) = 119.27$ ;  $p < 0.001$ . \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ . Source: SPSS output, 2024.

#### 4.5 Hypothesis Testing Summary

Table 4 summarizes the hypothesis of testing outcomes based on both bivariate and multivariate results.

**Table 4. Summary of Hypothesis Testing Results**

Hypothesis	Construct	Pearson r	p (Correlation)	$\beta$ (Regression)	p (Regression)	Decision
H <sub>1</sub>	Security → Adoption	0.511	0.000***	0.054	0.317	Not Supported
H <sub>2</sub>	Reliability → Adoption	0.599	0.000***	0.178	0.003**	Supported
H <sub>3</sub>	Accessibility → Adoption	0.603	0.000***	0.182	0.002**	Supported
H <sub>4</sub>	Convenience → Adoption	0.666	0.000***	0.291	0.000***	Supported
H <sub>5</sub>	Awareness → Adoption	0.594	0.000***	0.158	0.008**	Supported

Note. \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ . Source: Researchers' analysis, 2024.

#### 4.6 Discussion

The findings supported the H<sub>2</sub>–H<sub>5</sub> and concluded that convenience, accessibility, dependability and awareness are important independent predictors of internet banking uptake in Batticaloa. The dominance of convenience ( $\beta = 0.291$ ) is strongly consistent with the global literature and represents the practical logic of adoption: people embrace online banking mostly because it saves time and allows transactional freedom, not because of ideological commitment to digital channels. This has clear ramifications for strategy, banks in remote regions need to ensure their internet banking interfaces are intuitive, feature comprehensive and easily

integrated into clients' everyday financial habits.

The relevance of accessibility and reliability (H<sub>3</sub> and H<sub>2</sub>) is particularly relevant in the Batticaloa environment. Both notions are essentially infrastructure dependent. This implies that adoption is not just a consequence of individual psychology but of structural factors. Marketing alone will not get banks operating in underserved districts to their adoption targets; they will need to advocate for (and where possible co-invest in) enhanced regional internet infrastructure. This conclusion corroborates Rathnayake and Ranasinghe (2021) and further highlights its relevance in the post-pandemic policy landscape.

The non-significant direct effect of security ( $H_1$  rejected in regression,  $\beta = 0.054$ ,  $p = 0.317$ ) is of theoretical and practical interest. Security is highly correlated with adoption ( $r = 0.511$ ) but does not predict adoption independently when other variables are held constant. This is similar with Sarma and Ahmed (2023) who believe that security influence is mostly based on trust and convenience perceptions and not a direct

## **5. Conclusions and Recommendations**

### **5.1 Conclusions**

The study shows strong empirical evidence that convenience, internet connection, reliability of service and awareness among consumers are the main factors influencing the adoption of internet banking among the clients of commercial banks in Batticaloa district of Sri Lanka. Convenience is the main motivation, in line with global research, underlining the case for user-centric design and transactional ease to be essential to banks' digital adoption efforts. Accessibility and reliability are important, facilitating circumstances, stressing structural infrastructure limitations that affect remote regions more. Although security is positively related to adoption at the bivariate level, it is not an independent driver of adoption behavior in this population. This suggests that either security concerns have been adequately addressed by incumbent banks, or that its effect is mediated through trust and convenience perceptions.

These findings expand TAM and UTAUT to a non-metropolitan Sri Lankan environment post-pandemic, adding new empirical data to an urban-centric and pre-COVID-19 literature in terms of geography and time. The Batticaloa findings challenge the concept that the barriers to adoption in rural and peripheral markets are mostly psychological in nature: structural infrastructure shortages are equally, if not more, essential.

driver of adoption. It could also reflect the increasing normalization of digital security features among younger, educated users, who make up 74.8% of this sample, therefore diminishing the relevance of security as a standalone deterrent. Therefore, banks should focus on messaging security wins inside wider convenience and trust narratives, rather than isolated messaging.

### **5.2 Practical Recommendations**

The findings suggest a three-pronged approach for banking practitioners: first, engage in user experience optimization incorporating vernacular-language interfaces in Tamil and Sinhala, simplified onboarding and mobile-first design adapted to low-bandwidth conditions widespread in eastern Sri Lanka. Second, develop institutional reliability by investing in high-availability infrastructure, transparent communication of service levels, and fast incident response. Third, targeted awareness programs should be carried out, especially through community banking officers and trusted local intermediaries, to bridge the gap between nominal knowledge of online banking and actual understanding of how to utilize it. The CBSL's digital financial inclusion framework, for regulators, should expressly include district-level sufficiency infrastructure requirements, to ensure national adoption targets are not attained by aggregated urban growth masking ongoing periphery gaps.

### **5.3 Theoretical Contributions**

The study offers three contributions to academic literature. First, it confirms TAM and UTAUT notions in an under-represented sub-national Sri Lankan setting, thus increasing the geographic variety of the adoption literature. Second, it adds post-COVID-19 longitudinal context, recording adoption patterns in the post-pandemic equilibrium period (2024–2025), increasing understanding of structural vs crisis-induced

adoption drivers. Third, it puts up the idea of a “convenience-accessibility nexus”—the observation that both convenience and infrastructure accessibility are concurrently necessary for continued adoption—as a theoretical refinement with implications for the deployment strategy of fintech in emerging markets.

#### **5.4 Limitations and Future Research Directions**

This study is not without its limits. The sample frame of active users of online banking in Batticaloa does not allow for inference to non-users and limits generalizability to other areas of Sri Lanka. Cross-sectional design does not demonstrate causality. Future research should extend this study to a nationally representative multi-district sample, including non-users to better understand barriers to adoption, and use longitudinal or experimental designs to determine causal direction. Qualitative investigation, especially focus groups with rural, older and non-tech-literate client segments, would supplement quantitative findings and shed light on adoption routes not captured by Likert-scale tools. Moreover, the moderating functions of upcoming technologies (AI-driven personalization, biometric authentication, blockchain-based security) in the convenience-adoption connection constitute a fertile domain for future studies.

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