Analysis of mobile banking adoption in Ghana: do education levels differ?

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Article Info	ABSTRACT
	This study investigates the role of educational attainment in mobile banking (m-banking) adoption in Ghana, leveraging data from 598 respondents through a multi-group analysis. By integrating the technology acceptance model (TAM) and the theory of planned behavior (TPB) into a structural equation modelling framework, the research examines key factors such as subjective norms, perceived usefulness, ease of use, trust, and self-efficacy. Results reveal significant differences in adoption behaviors between lower- and higher-educated users. Subjective norms strongly influence higher-educated individuals, while perceived ease of use drives adoption among lower-educated users. Perceived usefulness positively affects higher-educated users but has a negative impact on lower-educated respondents. The findings highlight the moderating effect of education level on the adoption process, offering theoretical and practical insights into targeted strategies for enhancing financial inclusion in developing economies. These results underscore the importance of user segmentation in fostering broader acceptance and utilization of m-banking technologies.

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1. INTRODUCTION

The rise of mobile technologies has revolutionized the banking industry, enabling users to conduct financial transactions anytime and anywhere via mobile devices [1]–[3]. These technologies foster innovative service delivery and reduce transaction costs, driving business efficiency and economic growth in developing economies [4], [5]. Mobile banking (m-banking), typically conducted through SMS or wireless applications, allows users to manage accounts, pay bills, and transfer funds using handheld devices [6], [7]. The integration of m-banking into business processes enhances productivity and streamlines operations [8].

Globally, m-banking is one of the fastest-growing sectors, with financial institutions leveraging it to gain competitive advantages through value-added services [9]. In West Africa, digital financial reforms have promoted smoother mobile transactions [10]. Specifically in Ghana, banks have developed user-friendly mobile apps to improve customer convenience and reach underserved populations, thereby advancing financial inclusion [11]. Mobile money interoperability has further strengthened adoption by enabling seamless transfers across networks. For financial institutions, m-banking reduces overheads, enhances service availability, and broadens the customer base [1], [12], [13]. Customers benefit from its convenience, 24/7 access, increased privacy, improved security, and cost savings. It also supports financial health through digital tools for budgeting and savings, while offering safer alternatives during public health crises [14], [15].

Despite these benefits, limited research exists on how different demographic groups-particularly those with varying education levels-adopt m-banking in Ghana. This highlights a gap in understanding the diverse factors influencing adoption, necessitating a more nuanced, user-segmented approach to drive broader acceptance.

The 2022 Budget Statement of Ghana revealed that mobile money transactions exceeded GH¢500 billion in 2020, a significant rise from GH¢257 billion in 2019 [16]. A study by Stanbic Bank Ghana recognized mobile money as the country's most preferred digital payment method, with a 15% increase in subscribers and transactions valued at approximately GH¢589 billion (US$100 billion) in 2020 [17]. Mobile money services operate via USSD codes, allowing financial access without internet connectivity, thus promoting inclusion among low-income groups. Ghana also pioneered the adoption of QR codes for instant payments via mobile wallets in Africa [18]. M-banking has helped reduce the need for physical bank branches and ATMs, lowering operational expenses. A 2020 Boston Consulting Group (BCG) report ranked Ghana and Kenya as the world's second and third-highest users of mobile payments after China [19]. M-banking provides convenient, queue-free banking while reducing health-related risks. Mobile payments contribute to 82% and 87% of gross domestic product (GDP) in Ghana and Kenya, respectively, fueled by supportive government policies and public awareness of their benefits.

However, the adoption of mobile technologies is not uniform globally, as cultural factors influence user behavior. Zhang *et al.* [20] argue that cultural disparities explain the varied adoption rates across regions. Despite the widespread use of mobile money in Ghana, there is a lack of empirical research on m-banking adoption, especially compared to Asia and the Americas. Traditional branch banking still holds strong in Ghana [20], underscoring the need for more focused research on m-banking adoption factors. Previous studies in Sub-Saharan Africa have applied models like unified theory of acceptance and use of technology 2 (UTAUT2), technology acceptance model (TAM), and innovation diffusion theory (IDT) to examine m-banking usage [21], [22]. However, limited empirical research exists on combining TAM with the theory of planned behavior (TPB), especially using multi-group analysis to identify influencing factors. This study aims to fill that gap by integrating educational level as both an additional construct and a moderating variable, expanding on Venkatesh *et al.* framework [23].

The study will assess how constructs such as perceived cost (PC), trust (TS), ease of use, usefulness, subjective norms (SN), personal innovativeness (PI), and self-efficacy (SE) impact m-banking adoption. Understanding these drivers is essential for improving adoption, enhancing customer experience, and optimizing banking operations. The findings will guide Ghanaian banks in crafting strategies to strengthen mobile service delivery and gain a competitive edge. The study also seeks to identify the most effective theoretical model for analyzing m-banking adoption and to explore how adoption factors vary across educational levels.

2. METHOD
2.1. Literature review

Developing countries often surpass industrialized markets in establishing 21st-century infrastructure, as they are unburdened by legacy systems [24]. This advantage has prompted many financial institutions, especially microfinance organizations, to adopt mobile phones as platforms for offering formal banking services to diverse customer segments, including banked, underbanked, and unbanked populations. The widespread availability of mobile phones-more accessible than bank accounts has been instrumental in this transformation [25]. Despite efforts by banks and financial institutions to encourage m-banking usage, adoption rates remain inconsistent, necessitating research into the factors influencing uptake, particularly in both developed and developing economies [9].

2.1.1. Technology acceptance model

The TAM explains users' intentions to accept new technologies. It examines how external factors influence beliefs, attitudes, and behavioral intentions (BI) [9]. Adapted from the theory of reasoned action (TRA), TAM posits that BI, leading to actual usage, is shaped by SN and attitudes, which in turn are informed by individual beliefs. TAM highlights that perceived usefulness (PU) and perceived ease of use (PEOU) directly affect BI. PU alludes to the notion that technology would improve performance, while PEOU denotes the expectation that using the technology will be effortless [9]. However, while TAM offers a straightforward method for gathering information about users' perceptions, Kumar *et al.* [26] argue that it does not adequately capture factors like cost. These studies suggest that the financial burden of using internet-based technologies, such as m-banking, plays a critical role in adoption decisions. Although TAM suggests that users are likely to adopt technology if it improves efficiency and convenience, they will not do so if it is perceived as difficult to use, regardless of its potential benefits [22], [26]. TAM has evolved over time. TAM2, an extended version proposed in [26], incorporates social influence and cognitive instrumental processes to better explain BI. It suggests that BI-the willingness to use technology-significantly determines

actual usage [27]. To further enhance TAM's explanatory power, scholars have incorporated additional constructs, such as SE, which reflects users' confidence in their ability to use technology [28].

2.1.2. Theory of planned behavior
The TPB extends TRA by including perceived behavioral control (PBC) to account for situations where individuals may lack control or resources to perform a behavior [29]. TPB posits that attitudes, SN, and PBC influence both BI and actual behavior. Attitude reflects an individual's positive or negative evaluation of engaging in a behavior, while SN refers to perceived social pressures regarding whether the behavior should be performed [30], [31].

2.1.3. Innovation diffusion theory
The IDT investigates how technologies disseminate within an ecosystem of society over time. According to IDT, criteria such as relative advantage, trialability, observability, compatibility, and complexity influence the usage of new technologies [32]. These concepts align with TAM's constructs, as relative advantage corresponds to PU, and complexity mirrors PEOU. Combining TAM and IDT provides deeper insights into the adoption of new innovations [33].

2.1.4. Research model and hypotheses
This study adopts TAM and TPB as theoretical foundations to explore m-banking adoption in Ghana. The model incorporates TAM constructs, including PU and PEOU, alongside TPB elements such as SN and PBC. Furthermore, additional constructs-PC, TS, SE, and PI-are included to improve explanatory power. These constructs have proven relevant in previous studies on e-commerce, m-commerce, and online financial transactions [34]. In particular, TS is a crucial factor in online transactions, given the importance of establishing secure, long-term relationships with users in the face of data privacy concerns. Meanwhile, PI reflects an individual's willingness to explore and adopt new technologies, an essential factor influencing acceptance [35].

Our research model, illustrated in Figure 1, hypothesizes that PU, SN, PC, and TS positively impact BI to adopt m-banking. Additionally, SE and PI are expected to enhance PEOU, which in turn influences BI. These hypotheses will be tested to better understand how various factors drive m-banking adoption in Ghana. The model aims to identify the relationships among these variables and how they shape users' decisions to adopt m-banking services. This research contributes to the growing body of literature by integrating TAM, TPB, and IDT to provide a comprehensive framework for understanding technology adoption behavior.
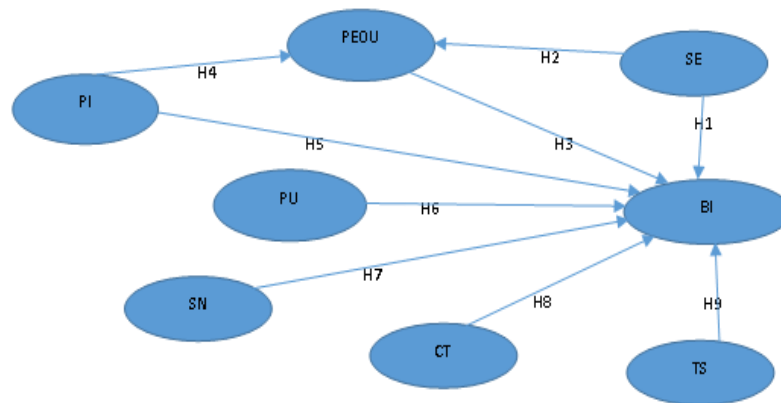

Figure 1. Conceptual model

2.1.5. Self-efficacy
In the 1960s, Albert Bandura, a professor at Stanford University, defined SE as a person's confidence in their capacity to perform in given settings or complete a task. SE is the fundamental means of assessing how individuals perceive their capacity to bring about change. The theory of social cognitive theory (SCT) describes SE as a judgement of one's capabilities to efficiently perform a task, focusing not on a person's skills but on their ability to apply these skills confidently and effectively [24]. SE has a significant impact on BI to use new technologies [1]. Research by Kumar *et al.* [26] highlights that SE strongly predicts PEOU. Accordingly, the following hypotheses are proposed: H1: SE significantly influences intention to adopt m-banking and H2: SE positively impacts PEOU.

2.1.6. Perceived ease of use

PEOU is a core component of the TAM. It refers to an individual's belief that using a particular technology will require minimal effort [9]. Several studies have confirmed PEOU's influence on m-banking adoption [26]. These findings imply that when consumers see innovation as simple to use, they are more inclined to engage with it. PEOU has also been shown to affect both the short-term adoption and long-term use of a technology [27]. Therefore, the following hypothesis is proposed: H3: PEOU significantly influences the intention to adopt m-banking.

2.1.7. Personal innovativeness

PI refers to the degree to which an individual is open to adopting new technologies. Rogers [36] defines it as "a key trait influencing the adoption and diffusion of innovation, related to the timing of individual acceptance of new technologies." Research indicates that PI significantly influences technology adoption [29], [31], [37]. Agarwal and Prasad [38] identified PI as a moderating factor between PEOU, PU, and individual perceptions of technology. As such, the following hypotheses are proposed: H4: PI positively affects PEOU and H5: PI significantly influences the intention to adopt m-banking.

2.1.8. Perceived usefulness

PU derives from TAM and refers to a user's belief that using a specific technology will enhance task performance [29]. PU has been repeatedly shown to influence BI toward technology adoption [26], [27]. Empirical studies have found that it plays a decisive role in determining the uptake of m-banking [20], [27]. Thus, the hypothesis: H6: PU positively influences the intention to adopt m-banking.

2.1.9. Subjective norm

SN, a concept drawn from TAM and the TPB, refers to the influence of social expectations on an individual's behavior [39]. It suggests that individuals may adopt technology to conform to the expectations of significant others [9]. Studies indicate that SN significantly affect m-banking adoption [23], [40]. Hence, the hypothesis: H7: SN positively influences the intention to adopt m-banking.

2.2. Perceived cost

PC includes financial outlays such as subscription fees, transaction charges, and switching costs associated with using new technologies. Research indicates that costs can hinder technology adoption [9], [22]. Therefore, the hypothesis: H8: PC negatively affects the intention to adopt m-banking.

2.2.1. Trust

TS is an essential element in establishing relationships and is crucial in digital transactions [27]. Studies show that TS influences users' intentions to adopt m-banking, with TS in service providers being central to users' confidence in financial transactions [30], [31], [41]. Consequently, the following hypothesis is suggested: H9: TS positively affects the intention to adopt m-banking.

2.2.2. The moderating effect of educational level

Educational level influences individuals' technology adoption behavior. Research shows that early adopters tend to have more formal education [42], [43]. Furthermore, those with higher education are more inclined to adopt internet-based services, perceiving them as less challenging [44]. Studies have shown that education level moderates the effects of SN, PU, PEOU, and PI on BI [45], [46]. This study seeks to explore these moderating effects further, proposing the following hypotheses: H10: The positive effect of SN on BI for m-banking adoption is stronger for individuals with higher education levels; H11: The positive effect of PU on BI for m-banking adoption is stronger for individuals with lower education levels; H12: The positive effect of PEOU on BI for m-banking adoption is stronger for individuals with lower education levels; and H13: The positive effect of PI on PEOU for m-banking adoption is stronger for individuals with lower education levels.

2.2.3. Research design and methodology

This section outlines the research methods used, including sampling techniques, data collection, and variable measurement.
i)   Sampling and data collection: this study examines the factors influencing m-banking adoption in Ghana. Participants were selected based on their likelihood of using m-banking services. Data were collected using a paper-based survey, which tends to yield higher response rates and encourages respondents to provide honest answers compared to online surveys [47], [48]. A total of 600 questionnaires were distributed, of which 598 were completed, resulting in a 99.67% response rate. A pilot survey was conducted with 25 lecturers and 15 non-academic staff at the University of Professional Studies, Accra,

to assess the clarity and relevance of the survey items. Their feedback informed the final design of the questionnaire, ensuring its relevance and comprehensibility.

ii)   Variable measurement: the study utilized variables from existing literature, including PEOU, PU, SN, SE, PC, TS, PI, and BI. Four items were used for each variable, except PEOU and SE, which had three. The replies were scored on a five-point Likert scale, comprising "Strongly Agree" to "Strongly Disagree." Table 1 presents the items, means, standard deviations, loadings, and variance inflation factors (VIF).

Table 1. Constructs, indicators, loadings, and VIF

Construct	Items	Indicators	M	SD	Loading	VIF
PU	PU1	Flexibility to conduct banking transactions 24 hours per day	3.388	1.012	0.837	2.369
	PU2	M-banking is quick, convenient, and low-cost	4.043	0.931	0.762	1.501
	PU3	Banking transactions on a mobile phone eliminate time and space constraints	3.261	1.131	0.907	1.974
PEOU	PEOU1	I feel the m-banking transaction will be straightforward and easy to comprehend.	3.87	0.969	0.85	2.234
	PEOU2	I believe it takes little effort to become skilled in using m-banking services.	3.957	0.931	0.927	4.434
	PEOU3	I agree that m-banking is simple to operate.	3.935	1.092	0.897	2.875
	PEOU4	Learning to use m-banking is straightforward.	3.935	0.987	0.914	4.04
BI	BI1	I will use m-banking services for different kinds of banking transactions.	3.833	1.019	0.883	1.865
	BI2	If I have access to m-banking, I intend to use it.	4.022	0.921	0.824	1.796
	BI3	During the next month, I intend to do a banking transaction with a mobile device.	3.985	0.924	0.878	2.127
SN	SN1	People who are important to me think I should use m-banking.	3.734	1.082	0.896	2.701
	SN2	People whose opinions I value prefer me to use m-banking.	3.63	1.113	0.832	1.912
	SN3	People who are important to me encourage my usage of m-banking.	3.749	1.114	0.941	3.305
PI	PI1	In my circle of friends, I am often the first to experiment with novel innovations.	3.565	1.076	0.927	2.621
	PI2	My peers highly value my opinions on emerging technologies.	3.401	1.279	0.877	2.196
	PI3	My peers depend highly on my opinion on new technology usage.	3.739	1.009	0.836	1.92
SE	SE1	I feel comfortable employing a smartphone to view internet films and music.	3.696	1.159	0.781	1.552
	SE2	I am comfortable using a mobile device for reading news.	3.804	1.191	0.866	2.739
	SE3	I am comfortable using my mobile device for streaming online programs.	3.783	0.998	0.775	1.541
	SE4	I am comfortable using smartphone gaming services.	3.495	1.307	0.833	2.615
TS	TS1	I feel that m-banking laws are adequate to protect consumers.	2.975	0.781	0.905	2.622
	TS2	I'm convinced that companies that offer m-banking have enough expertise and assets to provide these services.	3.217	0.832	0.738	1.586
	TS3	I trust that m-banking vendors will act lawfully when collecting, storing, processing, and managing my information.	2.965	0.92	0.942	2.567
CT	CT1	It might be costly to employ an m-banking service.	3.916	0.912	0.859	2.201
	CT2	I believe that using m-banking services will become more expensive as the cost of internet connectivity rises.	4.12	0.941	0.896	2.265
	CT3	I believe there are concealed fees in using m-banking services.	3.906	1.14	0.896	2.13

Notes: Significant at p<0.005 level (two-tailed test).

3.   RESULTS AND DISCUSSION

The study targeted 600 respondents in Ghana's Greater Accra Region, with 598 responses received. The sample comprised 63% males and 37% females. Most respondents (54.3%) were aged 31–40, and 73.9% held a postgraduate degree or higher.

3.1. Measurement model

The constructs in this study were operationalized as reflective measures and evaluated through item reliability, internal consistency, and discriminant validity. Acceptable factor loadings are ≥0.7, though values ≥0.5 are also acceptable [49]. As shown in Table 1, all indicators exceeded 0.7. Multicollinearity was assessed using VIFs, with no issues detected since all VIFs were below the threshold of 5 [50].

Confirmatory factor analysis was conducted to assess the model's fitness, reliability, and validity. Cronbach's alpha and composite reliability values exceeded the recommended threshold of 0.7 across the full sample (n=598) and sub-samples (n=442; n=156), ensuring internal consistency [51]. Convergent validity was confirmed, with all average variance extracted values above 0.5, indicating the constructs explained over half of the variance in their indicators [50]. Discriminant validity was evaluated using the Fornell–Larcker

criterion, ensuring that each construct's average variance extracted exceeded its highest squared correlation with other constructs. Table 2 presents the confirmatory factor analysis. The results in Table 3 confirm satisfactory discriminant validity.

Table 2. Confirmatory factor analysis

Construct	Cronbach alpha			Average variance extracted		
	Combined (n=598)	Higher education (n=442)	Lower education (n=156)	Combined (n=598)	Higher education (n=442)	Lower education (n=156)
BI	0.829	0.833	0.749	0.743	0.747	0.662
CT	0.862	0.85	0.888	0.781	0.767	0.816
PU	0.801	0.737	0.922	0.701	0.626	0.865
PI	0.856	0.86	0.852	0.776	0.778	0.774
SE	0.831	0.795	0.919	0.664	0.618	0.791
SN	0.87	0.838	0.944	0.793	0.756	0.898
TS	0.84	0.829	0.861	0.75	0.736	0.771
PEOU	0.919	0.918	0.934	0.805	0.803	0.836

Table 3. Discriminatory validity using the Fornell-Larcker criterion

	BI	CT	PU	PI	SE	SN	TS	PEOU
BI	0.862							
CT	0.541	0.884						
PU	0.336	0.423	0.837					
PI	0.473	0.367	0.149	0.881				
SE	0.611	0.81	0.213	0.38	0.815			
SN	0.791	0.609	0.306	0.514	0.636	0.891		
TS	0.232	0.128	0.207	-0.057	0.113	0.354	0.866	
PEOU	0.628	0.791	0.305	0.441	0.784	0.608	0.073	0.897

Notes: (n=598) Construct correlations with the square root of average variance extracted along the diagonals.

3.1.1. Structural model assessment and multi-group analysis

The results of the structural model are presented in Table 4. Hypotheses H1 to H9 were tested at a 5% significance level, with all hypotheses supported except H5 and H8. The multi-group analysis results (Table 5) indicate that all proposed hypotheses were significant at the 5% level, except H10 for respondents with lower education. Our findings suggest that SN, PEOU, SE, and PU significantly influence BI to adopt m-banking in Ghana. SE had a positive impact on BI ($\beta=0.184$, p=0.000), as did PEOU ($\beta=0.244$, p=0.000). However, PI did not significantly affect adoption intention. A strong positive relationship was found between SN and adoption intention ($\beta=0.618$, p=0.000). In contrast, PC did not significantly influence adoption, contradicting prior studies [24], [25]. TS was found to negatively impact adoption intention ($\beta=-0.251$, p=0.000).

Educational level moderated several relationships. For higher-educated respondents, SN had a stronger influence on BI ($\beta=0.717$, p=0.000) compared to those with lower education ($\beta=0.126$, p=0.147). PU had a positive effect on adoption intention among higher-educated individuals ($\beta=0.164$, p=0.000) but a negative effect for those with lower education ($\beta=-0.256$, p=0.000). The influence of PEOU was greater for respondents with lower education ($\beta=1.336$, p=0.000) than for those with higher education ($\beta=0.158$, p=0.000). PI also had a stronger effect on PEOU for the lower education group ($\beta=0.332$, p=0.000) than the higher education group ($\beta=0.158$, p=0.000). The predictive validity of the model was confirmed, with R^2 values of 0.683 for BI and 0.638 for PEOU, both above the moderate threshold of 0.5.

Table 4. Path coefficients and their significance

Hypotheses	Path	β	t	p Values	Results
H1	SE → BI	0.184	4.998	0	Supported
H2	SE → PEOU	0.721	27.371	0	Supported
H3	PEOU → BI	0.244	5.499	0	Supported
H4	PI → PEOU	0.166	4.84	0	Supported
H5	PI → BI	0.048	1.441	0.15	Not supported
H6	PU → BI	0.136	5.201	0	Supported
H7	SN → BI	0.618	14.104	0	Supported
H8	CT → BI	-0.018	0.739	0.46	Not supported
H9	TS→ BI	-0.251	4.975	0	Supported

Table 5. Path coefficients and their significance for multi-group analysis

Hypotheses	Path	Higher education (n=442)				Lower education (n=156)			
		β_1	t	p Values	Results	β_2	t	p Values	Results
H10	SN → BI	0.717	17.574	0	Supported	0.126	1.454	0.147	Not supported
H11	PU → BI	0.164	6.925	0	Supported	-0.256	4.137	0	Supported
H12	PEOU → BI	0.158	4.258	0	Supported	1.336	8.284	0	Supported
H13	PI → PEOU	0.094	3.325	0.001	Supported	0.332	4.984	0	Supported

3.2. Analysis

This study investigates the factors influencing m-banking adoption in Ghana, with broader implications for other developing countries. It provides valuable insights for financial institutions, telecommunications companies, and service providers aiming to enhance consumer engagement through tailored strategies, particularly considering users' educational backgrounds. Key determinants of BI to adopt m-banking include SN, PEOU, SE, and PU. SN emerged as the strongest predictor (β=0.618; p=0.000), confirming findings in earlier studies [23], [40]. However, its influence varied significantly with education: it was a dominant factor for higher-educated users (β=0.717; p=0.000), but statistically insignificant for lower-educated users (β=0.126; p=0.147). This indicates that social influence is more critical among educated users, likely due to stronger peer networks.

PEOU (β=0.244; p=0.000) also significantly influenced adoption, with a much stronger impact on lower-educated users (β=1.336; p=0.000) than higher-educated users (β=0.158; p=0.000), consistent with prior research [26], [27]. This underscores the need for intuitive, user-friendly interfaces for less technologically literate populations. SE (β=0.184; p=0.000) positively influenced adoption, reinforcing the value of training and educational initiatives. In contrast to prior studies, PU showed divergent effects: it positively influenced higher-educated users (β=0.164; p=0.000) but negatively affected lower-educated ones (β=-0.256; p=0.000), suggesting differing perceptions of utility. PI was more influential for lower-educated users (β=0.332; p=0.000) than higher-educated users (β=0.094; p=0.001), indicating a higher openness to exploring technology among the former. Notably, TS negatively impacted adoption (β=-0.251; p=0.000), highlighting the importance of transparent security communication. The study challenges the assumption of uniform adoption behaviors, advocating for segmented, personalized strategies to address the diverse needs of different user groups and promote inclusive m-banking adoption.

3.2.1. Practical implications

This study provides critical insights for financial institutions in developing countries aiming to enhance m-banking adoption. It recommends prioritizing user-friendly interfaces, especially for less-educated users, to improve PEOU. Marketing strategies should be segmented: for higher-educated users, campaigns should emphasize social influence and PU, while for lower-educated users, simplicity and usability are key. To increase adoption, service providers should offer tutorials and demonstrations to build SE and address TS concerns, alongside public campaigns to highlight m-banking security and reliability.

3.2.2. Theoretical contributions

Theoretically, the research confirms the relevance of TAM and TPB in the Ghanaian context. The analysis emphasizes the significant roles of constructs like SN, ease of use, and SE. It contributes to literature by showing how educational level moderates adoption behaviors, while casting doubt on the consistent impact of PI and cost.

3.2.3. Limitations and future research

The first limitation is that the sample was drawn primarily from Accra, the capital of Ghana, which may not fully represent the diverse socio-economic conditions across the country. Future research should include participants from all 16 regions to ensure broader generalization. Finally, this study focused on initial adoption rather than continuous use; future studies could explore long-term adoption trends and user retention.

4. CONCLUSION

The study introduces a novel model integrating TAM and TPB, validated through structural equation modelling. Key predictors of m-banking adoption include SN, PU, ease of use, and SE, with education level shaping their impact. Findings support tailored marketing and user empowerment strategies. To boost adoption, financial institutions should invest in secure, simple platforms and personalized outreach, enhancing customer satisfaction and long-term loyalty.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C	:	**C**onceptualization	I	:	**I**nvestigation	Vi : **Vi**sualization
M	:	**M**ethodology	R	:	**R**esources	Su : **Su**pervision
So	:	**So**ftware	D	:	**D**ata Curation	P : **P**roject administration
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CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, [IA], upon reasonable request.

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