2025 Volume: 5, No: 4, pp. 1157–1174 ISSN: 2634-3576 (Print) | ISSN 2634-3584 (Online) posthumanism.co.uk

DOI: https://doi.org/10.63332/joph.v5i4.1203

Mobile Banking Application Challenges and Continued Usage in Nigeria: Mediating Influence of Information and Systems Success Model

Fidelis, U. Amahi¹, Andrew Azuka Ugbah², Udoka Bernard Alajekwu³, Anastasia Chichi Onuorah⁴, Andrew, O.E. Erhijakpor⁵, Yetunde Abie Adegbite⁶

Abstract

Although Nigerian banking industry has recorded tremendous growth in the volumes of mobile banking transactions, the extent of deployment of the mobile banking application (MBA) in Nigeria on the overall, is still below expectations. Consequently, this research investigated the influence of MBA technical (poor network connectivity - PNC, app compatibility issues - ACI, technical glitches - TEG, and frequent system failures - FSF) and user-related challenges (low digital literacy - LDL and Inadequate Customer Support - ICS) on continued usage (COU) of MBA in Nigeria leveraging on information quality (IFQ), system quality (SYQ), and service quality (SEQ). 387 web-based copies of questionnaire were sent to bank experts using Google forms. The data collected from the students were coded, and analysed using the SmartPls. The findings revealed that both user-related such as LDL and technical challenges such as PNC, ACI, FSF and CST significantly hinder COU while user-related such as TEG and ICS had insignificant direct influence on COU. However, the introduction of IFQ, SYQ, and SEQ into the model significantly enhances the robustness of the analysis by evidencing the relevant mediating mechanisms, which improves COU. Hence, the study concludes that PNC, ACI, FSF and CST can still improve COU indirectly when the quality dimensions (IFQ, SYG, and SEQ) are high. Policy-wise, the Central Bank of Nigeria (CBN) and other financial regulators should mandate banks on national awareness campaigns on the usage of MBA.

Keywords: Mobile Banking Application Challenges, Continued Usage, Information Quality, System Quality, and Service Quality.

Introduction

Over the years, the Nigerian banking industry has recorded tremendous growth in the volumes of mobile banking transactions (Zahari, et al, 2024; Hassan, et al, 2024). According to the Central Bank of Nigerian Statistical Bulletin (2023), the total volumes of mobile banking transactions as at 2009 Q1 was 452,312.75 billion and fall to 301,541.83 in 2009Q4. From 2010Q1 to 2021Q4, there was steady rise. However, significant growth was recorded from 2022Q1 till 2023Q4 with the highest value recorded in 1,596,241,648.00 (Figure 1).

⁶ Department of Accounting, Topfaith University, Akwa-Ibom State, Nigeria., Orcid ID: 0009-0001-0392-8918.



¹ Department of Business Education-Accounting, University of Delta, Agbor, Delta State, Nigeria, Email: <u>amahifidelisu@gmail.com</u>, (Corresponding Author), Orcid ID: 0009-0000-7064-6462.

² Department of Accounting and Finance, University of Delta, Agbor, Delta State, Nigeria, Orcid ID: 0009-0002-0313-2925

³ Department of Finance, Chukwuemeka Odumegwu Ojukwu University, Anambra State, Nigeria, Orcid ID: 0000-0002-0624-524X.

⁴ Department of Banking and Finance, Delta State University, Abraka, Delta State, Nigeria Orcid ID: 0000-0003-3162-8493.

⁵ Department of Banking and Finance, Delta State University, Abraka, Delta State, Nigeria Orcid ID: 0000-0002-7302-1983.



Figure 1: Trend Analysis on Mobile Banking (Quarterly Basis)

Patnam and Yao (2020) & Aron (2018) traced the tremendous growth both in the volumes and value of mobile banking transactions to the current financial inclusion efforts of Nigerian governments; lockdown during the Covid 19 pandemic, and the demands by many users for a more efficient, reliable and user-friendly payment platform. The report further confirmed that most users use the mobile app for both banking and non-banking transactions at the convenient of their homes. Various banking transactions they use this app for include account balance inquiry, checking of transactions history, fund transfer, bill payments and loan applications. They also use the app to conduct non-banking transactions such as peer-to-peer payments, digital wallets, crypto-currency transactions and e-commerce payments. Hence, it is expected that as more users increasingly deploy mobile banking applications (MBA), the extent of financial inclusion ought to be deepen while operational costs of banks ought to reduce. Also, the extent of customer satisfaction ought to increase as well.

Despite the tremendous growth and high investment in mobile banking infrastructure by most Nigerian banks, the extent of deployment of the MBA in Nigeria, on the overall, is still below expectations (Omotosho, 2021; Ugbah, et al, 2025; Hodosi, et al, 2021). One major explanation for this huge digital gap is the presence of insistent challenges which hinder users from full acceptance and effective utilization of MBA. First, poor network connectivity (PNC) remains a key challenge. Hassan et al. (2024), and Chakraborty, et al. (2023) stressed that many users experience interrupted sessions and failed transactions due to unstable internet services, especially in villages and financially excluded areas. Second, low digital literacy levels (LDL) remains another major challenge since many still find it very difficult to navigate the digital landscape due to low LDL (Zahari, et al, 2024). This technical limitation to a large extent has made many users to adopt these modern technologies. Third, cyber-security threats (CST) is yet another growing issues considering the rising cases of data breaches, unauthorized transactions, and online fraud (Bakwuye, et al, 2025). This has made many Nigerians (old and existing users) not to have high confidence on digital financial channels. Fourth, system inefficiencies (frequently technical glitches) characterized by frequent transaction errors; app crashes, delayed confirmations, and unresponsive features further compound the challenge (Hassan, et al. 2024).

Journal of Posthumanism

Lastly, insensitivity of staff in the customer support services further compound these challenges in that even when many users report their level of dissatisfaction, the responses they get are not satisfactory (Ezeocha, 2024; Altenburger, 2023; Nguyen, & Dao; 2024). This has made many users to abandon conventional banking mobile banking platforms in search of non-conventional mobile banking platforms like those of Opay, Palmpay and Moniepoint etc that are licensed as online microfinance banks in Nigeria.

Judging from empirical evidence, attention of most researchers has been mainly on the extent the mobile banking challenge affect the continued use of the MBA, with less attention on how these challenges can be ameliorate through the lens of the Information and Systems Success (ISS) model. Hence, the current research drifted from a problem-oriented approach to a solutionoriented paradigm by providing a conceptual shift towards leveraging on information quality (IFQ), system quality (SYQ), and service quality (SEQ) to overcome the aforementioned challenges which hinders continued use of the MBA in the Nigerian context. As such, this research is expected to validate and extend the integration of ISS model into the digital banking landscape. Also, this research will enrich discourse on user retention and technological adoption in the Nigerian context. Beyond its contribution to academic discourse, this research is expected to provide actionable insights that will be useful to Nigerian banks, mobile application developers, and policy makers on steps to take to increase the continued usage of the mobile application despite the challenges. Further, the research is expected to provide developers on how they can evaluate the success of MBA using IFO, SYQ, and SEQ as parameters. By applying ISS model to Nigeria's mobile banking context, this research is expected to provide a more comprehensive examination on how the perceived IFQ, SYQ, and SEQ influences continuous usage of the mobile banking application especially in the Nigerian context. Consequently, the two (2) specific objectives which this paper seeks to address are to:

1. examine the effect of the key challenges on the continued usage of MBA in Nigeria

2. investigate the mediating influence quality dimensions have on the challenges which hinders continued usage of MBA especially in the Nigerian context.

Consequently, web-based questionnaire were sent to bank experts using Google forms. The data collected from the students were coded, and analysed using the SmartPls. Accordingly, the paper is organized into five (5) sections. Section 1 focused on the introduction; section 2 reviewed extant literature; section 3 focused on the methodology; sections 4 and 5 address results, discussions and conclusion. Also, the theoretical and empirical contributions, limitations and suggestions for future research were presented in the last section.

Literature Review

Given the avalanche of research devoted to factors affecting mobile banking adoption (see the studies of Andalib, & Hazarina, 2024; Al-Fahim, et al, 2024), this section focused mainly on a conceptual clarification on mobile banking application in Nigeria, theoretical framework and hypothesis development on the variables of interest.

Mobile Banking Application in Nigeria

Mobile banking apps are internet-enabled user friendly software applications which bank customers use to either access banking services or perform various financial transactions through their smartphones or other digital devices. With this innovation solution, bank customers can perform series of financial transactions such as balance inquiries, fund transfers, bill payments,

and loan applications at the confine of their homes (Saibaba, 2024). Advantageously, mobile banking apps provides a more convenient, secured, and user-friendly services unlike conventional/traditional methods (Al-Fahim, et al, 2024).

In today's banking landscape, mobile banking has become a necessity for those who want to participate in the system. It offers unparalleled convenience, allowing consumers to conduct financial transactions effortlessly from anywhere in the world (Ugbah et al, 2025). Due to its user-friendly interface and simplicity, banks are investing more resources in enhancing their online customer experience (Khan, & Ejike. 2017; Siano, et al, 2020; Rafdinal & Senalasari, 2021).

Theoretical Framework

The ISS Model served as the theoretical framework. DeLone and McLean developed the model in 1992 but later updated the model in 2003 (DeLone & McLean, 2003; Urbach & Mueller, 2011; Ojo, 2017). DeLone and McLean identify six (6) key factors which influence the success of IS/IT: SYQ, IFQ, SEQ, usage (USG), user satisfaction (USS), and net benefits (NEB) (Figure 2). However, our attention is on three (3) quality dimensions which are IFQ, SYQ, and SEQ. Justifiably, this theory provides valuable insights into how mobile bank developers can reduce the MBA challenges using IFQ, SYQ, and SEQ.





Hypotheses Development

Challenges and Continued Usage (COU) of MBA

Basically, the extent of deployment of MBA is directly influenced by the nature, occurrence, and degree of the challenges users face while using the digital solutions. These challenges further influence the decision to either use or discontinue the usage of digital solutions (Ohiani, 2021). Notably, poor internet connectivity, app compatibility issues, low digital literacy level, frequent system failures, cyber-attacks and other security issues, and weak customer support slows down users' adoption rate. By extension, they undermine policy makers' efforts to reduce financial exclusion through digital banking platforms. For example, if users experience repeated login failures, face difficulties while either installing or running the mobile app, and even when the mobile apps are installed, performance issues like crashing, freezing, or limited functionality **Journal of Posthumanism**

may also discourage users from continued usage. Again, delayed transactions, low digital skills, fear of cyber-attacks, and lack assistance when problems arise may reduce the continued usage of mobile app.

Theoretically, the Technology Acceptance Model (TAM) stresses MBA challenges lowers users' perception and by extension reduces adoption rate (Ohiani, 2021). By implication, the more MBA are user-friendly, intriguing, secure, and highly responsive to users' needs, the higher the likelihood of widespread adoption. Conversely, unresolved challenges lower the likelihood of consistently using MBA. Consequently, the paper hypotheses:

- H1: LDL reduces users' COU in Nigeria
- H2: PNC reduces users' COU in Nigeria
- H3: ACI reduces users' COU in Nigeria
- H4: TEG reduces users' COU in Nigeria
- H5: FSF reduces users' COU in Nigeria
- H6: CST reduces users' COU in Nigeria
- H7: ICS reduces users' COU in Nigeria

Mediating Influence of Information Quality (IFQ)

Usually, users with LDL face challenges when trying to navigate complex digital environments. DeLone and McLean (2003), however, stressed that high-IFQ characterized by simplified processes, user-friendly language, visual cues, and accessible explanations can enable digitally less literate users to perform banking transactions on a regular basis with greater confidence and less frustration (Daniyan, & Akinbowale, 2017). Hence, high IFQ bridges the gap between users' digital limitations and their continued use (COU) of MBA. Hence, the paper hypothesizes:

H8: IFQ mediates the relationship between LDL and users' COU significantly.

Mediating Influence of System Quality (SYQ)

Another critical factor that influences increased continued use of MBA in the face of technical challenges such as PNC, ACI, TEG, and FSF is SYQ. The emphasis here is that if users experience frequent network disruptions, ACI, FSF, or unexpected TEG, their perception towards the reliability, responsiveness, and functionality of the mobile banking application will reduce drastically (Omotosho, 2021). This will in turn reduce the likelihood of continued use of the mobile banking application for performing various financial transactions. Consequently, high SYQ acts as a critical mediating factor that reduces the adverse effect technical issues have on users' continued use of MBA, and vice versa. Hence, the study hypothesizes:

H9: SYQ mediates the relationship between PNC and users' COU significantly.

H10: SYQ mediates the relationship between ACI and users' COU significantly.

H11: SYQ mediates the relationship between TEG and users' COU significantly.

H12: SYQ mediates the relationship between FSF and users' COU significantly.

Mediating Influence of Service Quality (SEQ)

High SEQ mediates the relationship among CST, ICS, and the COU of MBA significantly. For

example, frequent CST, such as phishing and data breaches, reduces the confidence users' repose in the mobile app. This issue further reduces continued use of the app. However, high SEQ, characterized by responsiveness, assurance, and the proactive handling of security issues, increases the continued use of the digital platform. Again, ICS (unhelpful feedback, delayed responses, and unsatisfied personalized assistance) reduces users' continued use of MBA (Pallangyo, 2022; Ambore, Richardson, Dogan, Apeh, & Osselton, 2017). Nevertheless, high SEQ (effective and reliable service delivery) compensates even when users face both cyberrelated issues and support deficiencies. Hence, the paper hypothesizes:

H13: SEQ mediates the relationship between CST and COU significantly.

H14: SEQ mediates the relationship between ICS and COU significantly.

Methodology

The study used the quantitative data to analyze the survey responses statistically. With this, the research gain generalizable insights on the extent to which mobile app challenges affect users' adoption rate while leveraging the ISS Model. The respondents willingly participated, and the data collected was mainly for research/academic purposes. The respondents were all assured of their privacy. Roberts and Allen (2015) maintained that the principle of confidentiality and anonymity are paramount ethical consideration in research (Roberts & Allen, 2015). Thus, once the principle of confidentiality and anonymity were upheld and every other ethical standard are satisfied, this improves the research's integrity (Roberts & Allen, 2015)

The study focused on banking experts in Delta State Nigeria. The questionnaire was sent to the bankers' in Delta state, Nigeria. The online survey offers various advantages over the off-line self-administered questionnaire, including ease of respondents' participation, data management and efficient data collection from a large and highly diverse population (Chen et al., 2020; Steinberg, 1994). The online surveys are suitable for gaining several insights on the extent mobile banking apps challenges affect adoption rate. Respondents could respond to the questionnaire conveniently using their smartphones, laptops or tablets. The questionnaire covered mainly two (2) sections. The first section contained the respondents' profile, such as age bracket, sex, educational qualification and professional roles. The remaining sections covered the items on the variables of interest.

To avoid type I and II errors, the authors had to apply a pre-sample size estimation to determine the minimum sample size need for this research (She et al., 2021). We initially computed a minimum sample size of 400 respondents based on an approximately 5,000 population, with a 95% confidence interval and a 5% margin of error. Although, we desired to cover wider respondents, we only recruited 400 due to practical consideration. Nevertheless are high response rate of 96.75% was record suggesting that our findings is credible, which lends credibility to our findings. The details of the respondents' demographic profiles are shown in Table 1.

The study analyzed the data using Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS version 4.0.9.6. This model is highly advantageous to researchers as it estimates complex models with several latent variables, indicator variables, and structural paths without necessarily deviating from the assumptions of the normality of the sourced data (Hair et al., 2019). PLS-SEM is a causal-predictive model that stresses forecasts when estimating complex statistical models developed to provide causal explanations. This model provides the basis for formulating managerial implications as it fills the gaps between explanations and

Journal of Posthumanism

forecast (Avkiran, 2018; Hair et al., 2019).

Empirical Result and Discussion

Bank Expert Demography

The demographic profile of the bank experts surveyed cut across their age bracket (30 to 50 years), gender (males and females), educational qualification (BSc, MSc/MBA, and PhD/DBA), and professional roles (digital banking operations- Customer service, Risk and compliance, strategy and innovation, and system management). The outcome from the field survey is presented and reported thus:

Catagory	Maggurag	Frequency (F)	Percentage
	30 to 40	128	33.1
Age Brackets	41 to 50	147	37.9
(Years)	51 to 60	112	29.0
	Total	387	100
Conder (Sev)	Males	156	40.31
Gender (Sex)	Females	231	59.69
	Total	387	100
Educational	BSc./HND	149	38.50
Qualification (Degrees	MSc./MBA	127	32.82
Obtained)	Ph.D./DBA	111	28.68
	Total	387	100
	Digital Banking Operations	103	26.61
	Customer service Departments	87	22.48
Professional Polos/Department	Risk and Compliance		
s	Department	73	18.86
	Systems Management	65	16.80
	Strategy and Innovations	59	15.25
	Total	387	100

Table 1: Bank Experts' Demography

From Table 1, the age bracket falls within 30 to 50 years suggesting that those selected are expected to have being working in the banking industry over 5 years since the maximum entry year for most banks is 26 years. Also, the cut off year of 50 years suggests that those sampled are still actively employed. Accordingly, the report from the field survey evidenced that, majority of the bank experts falls within the age bracket of 41 to 50 years range (37.9%) suggesting that most bank experts are in the mid to senior level of management with experience

in both conventional and digital banking solutions. Those ages ranges of 30 to 40 are the next ranked with 33.1% (n=128 bank experts) suggesting that 128 younger bank professionals who are highly digitally inclined are often involved in day-to-day technical operations were sampled as well. Those ages 51 to 60 years were the least sampled, with a 29% (n=112 bank experts) suggesting that though those that fall within the age brackets of 50 to 60 years were recruited and are few, they likely hold strategic, advisory and regulatory roles were recruited. Overall, the age composition which fall those that are actively working in the banking industry gives a fair view that those with both operational and managerial cadre were recruited (Figure 1).



Figure 1: Bank Experts' Age Brackets (30 to 60 years)

Again, the survey evidenced that the banks sampled are female dominant reflecting the increasing presence of women in strategic position in the banking industry (Figure 2). This adds value to the analysis since women are often involved in both system use and customer feedbacks. By implication, it will give more insights on how to resolve the challenges users face while using the MBA.



Figure 2: Bank Experts' Gender Frequency (Males and Females)

Further, BSc holders formed the largest group (n=149 & %=38.50%). This confirmed that majority of the bank experts are operational staffs, IT experts, and front desk (customer service) staff who are directly involved in resolving issues users face while using the MBA. Followed closely are those with MSc./MBA (n=127 & %=32.82%) suggesting that mid-level professionals with digital strategy and compliance roles were sampled. Lastly, PhD/DBA holders make up the remaining 26.68% (Figure 3).



Figure 3: Bank Experts' Educational Qualification (Degrees)

Lastly, the survey evidenced that majority of the bank experts are in digital banking operations posthumanism.co.uk

in charge of system performance, implementation and supports (n=103, %=26.21%), those in charge of offering real-time feedback in case customers face difficulty while using the MBA were ranked next (n=87, %=22.48%), followed closely are those in risk and compliance department (n=73, %=18.86%), followed next are those in systems management department (n=65, %=16.80%) while those in strategy and innovations department, a key ISSM success parameter were ranked last (n=59, %=15.25%). The professional role mix gives credence to the fact that those recruited have fair view on the challenges that customers face while using the MBA.

Category	MBA Challenges	Frequency	Rank
		(Percentage)	
User-Related	LDL	83(21.5%)	1
Challenges			
Technical Challenges	PNC	59(15.30%)	2
Technical Challenges	ACI	55(14.23%)	4
Technical Challenges	TEG	30(7.65%)	7
Technical Challenges	FSF	56(14.39%)	3
Technical Challenges	CST	51(13.24%)	6
User-Related	ICS	53 (13.69%)	5
Challenges			

Table 2: Ranking of	f MBA Challenges
---------------------	------------------

The survey evidenced that bank experts categorized the challenges affecting the COU of MBA into technical and support-related issues. Among these challenges, LDL ranked the most frequently reported challenge facing COU of MBA, accounting for 21.5% of responses. This confirmed the key role of user (customer) education in enhancing COU, as many users lack the basic skills to navigate the complex mobile banking platforms efficiently. PNC followed closely, with 15.3% of responses suggesting that infrastructural deficiencies also disrupt smooth mobile banking application performance. Other major technical challenges include: FSF accounted for 14.39% (n=56 responses), ACI accounted for 14.23% (n=55 responses) and CST accounted for 13.24% (n=51 responses). All these technical challenges reduce user confidence on mobile banking application. Although TEG was ranked the least (7.65%), TEG still increases user dissatisfaction. On the user/support-related challenges, ICS accounted for 13.69% of 53 responses, suggesting that users face difficulty resolving issues most often. On the overall, the high prevalence of both challenges clearly confirmed that IFQ, SYG, and SEQ are essential tools which boost the COU of MBA in Nigeria despite the challenges.

Preliminary Tests: Measurement Model

Before testing the inner model/structural model (SRM), the outer model/measurement model was first tested. The reason for testing the outer model provides a solid foundation for testing the outer model by ensuring that all the constructs meet the reliability and validity criteria. Further, the outer model reaffirms the indicators perfectly measures the underlying latent variables or not. Various out model/measurement estimates are presented in Table 2 and 3, respectively:

U. Amahi et al. 1167

Constructs and indicators	Factor Loadings (FL)	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
LDL	0.83-0.89	0.818	0.819	0.863	0.686
PNC	0.80-0.84	0.730	0.749	0.811	0.800
ACI	0.81-0.89	0.801	0.799	0.857	0.720
TEG	0.75-0.82	0.798	0.798	0.910	0.701
FSF	0.72-0.87	0.757	0.769	0.823	0.593
CST	0.71-0.83	0.796	0.802	0.901	0.634
ICS	0.79-0.83	0.788	0.760	0.866	0.622
IFQ	0.72-0.88	0.710	0.756	0.851	0.631
SYQ	0.77-0.81	0.818	0.819	0.863	0.686
SEQ	0.80-0.84	0.730	0.749	0.811	0.800
COU	0.78-0.83	0.790	0.753	0.874	0.812

Table 2:	Construct	Reliability	and Conve	ergent V	alidity
1 uoic 2.	Construct	ronuonny	und Conv	cigont v	unuity
		2		<u> </u>	~

Table 2 reveals that values of the factor loadings (FL) fall between 0.71 and 0.89, which are above the threshold value of 0.70 (Hair et al., 2019). This confirmed that each construct is strongly associated with its respective indicators. Addiotnally, the Cronbach's alpha values (0.710 to 0.818) and rho_A values (0.749 and 0.819), which are above the threshold value of 0.70 both suggests strong internal consistency Furthermore, the Composite Reliability (CR) values fall between 0.811 and 0.910, which are also above the threshold value of 0.70. This suggests that the latent variables are well represented by their observed indicators.

Moreover, the AVE values (0.593 to 0.800), which is above the 0.50 threshold suggests that the respective constructs accounted for over 50% of the variance in the indicators. This further confirmed that convergent validity was established.

	1	2	3	4	5	6	7	8	9	10	11
LD	0.82										
L	8										
PN	0.08	0.89									
С	1	4									
ACI	0.52	0.17	0.84								
	7	5	9								
TE	0.52	0.14	0.55	0.83							
G	4	0.14	3	7							
FSF	0.13	0.08	0.06	0.06	0.77						
	0.15	4	3	7	0						
CST	0.09	0.10	0.54	0.53	0.10	0.79					
	5	2	7	8	1	6					
ICS	0.02	0.09	0.52	0.53	0.08	0.54	0.78				
	4	9	1	7	7	9	9				
IFQ	0.55	0.54	0.53	0.52	0.15	0.05	0.04	0.79			
_	8	2	1	5	3	8	1	4			

posthumanism.co.uk

1168 Mobile Banking Application Challenges and Continued

SY Q	0.05 7	0.01	0.46	0.48 8	0.01	0.54 1	0.53 5	0.02 2	0.82 8		
SE Q	0.03 9	0.02 1	0.51 9	0.54 6	0.02 2	0.53 7	0.52 9	0.05 7	0.55	0.89 4	
CO U	0.44 3	0.15 7	0.54 5	0.55 4	0.05 8	0.54 8	0.53 6	0.53 7	0.53 7	0.53 2	0.90 1

Table 3: Fornell-Larcker Criterion Test

From Table 3, Fornell-Larcker Criterion test evidenced that the *server* (bolded diagonal values) are above is above the unbolded off-diagonal values suggesting that the latent constructs are distinct.

Structural Model/Outer Model

The major tests conducted in this section before evaluating the direction of the model using Path Coefficients (β) and testing significance of the variables using either p-value or t-value, three major quality criteria tests were conducted. These tests include Goodness of Fit (unadjusted R², adjusted R², Normed Fit Index-NFI and the Standardized Root Mean Squared Residual-SRMR), Predictive Relevance (Q²), and Effect Size (f²). Overall, the quality criteria tests were conducted to determine if the model is highly reliable, valid, and predictive (i.e. sound). The outcomes are analyzed thus:

Constr uct	SRM R (<0.0 8)	Interpreta tion	NFI (Clo se to 1)	Interpreta tion	R ²	Adj . R ²	Interpretation
COU	0.01	Excellent fit	0.76 3	Good fit	0.5 24	0.4 99	High Predictive Power
IFQ	0.02	Excellent fit	0.83 2	High good fit	0.6 38	0.6 07	High Predictive Power
SYQ	0.01 3	Excellent fit	0.92 1	Excellent fit	0.6 57	0.6 26	High Predictive Power
SEQ	0.02	Excellent fit	0.85 3	High good fit	0.6 21	0.5 86	Moderate Predictive Power

Table 4: Model Evaluation and Goodness of Fit (SRMR, NFI, R², and Adj. R²)

Table 4 evidenced that the inner model demonstrates an excellent fit across the four (4) constructs. Specifically, the SRMR values for COU (0.010), IFQ (0.020), SYQ (0.013), and SEQ (0.020) are all below the acceptable benchmark value of 0.08. This suggests that the variance between observed and predicted correlations is insignificant. This further evidenced a strong overall model specification. Similarly, the NFI values further confirmed the adequacy of model fit. Specifically, SYQ reported the highest NFI value (0.921), followed by SEQ (0.853) and IFQ (0.832). The four constructs falls within the acceptable fit and is comparatively better than the baseline model.

In regards to the predictive power of the model, SYQ has the highest R^2 (0.657) and adjusted R^2 (0.626), COU and SEQ followed closely with R^2 values of 0.524 and 0.621 respectively, and adjusted R^2 values of 0.499 and 0.586. Notably, even though SEQ has a high good fit but had

Journal of Posthumanism

moderate predictive power due to the slightly lower adjusted R². Overall, results suggest that the model is practically meaningful as it provides a solid basis for both theoretical interpretation and policy recommendations.

Construct	f ² Value	Interpretation	Q ² Value (>0.35)	Interpretation
COU	0.272	Excellent fit	0.392	Strong predictive relevance
IFQ	0.301	Excellent fit	0.531	Strong predictive relevance
SYQ	0.322	Excellent fit	0.542	Strong predictive relevance
SEQ	0.209	Excellent fit	0.529	Strong predictive relevance

Table 5: Effect Size (f²) and Model Predictive Relevance (Q²)

The f2 values ranging from 0.209 to 0.301 and Q2 values ranging from 0.392 to 0.542 reaffirmed that the model is statistically robust and is also practically and theoretically relevant.

4.5. Hypothesis Testing: Path Coefficients, T-Value and P-Value

The regression estimate covers direct and indirect effects with emphasis on hypothesis specification, coefficient value (β value), t statistics value (t value), probability value (p value) and interpretation. Specifically, each hypothesis was tested with the intent to determine if the hypotheses formulated in section 2 are still valid. The decision rule is that if the t-statistics of a construct is >1.96 and the p value is <0.05(5%) but >95% confidence level, such hypothesis is valid, vice versa. Accordingly, the result estimate is presented and tested thus:

Paths	Hypothesis	β	T-value	P-value	Interpretation
		value			
Direct Effects					
LDL->COU	H1	-0.368	-5.366	0.000	Valid
PNC->COU	H2	-0.358	-5.411	0.000	Valid
ACI->COU	H3	-0.287	-2.329	0.021	Valid
TEG->COU	H4	0.001	0.249	0.804	Not Valid
FSF->COU	H5	-0.214	-2.208	0.027	Valid
CST->COU	H6	-0.180	-2.189	0.029	Valid
ICS->COU	H7	-0.003	-1.652	0.101	Not Valid
Indirect Effects					
LDL->IFQ->COU	H8	0.671	11.882	0.000	Valid
PNC->-SYQ-	H9				Valid
>COU		0.403	9.932	0.000	
ACI->->SYQ COU	H10	0.329	4.071	0.000	Valid
TEG->->SYQ	H11				Valid
COU		0.372	5.420	0.000	
FSF->SYQ->COU	H12	0.326	4.193	0.000	Valid

1170 Mobile Banking Application Challenges and Continued

CST->SEQ->COU	H13	0.288	2.231	0.026	Valid
ICS->SEQ->COU	H14	0.384	5.514	0.000	Valid

Table 6: Hypothesis Testing

From the regression (direct effect) estimate, HI: LDL->COU has negative coefficient value of -0.368, t-value of -5.366 (>1.96) and a p-value of 0.000 (<5% but >95 confidence level) suggesting that LDL has a negative significant influence on COU. By implication, HI: LDL->COU hold true/valid. In like manner, H2: PNC->COU ($\beta = -0.287$, t value = -2.329, & p value = 0.021), H3: ACI->COU (β value = -0.287, t value = -2.329, & p-value = 0.021), H5: FST->COU (β value = -0.214, t value = -2.208, & p value= 0.027), and H6: CST->COU (β value = -0.180, t value = -2.189, & p value= 0.029) are valid. This reaffirmed that the earlier hypotheses (H1-H3, H5-H6) are retained. However, H4: FST->COU (β value = 0.001, t value = 0.249, & p value = 0.804) and H7: ICS->COU (β value = -0.003, t value= -1.652, p value = 0.101) were rejected.

In the case of the indirect effect estimates, the regression estimates were categorized into IFQ model, SYQ model and SEQ model. The IFQ model only addresses H8: LDL \rightarrow IFQ \rightarrow COU (β value = 0.671, t-value =11.882 & p-value = 0.000. The result suggests that LDL positively significantly influence COU indirectly through high IFQ since that its β value (0.671) is positive, t-value of 11.882 (>1.96) and p-value of 0.00 (<0.05). In this regards, H8: LDL \rightarrow IFQ \rightarrow COU is still valid.

Furthermore, SYQ model covers H9: PNC \rightarrow SYQ \rightarrow COU, H10: ACI \rightarrow SYQ \rightarrow COU, H11: TEG \rightarrow SYQ \rightarrow COU and H12: FSF \rightarrow SYQ \rightarrow COU. The regression estimate clearly revealed that H9: PNC \rightarrow SYQ \rightarrow COU (β value = 0.403, t value = 9.932, & p-value = 0.000), H10: ACI \rightarrow SYQ \rightarrow COU (β value = 0.329, t value = 4.071, & p-value = 0.000), H11: TEG \rightarrow SYQ \rightarrow COU (β value = 0.372, t value = 5.420, & p-value = 0.000), and H12: FSF \rightarrow SYQ \rightarrow COU (β value = 0.326, t = 4.193, & p-value = 0.000) suggesting that PNC, ACI, TEG, and FSF significantly affects COU indirectly through SYQ. By implication, SYQ has a mediating influence on: PNC & COU, ACI & COU, TEG & COU, and FSF & COU, respectively. By extension, H9: PNC \rightarrow SYQ \rightarrow COU (H10: ACI \rightarrow SYQ \rightarrow COU, H11: TEG \rightarrow SYQ \rightarrow COU and H12: FSF \rightarrow SYQ \rightarrow COU are valid.

Lastly, SEQ model captures H13: CST \rightarrow SEQ \rightarrow COU and H14: ICS \rightarrow SEQ \rightarrow COU. The regression estimate confirmed that H13: CST \rightarrow SEQ \rightarrow COU (β value = 0.288, t value = 2.231, & p-value = 0.026 and H14: ICS \rightarrow SEQ \rightarrow COU (β value = 0.384, t value = 5.514, & p-value = 0.000) are valid. The reason is that their p-values estimated at 0.026 (2.6%) and 0.000 (0%) are far below 0.05 (5%) and above 95% confidence level.

Discussion and Practical Implications

The regression estimate provides clear insights into both the direct and indirect effects of various MBA challenges on COU. Specifically, the direct effect regression clearly revealed that LDL, PNC, ACI, FSF, and CST hinder COU significantly. However, TEG and ICS only exhibit insignificant direct effects. By implication, LDL, PNC, ACI, FSF, and CST are major factors that hinder COU of MBA in Nigeria. By extension, if these user-related challenges (LDL) and technical challenges (PNC, ACI, FSF, and CST) are addressed, the COU and retention of MBA will increase significantly. Meanwhile, the indirect effect (mediated) regression analysis clearly revealed that LDL positively and significantly improves COU indirectly through high IFQ, while PNC, ACI, TEG, and FSF positively and significantly improve COU through high SYQ. Also,

CST and ICS influence COU through high SEQ. This suggests that even when direct effects are minimal, the mediated pathways via high SYQ and SEQ will improve customer experiences. From the practical viewpoint, this study clearly stressed the need for improving users' digital literacy level through user education, ensuring app compatibility, enhancing network and system reliability, and strengthening cyber-security. Also, the regression estimate stressed that, for COU to increase, Nigerian banks need to ensure that the customer service unit is trained on how they can provide customers with clear, seamless, and highly responsive service delivery. Overall, the study stressed that a holistic strategy that addresses both technical infrastructure and user experience must be emphasized.

Furthermore, the mediated regression analysis clearly evidenced that the integration of the ISS model (IFQ, SYQ, and SEQ) into the analysis is practically relevant. The study evidenced that the introduction of IFQ, SYQ, and SEQ into the model significantly enhances the robustness of the analysis by evidencing the relevant mediating mechanisms, which improves COU. Specifically, the study reported that high IFQ improves COU even by reducing the challenges users face while navigating the digital environment. This reason is that high IFQ overcomes the challenges posed by digital literacy barriers by ensuring that information that is available to users is clear, accessible, and user-friendly. Similarly, the result stressed that high SYQ turns negative experiences into positive experiences by improving platform stability, app performance, and connectivity. By extension, high SYQ reduces the adverse effect technical challenges such as PNC, ACI, TEG, and FSF have on COU. In like manner, high SEQ characterized by a seamless and highly empathetic customer service experience has the capacity to reduce the cybersecurity concerns and support inefficiencies. The reason is that COU is sustained through high SEQ.

Thus, high IFQ, SYQ, and SEQ are strategic intervention tools that help Nigerian banks to reduce the adverse effects of both the technical and user-related challenges. The study further confirmed that these aforementioned quality dimensions can turn the potential challenges into opportunities for increased COU. These insights therefore offer practical pathways for Nigerian banks to improve digital banking adoption by focusing not only on resolving direct technical and user-related challenges but also on upgrading information flow, the overall system, and service experience.

Concluding Remarks

This study offers key insights into the direct and indirect effects of user-related and technical challenges on COU of MBA in Nigeria. The findings revealed that both user-related such as LDL and technical challenges such as PNC, ACI, FSF and CST significantly hinder COU while user-related such as TEG and ICS had insignificant direct influence on COU. However, the introduction of IFQ, SYQ, and SEQ into the model significantly enhances the robustness of the analysis by evidencing the relevant mediating mechanisms, which improves COU. Hence, the study concludes that PNC, ACI, FSF and CST can still improve COU indirectly when the quality dimensions (IFQ, SYG, and SEQ) are high. Policy-wise, the Central Bank of Nigeria (CBN) and other financial regulators should mandate banks to national awareness campaigns on the usage of MBA. Also, they should mandate all banks to train their frontline desk personnel/customer service care unit on empathetic ways of responding to customers. Again, the apex banks should increase their broadband coverage, ensure that their network is stable, ensure regular app compatibility updates while enforcing strict cybersecurity protocols. Lastly, the CBN and other financial regulators should give incentives to commercial banks that adopt user-friendly and all-inclusive digital platforms.

By integrating the ISS model into the mobile banking/digital banking research, this study advances the digital banking landscape by demonstrating how IFQ, SYQ, and SEQ dimensions strategically reduce the adverse effects of technical and user-related challenges on COU. As such, this research is expected to validate and extend the integration of ISS model into the digital banking landscape. Also, this research enriches discourse on user retention and technological adoption in the Nigerian context. Beyond its contribution to academic discourse, this research provides actionable insights that will be useful to Nigerian banks, mobile application developers, and policy makers on steps to take to increase the continued usage of the mobile application despite the challenges. Further, the research is expected to provide developers on how they can evaluate the success of MBA using IFQ, SYQ, and SEQ as a parameter. Nevertheless, the current study is limited to commercial banks. Hence, the study advocates that future studies should focus on microfinance banks and other non-conventional banks as well since they also have mobile applications and their users are increasing on daily basis. Lastly, future studies should use mixed methods since it gives a more robust outcome than a single method.

Acknowledgements

Special appreciation goes to the bankers in Delta state, Nigeria for creating time to respond to the items of the questionnaire swiftly.

References

- Akintola, G. B. (2024). Assessing the vulnerabilities of online digital mobile banking applications in Nigeria. International Journal of Scientific Research in Multidisciplinary Studies, 10(7), 29–45. https://www.researchgate.net/publication/382702719_Assessing_the_Vulnerabilities_of_Online_Digital_Mobile_Banking_Applications_in_Nigeria
- Al-Fahim, N. H., Ateeq, A. A., Abro, Z., Milhem, M., Alzoraiki, M., Alkadash, T. M., & Nagi, M. (2024). Factors influencing the mobile banking usage: mediating role of perceived usefulness. In Digital technology and changing roles in managerial and financial accounting: theoretical knowledge and practical application (Vol. 36, pp. 115-128). Emerald Publishing Limited. https://www.emerald.com/insight/content/doi/10.1108/s1479-351220240000036011/full/htm
- Al-Fahim, N. H., Ateeq, A. A., Abro, Z., Milhem, M., Alzoraiki, M., Alkadash, T. M., & Nagi, M. (2024). Factors influencing the mobile banking usage: mediating role of perceived usefulness. In Digital technology and changing roles in managerial and financial accounting: theoretical knowledge and practical application (Vol. 36, pp. 115-128). Emerald Publishing Limited.https://www.emerald.com/insight/content/doi/10.1108/s1479-351220240000036011/full/html
- Alharthi, A., Al-Emran, M., & Shaalan, K. (2017). Barriers to big data adoption in organizations: A systematic review. Business Horizons, 60(3), 285–292. https://doi.org/10.1016/j.bushor.2017.01.003
- Altenburger, R. (2023). Artificial Intelligence: Management Challenges and Responsibility. In: Schmidpeter, R., Altenburger, R. (eds.), Responsible Artificial Intelligence, CSR, Sustainability, Ethics & Governance, Springer Nature Switzerland AG. https://doi.org/10.1007/978-3-031-09245-9_1
- Ambore, S., Richardson, C., Dogan, H., Apeh, E., & Osselton, D. (2017). A resilient cybersecurity framework for Mobile Financial Services (MFS). Journal of Cyber Security Technology, 1(3-4), 202-224.
- Andalib, T.S., & Hazarina, H.N. (2024). The antecedents of mobile banking adoption among senior citizens in Malaysia. International Journal of Human–Computer Interaction, 40(9), 2380-2397. https://www.tandfonline.com/doi/abs/10.1080/10447318.2022.2161236

- Bakwuye, C. O., Dokai-Okonkwo, C. N., & Odor, H. O. (2025). Digital Banking and Customer Relationship Management:: An Empirical Study of Commercial Banks in Delta State, Nigeria. African Banking and Finance Review Journal, 21(21), 79-99. https://www.abfrjournal.com/index.php/abfr/article/view/310
- Chakraborty, A., Biswas, A., & Kumar Khan, A. (2023). Artificial Intelligence for Cybersecurity: Threats, Attacks and Mitigation. In: Biswas A. et al. (eds.), Artificial Intelligence for Societal Issues, Intelligent Systems Reference Library, 231, Springer Nature Switzerland AG. https://doi.org/10.1007/978-3-031-12419-8_1
- Daniyan, O. V., & Akinbowale, O. E. (2017). Adoption and challenges of mobile banking innovation services in benin-city. Journal of Global Accounting, 5(2), 73-89.
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: a ten-year update. Journal of management information systems, 19(4), 9-30. https://www.tandfonline.com/doi/abs/10.1080/07421222.2003.11045748
- Dey, S., & Majumder, S. (2024). Determinants influencing the adoption of mobile banking by women in Bangladesh. Journal of Global Business Insights, 9(1), 61-76.
- Ezeocha, C. M. (2024). Financial technology as a tool for promoting financial inclusion in Nigeria: A theoretical review. African Journal of Management and Business Research, 15(1), 166-181. https://afropolitanjournals.com/index.php/ajmbr/article/view/261
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European business review, 31(1), 2-24.
- Hassan, A. O., Ewuga, S. K., Abdul, A. A., Abrahams, T. O., Oladeinde, M., & Dawodu, S. O. (2024). Cybersecurity in banking: a global perspective with a focus on Nigerian practices. Computer Science & IT Research Journal, 5(1), 41-59. https://doi.org/10.53771/ijstra.2024.6.1.0035
- Hodosi, I., Petersson, L., & Johansson, L. (2021). Risk factors in cloud computing relationships: A study in public organizations in Sweden. Journal of Cloud Computing: Advances, Systems and Applications, 10(1), 1–16. https://doi.org/10.1186/s13677-021-00262-9
- Khan, H. U., & Ejike, A. C. (2017). An assessment of the impact of mobile banking on traditional banking in Nigeria. International Journal of Business Excellence, 11(4), 446-463. https://www.inderscienceonline.com/doi/abs/10.1504/IJBEX.2017.082573
- Nguyen, G. D., & Dao, T. H. T. (2024). Factors influencing continuance intention to use mobile banking: an extended expectation-confirmation model with moderating role of trust. Humanities and Social Sciences Communications, 11(1), 1-14.
- Ohiani, A. S. (2021). Technology innovation in the Nigerian banking system: prospects and challenges. Rajagiri Management Journal, 15(1), 2-15.
- Ojo, A. I. (2017). Validation of the DeLone and McLean information systems success model. Healthcare informatics research, 23(1), 60-66. https://doi.org/10.4258/hir.2017.23.1.60
- Omotosho, B. S. (2021). Analysing user experience of mobile banking applications in Nigeria: A text mining approach. CBN Journal of Applied Statistics, 12(1), 77-108.
- Pallangyo, H. J. (2022). Cyber security challenges, its emerging trends on latest information and communication technology and cyber crime in mobile money transaction services. Tanzania Journal of Engineering and Technology, 41(2), 189-204.
- Saibaba, S. (2024). Examining the determinants of mobile banking app continuance intention in India: An extension of the IS success model. Journal of Internet Commerce, 23(1), 50-89. https://www.tandfonline.com/doi/abs/10.1080/15332861.2023.2236428
- Siano, A., Raimi, L., Palazzo, M., & Panait, M. C. (2020). Mobile banking: An innovative solution for increasing financial inclusion in Sub-Saharan African Countries: Evidence from Nigeria. Sustainability, 12(23), 10130.https://www.mdpi.com/2071-1050/12/23/10130

- Ugbah, A., Ighosewe, F. E., & Erhijakpor, A. E. O. (2025). Cloud-based accounting challenges and integration amongst accounting and finance professionals in Nigeria. Edelweiss Applied Science and Technology, 9(4), 827–840. https://doi.org/10.55214/25768484.v9i4.6111
- Urbach, N., & Müller, B. (2011). The updated DeLone and McLean model of information systems success. In Information Systems Theory: Explaining and Predicting Our Digital Society, Vol. 1 (pp. 1-18). New York, NY: Springer New York. https://link.springer.com/chapter/10.1007/978-1-4419-6108-2_1
- Zahari, N. A. S., Abdull Rahman, N. L., & Mutalib, A. H. (2024). Revolution of mobile banking applications towards banking customers in northern region, Malaysia. In Voice of Academia, 20(2), 330–343). https://ir.uitm.edu.my/id/eprint/110610.