

Effect Of Digital Services On Bank Stability Of Listed Deposit Money Banks In Nigeria

Ibrahim Ahmed Abdullahi¹, Faisal Saidu Abubakar²

¹Department of Business Administration, Faculty of Administration, Nasarawa State University, Keffi, Nigeria

²Department of Business Administration, Faculty of Administration, Nasarawa State University, Keffi, Nigeria

^{1st}ibrahimahmedabdullahi@nsuk.edu.ng; ^{2nd}fayva75@gmail.com;

Corresponding Author: IBRAHIM Ahmed Abdullahi, ibrahimahmedabdullahi@nsuk.edu.ng

Abstract— This study examines the effect of digital banking services (mobile banking and internet banking) on bank stability measured by the Z-score of listed deposit money banks in Nigeria Exchange, using data from 2014 to 2023. Ex-post facto research design was adopted, the population of the study consist of 13 listed deposit money banks, census sampling method was utilized, therefore the 13 listed deposit money bank was used as the sample size since the population is not too large. Employing a fixed-effects regression model, the results indicate that while mobile banking and internet banking are statistically significant, their direct effect on bank stability is minimal, as evidenced by the low coefficients for these variables despite their significance. This result suggests that other factors, such as regulatory frameworks, market competition, and risk management practices, may play a more substantial role in determining stability. The findings highlight that while digital banking services enhance operational efficiency and financial inclusion, their direct contribution to bank stability is limited. The study recommends strengthening risk management strategies and enhancing regulatory policies to mitigate the potential negative effects of digital transformation on bank stability.

Keywords— Bank Stability, Deposit Money Banks, Internet Banking, Mobile Banking.

I. INTRODUCTION

The stability of banks is a key factor in ensuring the sound functioning of the financial system and the overall economy. Banks act as critical economic intermediaries by mobilizing deposits and providing credit, which helps drive investment, consumption, and economic growth. Bank stability is essential for maintaining investor confidence, ensuring financial security for depositors, and minimizing the likelihood of systemic crises [1]. A bank's stability prevents the destabilizing effects of financial instability, which can result in the failure of financial institutions, massive loss of wealth, and large-scale economic disruptions. Previous studies have highlighted that bank stability not only contributes to macroeconomic stability but also enhances the sustainability of the banking sector by mitigating the risk of bank runs, reducing credit rationing, and supporting long-term investments [2], [3]. Empirical evidence has shown that when banks are stable, they are better positioned to withstand external shocks, protect their assets, and serve as reliable liquidity providers in times of financial stress [4], [5].

Digital services in the banking industry have grown from a luxury to a necessity in the contemporary business world. The increasing demand for convenience, speed, and security in financial transactions has propelled banks to adopt digital platforms such as mobile banking and internet banking. Digital banking services facilitate easy access to financial services, reduce waiting times, and increase the overall efficiency of financial operations [6]. Additionally, digital banking services provide greater convenience for customers, allowing them to perform transactions at any time. This is particularly useful for individuals in remote areas or those with mobility limitations [7]. Research also

highlights the significant role of digital services in promoting financial inclusion by providing unbanked populations with access to banking products and services without the need for a physical bank branch [8], [9]. Furthermore, digital transformation allows banks to lower operational costs, increase customer reach, and offer innovative financial products, enhancing their competitive advantage in a rapidly evolving market [10]. As a result, the necessity of digital services has become more pronounced in the banking sector, as they drive greater accessibility, lower costs, and facilitate improved customer service [11].

The relationship between digital services and bank stability has been empirically studied, with various findings suggesting both positive and negative associations. Digital services, such as mobile banking and internet banking, can enhance bank stability by expanding customer access, improving operational efficiency, and diversifying revenue streams. According to Akinboade et al. [12], adopting digital banking services enables banks to reach a more extensive customer base, which can contribute to their financial stability through increased deposits and fees. Further, digital services improve operational efficiencies, reducing costs and higher profitability [13]. On the other hand, several studies have pointed out the risks associated with digital banking services, including cybersecurity threats, fraud, and technological failures, which may undermine the stability of banks if not correctly managed [14], [15]. In particular, due to its widespread use and high-volume transactions, mobile banking could expose banks to operational risks that may negatively affect their stability [16]. Thus, the relationship between digital services and bank stability is multifaceted and requires further empirical examination to determine how these services affect banks in both positive and negative ways.

Several studies have explored the empirical relationship between the specific proxies of digital services (mobile banking and internet banking) and bank stability, measured by the Z-score. Mobile banking, for instance, has been positively associated with increased bank stability due to its role in enhancing customer reach and financial inclusion [9]. By providing greater accessibility to financial services, mobile banking helps banks increase deposits, improving their financial health and reducing their vulnerability to liquidity crises [6]. Internet banking has also contributed positively to bank stability by enhancing customer convenience and reducing operational costs [8]. Studies show that Internet banking can enhance operational efficiency, lower transaction costs, and increase profitability, which are factors that contribute to a bank's stability [13]. However, the empirical literature also highlights that these digital services could present new vulnerabilities, particularly cyber threats and technological disruptions that may lead to instability [14], [15]. As a result, the relationship between digital services proxies and bank stability proxies remains complex and warrants further investigation to capture both the benefits and risks of digital banking services.

The general objective of this study is to empirically investigate the effect of digital services on the stability of listed deposit money banks in Nigeria. This research is essential because Nigeria represents a unique market context where digital banking services are rapidly growing but also significant challenges related to infrastructure, regulatory frameworks, and cybersecurity risks [9]. The study aims to provide valuable insights into how mobile banking and internet banking impact the stability of banks, which is critical for policymakers, bank managers, and regulators in ensuring the banking system's resilience.

II. EMPIRICAL REVIEW

A. Concept of Bank Stability

Bank stability refers to the ability of a bank to operate efficiently and sustainably without jeopardizing the financial system or the economy. A stable bank is resilient to financial shocks, has strong risk management systems, and maintains a healthy balance between its assets and liabilities. Stability ensures that banks meet their financial obligations to depositors, maintain liquidity, and continue lending to support economic growth [1]. Bank stability also reflects a bank's capacity to remain solvent over time, prevent failure, and protect against credit, operational, and market risks. Several proxies are used to measure bank stability, the most common being the Z-score, which assesses the distance between a bank's return on assets (ROA) and its standard deviation of return, adjusted for the bank's equity capital. A higher Z-score indicates a lower probability of insolvency, as it suggests a bank has a higher return on assets relative to its risk exposure. Other measures of bank stability may include capital adequacy ratios, liquidity ratios, and efficiency ratios, each of which provides insights into a bank's financial health and ability to weather economic downturns [3], [5].

The Z-score is widely recognized in empirical banking studies as an indicator of overall stability because it combines profitability, risk, and capital into a single metric, assessing a bank's capacity to absorb shocks. Other proxies of bank stability include the capital adequacy ratio (CAR), which measures the bank's capital about its risk-weighted assets, and the loan-to-deposit ratio, which helps to gauge a bank's liquidity risk. Banks with strong capital ratios and efficient liquidity management exhibit excellent stability, as they can better withstand market fluctuations, loan defaults, or unexpected liquidity crises [12].

B. Concept of Digital Services

Digital services in the banking sector refer to using information technology to offer banking products and services to customers via electronic platforms. These services include mobile banking and internet banking, all of which have become integral to the modern banking experience. Digital services allow customers to perform a wide range of banking activities such as transferring money, checking account balances, paying bills, and applying for loans without the need to visit physical bank branches [6]. Digital services have revolutionized how financial institutions interact with their customers, making banking more convenient, accessible, and cost-effective. The proliferation of smartphones and the Internet has also facilitated the widespread use of mobile and Internet banking, allowing customers in both urban and rural areas to engage in financial transactions and manage their accounts easily [7].

1) **Mobile Banking:** Mobile banking refers to using mobile devices like smartphones and tablets to conduct banking transactions and access various financial services. This form of banking allows customers to perform activities such as checking account balances, transferring funds, paying bills, applying for loans, and even accessing financial advice all from the convenience of their mobile devices. Mobile banking has grown rapidly in recent years due to the widespread availability of smartphones and mobile Internet, making it an accessible and flexible option for managing personal finances. The adoption of mobile banking is particularly significant in emerging markets where physical banking infrastructure may be limited or difficult to access, allowing mobile banking to bridge the gap and bring banking services to underserved populations [6].

2) **Internet Banking:** Internet banking, also known as online banking or e-banking, refers to using the Internet as a platform for delivering banking services and products to customers. It allows individuals and businesses to conduct financial transactions and access banking services such as checking account balances, transferring funds, paying

bills, and managing investments without visiting a physical bank branch. Internet banking typically involves secure online platforms or mobile applications accessible via computers or mobile devices. With the help of these platforms, customers can manage their accounts, view their transaction history, apply for loans, and even execute real-time foreign exchange transactions [6].

C. Mobile Banking and Bank Stability

Recent empirical studies continue to emphasize the positive and significant effects of mobile banking on bank stability. According to Soni et al. [38], mobile banking is critical in improving liquidity management by allowing banks to rapidly process transactions and attract deposits from a broader customer base, particularly in underserved regions. This increased deposit base contributes directly to the bank's capital position, enhancing its ability to absorb shocks and remain solvent during economic uncertainty. Additionally, mobile banking has been linked to reduced operational costs, strengthening financial stability by improving profitability.

However, despite these positive outcomes, mobile banking has been associated with certain risks that can undermine bank stability. Several recent studies point to significant adverse impacts, mainly due to the increasing cybersecurity vulnerabilities in mobile banking platforms. In their study, Tan and Low [39] warned that mobile banking exposes banks to cyber threats, including data breaches and financial fraud, which can significantly harm customer trust and a bank's reputation. These risks, if left unaddressed, can undermine the financial stability of banks by reducing deposit inflows and increasing operational costs related to security measures.

Hypothesis 1 (H01): Mobile banking has no significant effect on the stability of listed deposit money banks in Nigeria.

D. Internet Banking and Bank Stability

Empirical studies have consistently highlighted the positive and significant effects of Internet banking on bank stability. A major advantage of Internet banking is its ability to enhance operational efficiency by automating and streamlining various banking processes, thus reducing overhead costs. According to Ghosh and Chakraborty [17], internet banking allows banks to handle more transactions with lower operational risks, resulting in increased profitability and financial stability. Similarly, Tan and Low [39] found that banks offering Internet banking services experienced significant improvements in their liquidity positions and risk management capabilities.

Other empirical research has identified risks associated with Internet banking that can negatively affect bank stability despite the positive impacts. According to DeYoung [14], internet banking can expose banks to cybersecurity threats, including hacking, fraud, and data breaches, which could lead to financial losses and a decline in customer trust. These security vulnerabilities could destabilize a bank's operations, mainly if they result in significant financial or reputational harm [15].

Hypothesis 2 (H02): Internet banking does not significantly affect the stability of listed deposit money banks in Nigeria.

E. Theoretical Frameworks

The most relevant theoretical framework for this study is the Risk Management Framework. Given that digital banking services, such as mobile banking and internet banking, introduce both opportunities and risks, it is crucial to understand how banks

manage these risks to maintain stability. The Risk Management Framework provides a comprehensive approach to identifying, assessing, and mitigating various risks, including operational, technological, and cybersecurity risks, directly associated with adopting digital banking services [21]. The framework has been applied extensively in studies examining the impact of digital services on bank stability, as it focuses on how banks can control the risks introduced by technology, ensuring that these innovations do not destabilize their operations [14], [15].

III. METHODOLOGY

The research adopts an ex-post facto research design, which is appropriate for examining the effect of independent variables (mobile banking and internet banking) on the dependent variable (bank stability, measured using the Z-score) based on secondary data. Since this study focuses on understanding the impact of digital banking services on bank stability in Nigeria, the ex-post facto design is suitable as it allows for the analysis of past events and their effects without manipulation or control of variables. The population consists of the 13 listed deposit money banks (DMBs) in Nigeria, with a census sampling technique used to select all these banks as the sample. The use of the census sampling method is justified as it enables a comprehensive analysis of all the major players in the Nigerian banking industry, ensuring that the findings are representative and robust.

Data for this study was collected from secondary sources, primarily the annual reports and accounts of the listed deposit money banks in Nigeria. The data analysis techniques include both descriptive and inferential statistics. The main analytical tool will be multiple linear regression, with ordinary least squares (OLS) and robust regression methods used to estimate the model coefficients.

TABLE I VARIABLES MEASUREMENT

SN	Variable Name	Acronyms	Variable Measurement	Empirical Evidence
1	Bank Stability	Z-Score	Calculated as: $(ROA + Equity/Assets) / \sigma(ROA)$	[3], [12]
2	Mobile Banking	MB	Total volume of transactions processed through mobile banking by DMBs	[9], [12]
3	Internet Banking	IB	Total volume of transactions processed through internet banking by DMBs	[6], [7]

IV. RESULTS AND DISCUSSION

A. Descriptive Statistics

The descriptive statistics for the variable "bank stability" (bs) show a mean value of 3.35, which suggests that, on average, the stability of the banks is slightly above a mid-level threshold. The median value is 3.553, slightly higher than the mean, indicating that the data is skewed to the lower side, with more banks exhibiting higher stability scores. The standard deviation (SD) of 0.974 indicates moderate variability in bank stability across the sample.

TABLE II DESCRIPTIVE STATISTICS

	Mean	Median	SD	Min	Max
BS	3.35	3.553	0.974	1.563	4.973
MB	2759875.9	2670181.5	1363462.366	501768	4926263
IB	2817967.9	2891491.5	1259252.388	501915	4985730

B. Correlation Analysis

The matrix of correlations reveals the relationships between the variables in the dataset. Starting with the correlation between bank stability (BS) and mobile banking (MB), the value is 0.059, which indicates a very weak positive correlation. This suggests a negligible relationship between bank stability and mobile banking transactions. The correlation between bank stability (BS) and internet banking (IB) is -0.006, close to zero.

TABLE III MATRIX OF CORRELATIONS

Variables	BS	MB	IB
BS	1.000		
MB	0.059	1.000	
IB	-0.006	-0.002	1.000

C. Diagnostic Tests

The results from the Breusch–Pagan/Cook–Weisberg test for heteroskedasticity showed a chi-square statistic of 0.04 and a p-value of 0.8339. Since the p-value is greater than 0.05, we fail to reject the null hypothesis, indicating no significant heteroskedasticity. The Variance Inflation Factor (VIF) analysis shows a mean VIF of 1.02, suggesting that multicollinearity is not a significant issue. The Hausman specification test yielded a p-value of 0.745, suggesting the random effects model is appropriate. However, the Breusch and Pagan Lagrangian multiplier test (Table VII) yielded a p-value of 0.2500, failing to reject the null hypothesis that variance of random effects is zero. This indicates a pooled or fixed effect model might be more appropriate. Ultimately, the study adopted a Fixed Effect regression result as presented in Table

VIII. TABLE IV BREUSCH–PAGAN/COOK–WEISBERG TEST FOR HETEROSKEDASTICITY

Assumption	Normal error terms
Variable	Fitted values of bs
H0	Constant variance
chi2(1)	0.04
Prob > chi2	0.8339

TABLE V VARIANCE INFLATION FACTOR

Variable	VIF	1/VIF
MB	1.030	0.967
IB	1.000	0.997
BS	1.020	
Mean VIF	1.02	

TABLE VI HAUSMAN SPECIFICATION TEST

Chi-square test value	1.949
P-value	0.745

TABLE VII BREUSCH AND PAGAN LAGRANGIAN MULTIPLIER TEST

Test: Var(u) = 0	
chibar2(01)	0.45
Prob > chibar2	0.2500

D. Regression Results

The Fixed Effect Regression Results presented in Table VIII provide a comprehensive analysis. The mobile banking (MB) coefficient is 0, with a t-value of 5.20 and a p-value of 0.000. Since the p-value is less than 0.01, mobile banking has a statistically significant positive effect on bank stability, though the magnitude is minimal. Similarly, internet banking (IB) shows a coefficient of 0, with a t-value of 5.79 and a p-value of 0.000, indicating a statistically significant positive effect. The model's R-squared value of 0.490 suggests that approximately 49% of the variability in bank stability is explained by the independent variables.

TABLE VIII FIXED EFFECT REGRESSION RESULTS

bs	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
MB	0	0	5.20	0.000	0 0	***
IB	0	0	5.79	0.000	0 0	***
Constant	1.551	.221	7.01	0.000	1.113 1.989	***
Mean dep var	3.350	SD dep var	0.974			
R-squared	0.490	Obs	130			
F-test	27.158	Prob > F	0.000			

E. Discussion

The findings from the fixed-effects regression model suggest that mobile banking and internet banking have statistically significant positive effects on bank stability. Despite the statistical significance, the coefficients for mobile and Internet banking are reported as 0,

implying that their direct contribution to bank stability is minimal. This finding is paradoxical, as mobile and internet banking are often associated with improving a bank's financial performance. However, the results point toward a potential gap in the direct relationship between digital banking services and stability, suggesting that other factors might be at play.

These findings align with studies such as Mollah et al. [23], who found that mobile banking was associated with positive profitability but the relationship with stability was not always statistically magnitude heavy. It also echoes concerns by DeYoung [14] regarding cybersecurity vulnerabilities that may counterbalance benefits.

V. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, while mobile and Internet banking are statistically significant predictors of bank stability, the findings suggest their direct impact on stability is limited. Despite their statistical significance, the low coefficients for both variables indicate that the relationship between digital services and bank stability may be more complex than initially expected. Other factors, such as regulatory policies, technological infrastructure, market competition, and risk management practices, are likely to be important in determining the true impact of digital banking services on stability.

Based on these findings, it is recommended that banks should focus on enhancing their risk management strategies to mitigate the potential adverse effects of digital services, such as cybersecurity threats and technological disruptions. Moreover, policymakers should consider strengthening regulations around digital banking to ensure that banks are adequately protected from the risks associated with digital transformation.

REFERENCES

- [1] A. Demirgüç-Kunt and E. Detragiache, "The determinants of banking crises in developing and developed countries," IMF Staff Papers, vol. 45, no. 1, pp. 81-109, 1998.
- [2] J. P. Hughes and L. J. Mester, "Bank capitalization and cost: Evidence of scale economies in risk management and signaling," Review of Economics and Statistics, vol. 80, no. 2, pp. 314-325, 1998.
- [3] L. Laeven and R. Levine, "Bank governance, regulation, and risk taking," Journal of Financial Economics, vol. 93, no. 2, pp. 259-275, 2009.
- [4] H. Almeida and M. Campello, "Financial constraints, asset tangibility, and corporate investment," Review of Financial Studies, vol. 20, no. 5, pp. 1429-1460, 2007.
- [5] A. N. Berger, L. F. Klapper, and R. Turk-Ariss, "Bank competition and financial stability," Journal of Financial Services Research, vol. 35, no. 2, pp. 99-118, 2009.
- [6] A. Y. L. Chong, F. T. S. Chan, and K. B. Ooi, "Predicting the determinants of mobile commerce adoption: A two-step MCDM approach," Expert Systems with Applications, vol. 37, no. 8, pp. 5604-5615, 2010.
- [7] C. K. Ayo, J. O. Adewoye, and A. A. Oni, "The impact of mobile banking on the performance of the Nigerian banking industry," Journal of Internet Banking and Commerce, vol. 21, no. 3, pp. 1-14, 2016.
- [8] J. Gable and C. Johnson, "Internet banking: A new era in banking," Financial Services Review, vol. 10, no. 1, pp. 15-28, 2001.
- [9] M. I. Mollah and M. A. Rauf, "Digital banking services and financial stability: Evidence from the global perspective," Global Journal of Management and Business Research, vol. 18, no. 1, pp. 23-31, 2018.
- [10] R. J. Hwang and S. Kim, "The impact of digital transformation on banking," Journal of Banking & Finance, vol. 67, pp. 12-25, 2016.

- [11] L. Zhao, B. L. Tan, and H. H. Teo, "Understanding the role of mobile banking in the financial inclusion process," *Journal of Financial Services Marketing*, vol. 15, no. 2, pp. 141-154, 2010.
- [12] O. A. Akinboade, F. A. Akinmoladun, and R. A. Ganiyu, "The effect of mobile banking on financial inclusion in Nigeria," *International Journal of Economics, Commerce and Management*, vol. 4, no. 6, pp. 1-13, 2016.
- [13] S. Mathews and C. Thompson, "The efficiency of mobile banking in the global context," *Journal of Economics and Business*, vol. 14, no. 1, pp. 80-95, 2012.
- [14] R. DeYoung, "The economics of digital banking: Implications for the financial services industry," *Journal of Financial Services Research*, vol. 47, no. 1, pp. 49-69, 2015.
- [15] Y. Zhou, "The digital revolution: How technology affects financial stability in the banking sector," *Journal of Banking Regulation*, vol. 16, no. 4, pp. 289-305, 2015.
- [16] W. Gates and S. Lee, "Mobile banking risks and security," *Journal of Information Security*, vol. 22, no. 3, pp. 112-125, 2014.
- [17] P. Ghosh and S. Chakraborty, "Mobile banking: A strategic tool for enhancing financial inclusion," *International Journal of Management*, vol. 11, no. 6, pp. 16-25, 2020.
- [18] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319-340, 1989.
- [19] J. B. Barney, "Firm resources and sustained competitive advantage," *Journal of Management*, vol. 17, no. 1, pp. 99-120, 1991.
- [20] M. Koutsou-Wehling, A. Muotolu, and M. Nwadiakor, "The effect of automated teller machine (ATM) network expansion on the banking industry," *International Journal of Financial Studies*, vol. 9, no. 3, pp. 124-137, 2021.
- [21] P. M. Linsley and P. J. Shrives, "Examining corporate social responsibility reporting in the UK: A longitudinal study," *Journal of Business Ethics*, vol. 63, no. 1, pp. 33-48, 2006.
- [22] V. Sundararajan and D. He, "Financial technology and banking stability: New opportunities and risks," *Journal of Financial Technology*, vol. 6, no. 2, pp. 99-112, 2021.
- [23] M. I. Mollah, M. A. Mahmud, and M. A. Rauf, "Digital banking and financial stability: The effects of mobile and internet banking," *Research in International Business and Finance*, vol. 53, p. 101147, 2020.
- [24] A. M. Muhammad and R. Alimohammad, "Digital loan services and financial inclusion: Insights from Nigerian banks," *Journal of Financial Technology*, vol. 2, no. 3, pp. 45-60, 2022.
- [25] A. Ndlovu and T. Ndlovu, "Mobile banking and financial stability in emerging markets," *International Journal of Finance and Accounting*, vol. 7, no. 2, pp. 85-98, 2017.
- [26] E. Osei-Assibey, "The role of ATM networks in bank performance and financial stability," *Journal of Finance*, vol. 29, no. 3, pp. 147-160, 2015.
- [27] L. Zhang, X. Li, and H. Wang, "The impact of digital banking services on bank risk management: Evidence from China," *Journal of Financial Risk Management*, vol. 14, no. 2, pp. 112-129, 2020.
- [28] O. O. Adeoti, "Mobile banking and financial inclusion in Nigeria," *African Journal of Accounting, Economics, Finance and Banking Research*, vol. 8, no. 8, pp. 32-46, 2013.
- [29] M. Anand and A. Saxena, "The impact of mobile banking on the financial services sector: Evidence from India," *Journal of Financial Services*, vol. 14, no. 1, pp. 18-29, 2017.
- [30] A. Asidok and E. Michael, "The role of internet banking in financial stability," *Journal of Internet Banking and Commerce*, vol. 23, no. 2, pp. 1-11, 2018.
- [31] P. Chondough, "Digital loan services and financial inclusion in sub-Saharan Africa: A case study of Nigeria," *International Journal of Development Studies*, vol. 6, no. 1, pp. 25-39, 2021.

- [32] C. Hsiu-I Ting, "ATM systems and banking industry competitiveness: A case study of the Taiwanese banking sector," *Journal of Asian Business and Economic Studies*, vol. 24, no. 4, pp. 52-66, 2017.
- [33] B. Idris, "Internet banking adoption in Nigeria: A survey of Nigerian banks," *International Journal of Research in Management and Business Studies*, vol. 2, no. 5, pp. 47-58, 2014.
- [34] A. I. Igbinosa and O. Oyeboade, "The role of digital banking in Nigerian financial stability," *Journal of Banking and Finance*, vol. 15, no. 1, pp. 85-102, 2021.
- [35] T. Lasisi, O. Olamide, and M. Olorunfemi, "The role of ATMs in financial inclusion and bank stability in Nigeria," *Journal of Financial Services Marketing*, vol. 25, no. 3, pp. 134-150, 2020.
- [36] A. Muotolu and M. Nwadiakor, "The role of automated teller machines in banking operations: A case study of Nigerian banks," *International Journal of Banking Technology*, vol. 9, no. 4, pp. 33-46, 2019.
- [37] H. Smaoui and M. H. Ben, "Impact of digital services on bank stability: Evidence from the African banking sector," *African Journal of Economic and Management Studies*, vol. 11, no. 2, pp. 205-217, 2020.
- [38] S. Soni et al., "Mobile banking and liquidity management," *Journal of Financial Liquidity*, vol. 12, pp. 45-56, 2020.
- [39] W. Tan and L. Low, "Cybersecurity in mobile banking," *Journal of Internet Security*, vol. 9, pp. 200-215, 2021.