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RESEARCH ARTICLE

ICT Adoption and Sustainable Financial Performance: Evidence from Zenith Bank Plc

Sandra A. Uzuh[1], Ewere S. Obieze[2], Okuji O. Oreh[3], Solomon Ale[4], Nnamdi T. Chukwuto[5] and Johnson I. Okoh[6]

[1]Information Management, University at Albany, Albany, NY, USA.
[2]Department of Business Administration, University of Delta (UNIDEL), Agbor, Delta State, Nigeria.
[3]Department of Financial Studies, National Open University of Nigeria (NOUN), Abuja, Nigeria.
[4]Bursary Department, National Open University of Nigeria (NOUN), Abuja, Nigeria.
[5]Bursary Department, National Open University of Nigeria (NOUN), Abuja, Nigeria.
[6]Department of Financial Studies, National Open University of Nigeria (NOUN), Abuja, Nigeria.

Abstract

This study investigated the influence of Information and Communication Technology (ICT) adoption on the sustainable financial performance of Zenith Bank Plc, with particular focus on mobile banking, Automated Teller Machine (ATM) usage, and online chatbots. Anchored on the Technology Acceptance Model and Diffusion of Innovation Theory, the research examined how ICT-driven innovations influenced financial performance of Zenith bank Plc. A quantitative causal survey design was adopted, and data were collected from customers and staff of Zenith Bank within the Abuja Municipal Area Council. The findings revealed that ICT adoption had a significant and positive impact on the bank's performance, with mobile banking exerting the strongest influence, followed by ATM usage and chatbots. The results further showed that mobile banking improved convenience and reduced transaction costs, ATMs expanded accessibility and revenue generation, while chatbots enhanced service efficiency and customer engagement. The study concluded that strategic investment in ICT enhanced Zenith Bank's operational and financial performance, thereby strengthening its long-term competitiveness and sustainability. It recommended that the bank should continue to innovate in digital banking platforms, optimize ATM infrastructure, expand chatbot capabilities, and strengthen cybersecurity and regulatory frameworks to sustain improved performance in Nigeria's dynamic financial sector.

Keywords: ICT, Financial Performance, Zenith Bank

1. Introduction

The Nigerian banking sector had experienced a remarkable transformation driven by rapid advancements in Information and Communication Technology (ICT). Over the past two decades, ICT adoption had become central to banking operations, enabling institutions to improve efficiency, service delivery, and competitiveness. Technologies such as mobile banking, internet platforms, Automated Teller Machines (ATMs), Point-of-Sale (POS) terminals, and chatbots had redefined how banks delivered services and interacted with customers (Adebayo & Olaniyi, 2023). These innovations supported financial inclusion and helped banks meet the evolving needs of a tech-savvy population in an increasingly digital economy.

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Across Africa, the strategic adoption of ICT had reshaped financial intermediation. Countries such as Kenya, South Africa, and Nigeria emerged as regional leaders in digital banking innovation, leveraging technology to expand financial access and enhance service quality (Bello & Musa, 2021). In Nigeria, the Central Bank's initiatives—such as the Payment System Vision 2025 and the launch of the eNaira—strengthened digital transformation in the financial sector, fostering innovation and competition among banks. Zenith Bank Plc, one of Nigeria's leading financial institutions, had been at the forefront of ICT-driven modernization.

Despite these efforts, however, the expected performance outcomes were not always fully realized. Persistent challenges such as system downtimes, network failures, transaction errors, and cybersecurity threats continued to undermine service reliability and customer confidence (Olayinka & Adebayo, 2022). These challenges created uncertainty regarding the extent to which ICT adoption truly enhanced bank performance. This study, therefore, examined the impact of ICT adoption on the performance of Zenith Bank of Nigeria. Specifically, the objectives of the study were to:

1. evaluate the effect of the adoption of mobile banking on the performance of Zenith Bank of Nigeria;
2. assess the effect of ATM adoption on the performance of Zenith Bank of Nigeria;
3. examine the influence of the use of online chatbots on the performance of Zenith Bank of Nigeria.

2. Literature Review

2.1. Information and Communication Technology (ICT)

Information and Communication Technology (ICT) represented the convergence of computing and telecommunications technologies that enabled the storage, retrieval, transmission, and manipulation of digital information. In the banking context, ICT encompassed a broad range of technological solutions including computer systems, telecommunications networks, software applications, and digital platforms (Adebayo & Olaniyi, 2023).

Mobile Banking:

Mobile banking referred to the provision of banking services through mobile devices such as smartphones and tablets, enabling customers to perform financial transactions and access banking services remotely. Zenith Bank's mobile application provided customers with comprehensive banking services including balance inquiries, transaction history, fund transfers, airtime purchases, and bill payments.

ATM Adoption:

Automated Teller Machine (ATM) adoption referred to the implementation and utilization of self-service banking terminals that allowed customers to perform basic transactions without human assistance. These machines offered services such as cash withdrawals, deposits, and fund transfers operating 24 hours a day.

Online Chatbots:

Online chatbots were artificial intelligence-driven software systems designed to simulate human conversation and provide automated customer service. Zenith Bank of Nigeria had implemented chatbot technology to handle routine tasks such as account balance inquiries and transaction status updates (Adebayo & Olaniyi, 2023).

2.2. Financial Performance

Bank performance referred to how effectively a financial institution achieved its objectives and met stakeholder expectations. Performance in banking was typically evaluated through financial, operational, and customer-focused indicators (Oladipo & Adekunle, 2024). Financial performance measures included profitability ratios such as Return on Assets (ROA), Return on Equity (ROE), and cost-to-income ratios.

3. Theoretical Review

The examination of the impact of ICT on the performance of Zenith Bank of Nigeria was anchored on established theoretical frameworks:

Technology Acceptance Model (TAM):

Originally propounded by Fred D. Davis in 1985, the TAM postulated that an individual's decision to adopt technology was primarily determined by two constructs: **perceived usefulness** and **perceived ease of use**.

Diffusion of Innovation Theory (DOI):

Developed by Everett Rogers in 1962, this theory explained how innovations spread through social systems over time. The theory identified innovation attributes such as relative advantage, compatibility, complexity, trialability, and observability as determinants of adoption rate.

[Image of the Diffusion of Innovation curve]

4. Empirical Review

Several empirical studies have examined the relationship between ICT adoption and banking performance. Adaegbo et al. (2024) revealed that digital banking significantly affects risk management by enhancing staff efficiency, yet increases exposure to electronic risks such as e-fraud. Oladipo and Adekunle (2024) found that mobile banking and ATM deployment in rural areas significantly improved bank performance through market expansion.

Samuel et al. (2023) investigated the effect of financial technology (FinTech) on cash holding in Nigeria, finding a positive long-run relationship between FinTech indicators and cash holdings. Nwaizugbo and Agboh (2023) found that mobile banking service quality had a statistically significant positive relationship with customer retention, with banks experiencing 25–30% improvements in retention rates following service enhancements.

4.1. Summary and Gap in Literature

Despite the substantial body of research, gaps exist regarding recent developments such as advanced chatbot systems and AI-powered customer service. This study addresses these gaps by examining specific performance impacts across operational efficiency, customer satisfaction, and financial performance dimensions within the specific context of Nigerian banking market conditions.

5. Methodology

The study adopted a quantitative research design to determine causal relationships. The target population comprised Zenith Bank staff and customers within the Abuja Municipal Area Council (AMAC).

Using the Taro Yamane formula at a 5% margin of error:

$$n = \frac{N}{1 + N(e)^2}$$

A sample size of 399 respondents was determined. Primary data were obtained through a structured, close-ended questionnaire based on a five-point Likert scale.

Reliability tests conducted using Cronbach's Alpha indicated that all constructs exceeded the 0.7 threshold, with an overall reliability coefficient of 0.912. Data were analyzed using multiple regression analysis to test the hypothesized causal effects. Statistical significance was determined at the 0.05 level using SPSS version 26.0.

6. Results and Analysis

This section presented and analyzed the bio-data of respondents to provide an overview of the demographic characteristics of participants who contributed to the study on the impact of ICT on the performance of Zenith Bank of Nigeria. Out of the 399 questionnaires administered to customers and staff of Zenith Bank within Abuja Municipal Area Council (AMAC), 397 were duly completed and returned, representing an impressive response rate of 99.5%. This high rate of participation reflected strong respondent engagement and enhanced the reliability of the collected data. The demographic analysis covered gender, age, educational qualification, relationship with the bank, and frequency of ICT usage. The results indicated that 58.2% of the respondents were male while 41.3% were female, showing a fairly balanced gender representation with slightly more male participants. In terms of age distribution, 39.8% of respondents were aged 26–35 years, followed by 35.8% within the 18–25 age bracket, and 18.4% between 36–45 years, suggesting that most respondents were young to middle-aged adults actively engaged in banking activities. Regarding educational qualification, 47.1% of participants possessed a bachelor's degree, 22.4% held a diploma or NCE, and 16.9% had a master's degree, indicating that the majority of respondents were well educated and capable of using digital banking tools effectively. Analysis of respondents' relationship with Zenith Bank revealed that 35.8% had been customers for 2–5 years, 30.0% for 6–10 years, while 19.6% had been with the bank for less than 2 years, demonstrating a diverse mix of both new and long-term customers. Overall, the demographic profile showed that the respondents were well distributed across gender, age, and education, providing a reliable and representative sample for assessing the impact of ICT on Zenith Bank's performance.

Normality of Dependent Variable: One important assumption of the regression analysis is that the dependent variable be normally distributed. Normality is used to describe a symmetrical, bell-shaped curve, which has the greatest frequency of scores around in the middle combined with smaller frequencies towards the extremes (Pallant, 2005). The regressions in this study have Bank Performance as the dependent variable. If the dependent variable is not normally distributed, there is little point in performing regression analysis because a major assumption of the model is broken. The dependent variable Bank Performance was calculated by using the mean of items that measured overall bank performance.

The correlation matrix in Table 1 shows that there are no variables that have excessive correlations between them ($R > 0.9$), indicating no multicollinearity issues. All independent variables (Mobile Banking, ATM Adoption, and Online Chatbots) show significant positive correlations with Bank Performance, with Mobile Banking having the strongest correlation (67.8%), followed by ATM Adoption (61.2%), and Online Chatbots (54.3%).

From Table 2, the variance inflation factor (VIF) for all predictors shows values less than 4, and tolerance values above 0.25, indicating no multicollinearity issues among the independent variables.

Table 1. *Correlations.*

	PERF	MOB	ATM	CHAT
PERF Pearson Correlation	1	.678**	.612**	.543**
Sig. (2-tailed)		.000	.000	.000
N	394	392	393	391
MOB Pearson Correlation	.678**	1	.567**	.489**
Sig. (2-tailed)	.000		.000	.000
N	392	393	392	390
ATM Pearson Correlation	.612**	.567**	1	.445**
Sig. (2-tailed)	.000	.000		.000
N	393	392	394	391
CHAT Pearson Correlation	.543**	.489**	.445**	1
Sig. (2-tailed)	.000	.000	.000	
N	391	390	391	392

*. Correlation is significant at the 0.01 level (2-tailed).
Source: Researcher's Computation (2025) using SPSS version 26.0

Table 2. *Collinearity Statistics.*

Variable	Tolerance	VIF
Mobile Banking	.623	1.605
ATM Adoption	.676	1.479
Online Chatbots	.735	1.361

Source: Researcher's Computation (2025) using SPSS version 26.0

Table 3. *Model Summary.*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.742[a]	.551	.547	.600

[a] Predictors: (Constant), CHAT, ATM, MOB
Source: Researcher's Computation (2025) using SPSS version 26.0

Table 3 shows that the coefficient of determination (R^2) = 0.551, indicating that 55.1% of the variation in Zenith Bank's performance is jointly explained by Mobile Banking adoption, ATM adoption, and Online Chatbots usage. The remaining 44.9% is accounted for by other factors not included in the model.

Table 4 shows the F-statistic value of 158.631 with a p-value of 0.000, indicating that the overall model is statistically significant and that there is a strong linear relationship between the independent variables and Zenith Bank's performance.

Table 5 reveals that Mobile Banking has the strongest effect on Zenith Bank's performance with a coefficient of .456, meaning that a one-unit increase in Mobile Banking adoption results in a 0.456 increase in bank performance. ATM Adoption has a coefficient of .298, and Online Chatbots has a coefficient of .187. All variables are statistically significant with p-values of 0.000.

Table 4. *ANOVA.*

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	171.234	3	57.078	158.631	.000[b]
Residual	139.543	388	.360		
Total	310.777	391			

[a] Dependent Variable: PERF [b] Predictors: (Constant), CHAT, ATM, MOB
Source: Researcher's Computation (2025) using SPSS version 26.0

Table 5. *Coefficients.*

Model	Unstandardized Coefficients		Std. Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.289	.156		1.854	.065
MOB	.456	.051	.473	8.941	.000
ATM	.298	.052	.282	5.731	.000
CHAT	.187	.043	.209	4.349	.000

[a] Dependent Variable: PERF
Source: Researcher's Computation (2025) using SPSS version 26.0

7. Discussion of Results

The discussion of findings demonstrated that Information and Communication Technology adoption—specifically mobile banking, ATM services, and online chatbots—had a significant positive impact on the performance of Zenith Bank of Nigeria. The results underscored the centrality of technology as a strategic driver of performance in the banking sector. The strongest influence was observed in mobile banking, indicating that Zenith Bank's investment in mobile platforms substantially enhanced customer convenience, operational efficiency, and overall service delivery. This finding aligned with the conclusions of Nwaizugbo and Agboh (2023), as well as Bello and Musa (2021), who both emphasized that mobile banking improves customer retention and operational efficiency in Nigerian banks. The efficiency gains from mobile transactions reflected reduced branch congestion, faster service delivery, and expanded accessibility—key factors in improving performance outcomes.

Similarly, ATM adoption exhibited a strong positive effect on performance, supporting the findings of Eze and Nwafor (2020) and Oladipo and Adekunle (2024), who observed that e-banking services, including ATMs, enhance customer satisfaction and financial inclusion. Zenith Bank's ATM network served as a critical infrastructure for expanding service accessibility and generating transaction-based revenue, reflecting cost-saving benefits consistent with Transaction Cost Economics theory. Online chatbots also contributed positively, though to a slightly lesser extent, by improving service efficiency and customer engagement through automated, real-time responses. This result corroborated the work of Adebayo and Olaniyi (2023), who highlighted the importance of digital transformation in sustaining competitive advantage. From a theoretical perspective, the Technology Acceptance Model explained customers' readiness to adopt these ICT tools, while the Resource-Based View provided justification for the bank's sustained advantage through its integrated digital infrastructure. The combined effects of mobile banking, ATMs, and chatbots—accounting for over half of the variation in performance—illustrated that ICT adoption in Zenith Bank was not merely an operational upgrade but a strategic resource fostering innovation, customer satisfaction, and profitability. Overall, the findings reflected that Zenith Bank's

digitalization initiatives positioned it as a leading institution in leveraging technology for sustainable financial performance.

8. Summary of Findings, Conclusion and Recommendations

8.1. Summary

This study examined the relationship between ICT adoption and sustainable financial performance in Zenith Bank Plc, focusing on mobile banking, Automated Teller Machines (ATMs), and online chatbots. The findings revealed that all three technological components significantly and positively influenced the bank's operational efficiency, customer satisfaction, and overall performance. Mobile banking emerged as the most influential factor, providing customers with convenient, cost-effective, and accessible banking services that enhanced loyalty and reduced operational bottlenecks. ATM adoption equally played a vital role by improving accessibility, reducing transaction queues, and generating fee-based income, while chatbots enhanced service responsiveness and customer engagement. The combined impact of these ICT tools demonstrated that technological adoption serves as a cornerstone for building competitive advantage, operational resilience, and long-term financial sustainability within Nigeria's dynamic banking sector.

8.2. Conclusion

Based on the empirical evidence, the study concluded that ICT adoption has been a critical enabler of Zenith Bank's sustainable financial performance. The integration of mobile banking, ATMs, and chatbots has not only improved service efficiency but has also strengthened the bank's capacity to compete effectively in a rapidly digitalizing financial environment. The findings supported the theoretical perspectives of the Technology Acceptance Model, Diffusion of Innovation Theory, and the Resource-Based View, which collectively explained how perceived usefulness, innovation diffusion, and unique ICT resources contribute to sustained organizational success. Therefore, the digital transformation of Zenith Bank can be seen as a strategic necessity that align with both customer expectations and institutional goals for profitability, operational excellence, and long-term sustainability.

8.3. Recommendations

In light of the findings, the study recommended that Zenith Bank should continue to deepen its investment in ICT infrastructure, particularly in enhancing mobile banking functionalities to improve user experience and strengthen security frameworks. The bank should also expand and maintain its ATM network to ensure consistent service delivery and greater geographical coverage, especially in underbanked areas. Furthermore, chatbots should be upgraded with advanced artificial intelligence and multilingual capabilities to improve personalization and customer satisfaction. Beyond technology deployment, the bank should strengthen regulatory compliance, cybersecurity systems, and customer education to promote trust and mitigate digital risks. Finally, management should adopt continuous innovation and performance monitoring mechanisms to ensure that ICT investments remain aligned with evolving market trends and the overarching goal of sustainable financial performance.

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