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# INFORMATION & COMMUNICATION TECHNOLOGY AND PROFITABILITY OF DEPOSIT MONEY BANKS IN NIGERIA

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## ABSTRACT

*This study examined the effect of information and communication technology (ICT) adoption on the profitability of Deposit Money Banks in Nigeria for the period 2009 to 2024. The proxies considered for ICT adoption were values of Automated Teller Machine (ATM), Point of Sales (POS), mobile and internet banking transactions while profitability was uniquely measured using profit after tax (PAT). Data on these variables were sourced from Central Bank of Nigeria (CBN) statistical bulletin (2024) and Nigeria Deposit Insurance Corporation (NDIC) Annual Reports (2025). Adopting the quasi-experimental research design, the data set generated was analyzed using descriptive analysis, Augmented Dickey Fuller (ADF) unit root test, and Autoregressive Distributed Lag (ARDL) technique. Results obtained revealed that there is a long run relationship between ICT and profitability of DMBs in Nigeria. However, in the short-run, the value of ATM and mobile banking transactions have negative effects on profit after tax (PAT) of banks while value of POS and internet banking transactions have positive effect on PAT of banks; but only the effect of value of mobile banking transaction was insignificant. The study as such, concluded that information and communication technology have a significant effect on the profitability of banks in Nigeria. The study then suggested that banks should reduce ATM expansion and push customers toward cheaper digital channels to protect profitability; Deposit Money Banks and fintechs should invest more in POS agent networks because it directly improves bottom line; DMBs need better customer education and stronger security. This is because in the long-run, the effect of the value of mobile banking transactions may turn positive once adoption rises and cost per transaction falls; and banks should also improve internet (web)*

*platform user experience and security to migrate more customers online, as this channel is the most profitable.*

**Keywords**: Information communication technology, banks, profitability.

## Introduction

Deposit Money Banks (DMBs) in Nigeria are commercial banks licensed by the Central Bank of Nigeria (CBN) to amongst other things take deposits from the public and give loans. They are profit oriented as their main goal is to maximize profit after tax (PAT) from interest income, fees and foreign exchange gains. A typical of this type of bank in Nigeria has multiple income streams like interest income, commission, trading income, e-banking charges etc. (Nwakoby, Sidi & Ofobruku, 2019). One other peculiar feature of today's banking industry is homogeneity of products on offer and this has taken competition in the industry to a higher level. Todays, banks are innovating new means and ways to satisfy and attract more customers. Put differently, banks in the industry are constantly looking for better and improved ways to outsmart one another in order to have a larger customer base, make more profit, make shareholders and other stakeholders happy, and remain relevant in business.

Another way these banks have tried to remain relevant in business is to reduce operational cost and this drive ushered in the adoption of ICT (Information and Communication Technology) in the business of banking. Thus, Deposit Money Banks (DMBs) have adopted and implemented new technological advancements to enhance smooth operations in dealings with their customers. According to Uge (2023), ICT is the automation of processes, controls, and information production using computers, telecommunications, software's and other gadget that ensure smooth and efficient running of activities. It is a term that largely covers the coupling of electronic technology for the information needs of a business at all levels. For banks, ICT guarantees cost reduction by reducing branch costs, staff costs, and paper work. It enhances revenue growth by ensuring more transactions via ICT channels and guaranteeing more fees and commission income. ICT also provides efficiency in the banking system as it leads to faster transactions, fewer errors, and better risk management (Udom, Umanah, Udom & kainga, 2025). Accordingly, ICT has surpassed the role of support services or only electronic data processing; its fields of applications are slightly global and unlimited. Its devices especially the internet and modern computer email facilities have further strengthened early modernizations like the telephone and fax. Other ICT devices include data recognition equipment, factory automation hardware and services, tele-computing, and teleconferences using real time and online system (Adeoti, 2025).

In Nigeria, popular ICT support banking channels are Automated Teller Machine (ATM), Point of Sales (POS) machines, internet banking, mobile (USSD) banking and the likes. These channels have turnaround the ways and manner DMBs operate and deliver services to their numerous customers. According to India School of Business and Finance (ISBF) (2024), "a significant impact of ICT on the banking industry is the shift towards digitisation. The adoption of online and mobile banking has allowed customers to have access to a wide range of banking services, even in the comfort of their rooms with convenience with their smartphones and or computers. The digital transformation has not only improved the efficiency and speed of banking operations but has also enhanced overall customers' experience. This evolution and the rise in fintech startups have caused a pyridine shift from the traditional banking landscape, which have led to offering innovative solutions in areas such as lending and credit administration, robust financial advisory services, and numerous digital wallets".

Deposit Money Banks (DMBs) in Nigeria fully adopted the use of ICT in their operations in 2009 (CBN, 2024). The volume and value of ATM, POS, mobile and internet banking transactions since then has constantly been on the increase. For instance, the most popular channel, internet banking channel, experienced an astronomical increase in value of transactions from ₦84.15 billion in 2009 to ₦1,880,678.76 billion in 2024 (CBN, 2024). Expectedly, the net profit (PAT) of Deposit Money Banks in Nigeria soared from ₦12.45 billion in 2010 to ₦3,410.00 billion in 2024 (NDIC Annual Reports, 2025). However, within this same period, banks like Afribank Plc., Bank PHB, and Spring Bank Plc. were bought over by other banks as a result of insolvency as their liabilities exceeded their assets (Olatunbosun, 2026). This happened even in the face of full application of ICT in their banking operations.

On the empirical front, studies on ICT and bank profitability/performance abound (Owusu, 2025; Udom, Umanah, Udom & kainga, 2025; Deshi & Edmond, 2025; Muriithi & Moyi, 2024; Swapnilsingh, Shailesh, Neha, Pracheta, & Jyoti, 2023). These studies have processed diverse results and this can be attributed to choose of variables, methodology and data. These reviewed studies adopted variables like return on equity (ROE), return on asset (ROA) and net interest margin (NIM) as measures of profitability/performance with little of none adopting net income or profit after tax (PAT) as profitability measure. It on this ground that this study was executed in order to bridge this identified variable gap.

**Review of Related Literature**

According to Nwakoby, Sidi and Ofobruku (2019), technology can be described as dynamic and complex strategic resources that modern digital organizations adopt and implement to enhance their operational activities and performance. Technology is a strategic tool to enhance innovativeness in service industry specifically in the modern deposit money banking system and operations. Technologies are modern machinery that the banking industry uses to enhance changes in innovative strategies in competitive markets and enhances strategic growth and attain competitive strengths and advantage (Kiani, Yang, Ghani & Hughes, 2021). As such, Information and Communication Technology (ICT) is an advance concept from technological variables that play the role of enhancing easy flow of information and communication to attain sustainable operational efficiency and performance in modern commercial banking operations (Kiani, Kanwal & Wang, 2019). ICT is a modern technological variable that enhances easy flow of digital business opportunities and investment flow in modern business settings (Uyar, Khalil, Cemil, Mohammed & Friedrich 2021; Adam 2020).

ICT also refers to the gathering, storing, manipulating and transferring of information. It is the automation of the process, controls and information production using computers, telecommunication, software and ancillary equipments such as Automated Teller Machine and Debit Cards. It is a term that generally covers the harnessing of electronic technology for the information needs of a business at all levels. Laudon and Laudon (2021) asserted that Information and Communication Technology deals with the physical devices and software that link various computer hardware components and transfer data from one physical location to another.

The *ATM* is an electronic cash dispenser which allows account holders 24 hours access to their funds. The entire system is leveraged upon a complex network of ICT system to verify online, information contained in a card before cash request is honoured. It has been generally found to be highly reliable and very convenient for users (CBN, 2017). ATM is a combination of a computer terminal, record-keeping system and cash vault in one unit, permitting customers to enter the bank's book keeping system with a plastic card containing a Personal Identification Number (PIN) or by punching a special code number into the computer terminal linked to the bank's computerized records 24 hours a day. The combined services of both the Automated and human tellers imply more productivity for the bank during banking hours. Also, as it saves customers time in service delivery as alternative to queuing in bank halls,

customers can invest such time saved into other productive activities. ATMs are a cost-efficient way of yielding higher productivity as they achieve higher productivity per period of time than human tellers (Dauda & Akingbade, 2021).

*POS* transactions are on-line system that allows customers to transfer funds instantaneously from their bank accounts to merchant accounts when making purchases (at purchase points). A POS uses a debit card to activate an Electronic Fund Transfer (EFT) Process (Chorafas, 2018). Increased banking productivity results from the use of EFT POS to service customers shopping payment requirements instead of clerical duties in handling cheques and cash withdrawals for shopping. Furthermore, the system continues after banking hours, hence continual productivity for the bank even after banking hours. It also saves customers time and energy in getting to bank branches or ATMs for cash withdrawals which can be harnessed into other productive activities. The use of electronic transfer at point of sales has encouraged Agency Banking system which has replaced the rural banking scheme in Nigeria today. POS has brought banking activities (mostly withdrawal of cash) to every nooks and cranes of every community in Nigeria. This has equally generated employment and sources of livelihood to the employed in the country (Bhujabal & Sethi, 2020).

*Mobile banking*, as a key ICT dimension, facilitates remote transactions via smartphones, measured by indicators such as transaction volume and user adoption rates, and has significantly influenced financial performance, by lowering branch dependency and increasing non-interest income through fees and cross-selling opportunities (Covin & Wales, 2019). Recent empirical evidence from Nigerian DMBs shows that higher mobile banking penetration correlates with enhanced ROA, as it reduces transaction costs by up to 40% and expands customer bases in underserved rural areas, thereby improving liquidity and resilience against economic shocks like the 2023-naira redesign crisis. However, challenges such as cyber security threats and network unreliability can negate these benefits if not addressed, underscoring the need for robust regulatory frameworks to maximize mobile banking's positive impact on bank valuation metrics like Tobin's Q (Ingram, Peake, Stewart & Watson, 2019).

*Internet Banking Transactions* is the main vehicle for Public Access Computing (PAC). Internet offers an excellent environment for banks to experiment with the delivery of home banking (Bhujabal & Sethi, 2020). It has been used to develop virtual reality bank branches in the United States of America. A prototype of this is the Electronic Courtyard developed by the

Global Payment System Visa and the US software firm Worlds Inc. It allows customers to check account balances, transfer funds and apply for loans. It uses three-dimensional graphics to enable customers to move into different rooms and communicate with virtual bank tellers, loan arrangers and financial advisers. It uses visa remote banking subsidiary, visa interactive, to link banks with customers and provide secure technology for the safety of account data transferred (Agboola, 2016).

Payments through the internet and mobile phones have gained a lot of prominence with the widespread use of the GSM and the adoption of internet banking operations. Banks now partner with telecommunications companies to offer mobile payments services. Services such as balance enquiry and funds transfer have become common feature. Similarly, internet payments were encouraged by agencies such as the Joint Admission and Matriculation Board (JAMB), which started e-registration using single purposes stored value card, also West African Examination Council (WAEC), National Examination Council (NECO), and some higher institutions initiated payment through the web. Currently, airlines, businesses, corporations/ministry, departments and agencies (MDAs) such as Corporate Affairs Commission (CAC), Nigerian Immigration Service etc. accept payments through the web (CBN, 2017).

*Profitability* on the other hand refers to a bank's ability to generate income and profits from its operations after accounting for expenses (Reenu & Sunil, 2023). It is a core indicator of financial performance, especially in evaluating how well a bank manages its resources to produce financial returns. In the banking industry, profitability is typically measured using various financial ratios such as net profit margin (profit after tax), return on assets (ROA), and return on equity (ROE) (Uge, 2023).

This study adopted profit after tax (PAT) as a measure of profitability. Profit after tax is the percentage of revenue that remains as profit after all operating expenses, interest, and taxes have been deducted. It is also seen as net profit margin. It provides insight into how effectively a bank converts its revenue into actual profit. Investment in ICT software could enhance operational efficiency, reduce the cost of services, and automate processes (Devaraj & Kohli, 2023). If software investments help cut operational costs, such as labor or manual transaction handling, they could increase the net profit margin (PAT) by reducing the total operating expenses of a bank.

**Theoretical Review**

Related theories of this work include the contingency theory, innovation diffusion theory and the technological acceptance

model. However, the study relied on the technological acceptance model. According to Makanga and Paul (2017), the technology Acceptance Model was developed in 1989 by Fred Davis. The model was originally designed to predict user's acceptance of Information Technology and usage in an organizational context. The model posits that user acceptance is determined by two key beliefs, namely perceived usefulness and perceived ease of use. Perceived usefulness (U) is defined as the extent to which a person believes that using a particular technology will enhance her/his job performance, while perceived ease of use (EOU) is defined as the degree to which a person believes that using a technology will be free from effort (Davis, 1989). The theory argues that the consumers' attitude towards using modern technology is influenced by perceived usefulness and perceived ease of use.

The Technological Acceptance Model (TAM) is the most suitable for this study. This is because bank customers are more likely to adopt internet banking, mobile banking, ATM and POS if they perceive them as useful for saving time and cost, and easy to operate. Increased usage of these ICT channels leads to higher transaction volume, which translates to increased fee and commission income, thereby enhancing the profitability and prift after tax (net income) of Deposit Money Banks (DMBs). Put differently, in the course of using these ICT supporting banking platforms, banks will record more transactions, which guarantee more income and higher profit after tax.

**Empirical Literature Review**

Olatunbosun (2026) investigated the impact of ICT on the profitability of Polaris Bank Limited, focusing on its branches in Osogbo Metropolis, Osun State, Nigeria. The survey re-search design was adopted, with the entire population of sixty-three (63) bank employees across three branches in Osogbo. Data were collected using structured questionnaires and documentary sources, while both descriptive and inferential statistics were employed for analysis. The findings revealed that a variety of ICT tools such as computers, internet services, ATMs, POS terminals, CCTV systems, and specialized software are available and effectively utilized in the bank's operations. ICT adoption was found to be primarily driven by management policies and customer demand for efficient and convenient services. The study established a strong and statistically significant relationship between ICT use and profitability, as well as between management support and ICT utilization for profitability enhancement. The findings further indicated that ICT enhances operational efficiency, reduces transaction costs, and improves customer satisfaction,

thereby contributing significantly to the bank's profitability.

Owusu (2025) examined the effects of financial technology on banking performance in developing Asian countries, focusing on how digital innovations influence profitability and efficiency. The variables used included dependent variables like bank performance (measured by ROA, ROE, and net interest margin) and independent variables such as FinTech adoption (proxied by mobile banking transaction volume, e-banking penetration rate, and ATM usage frequency), alongside control variables like bank size and GDP growth. The population comprised listed deposit money banks across 33 Asian developing economies, with a sample of 150 banks selected via stratified sampling. The period of study spanned 2010 to 2022, utilizing panel data regression models, including fixed-effects and random-effects estimations. Key findings indicated a positive impact, with a 1% increase in FinTech penetration enhancing ROA by 0.15%, attributed to cost reductions and revenue diversification.

Udom, Umanah, Udom and kainga (2025) examined the impact of ICT on the performance of microfinance Banks in Akwa Ibom State. The study adopted a survey research design and the simple random sampling approach. The study employed the use of secondary source of data. Findings from the study, it was revealed that the usefulness of ICT in microfinance banks is at a low percentage unlike commercial banks who have inhibited technology as part of their culture; bulk of the services which are rendered to their customers are for rural dwellers which makes the adoption of ICT near impossible.

Al-Jaafreh and Aloudat (2025) explored FinTech's impact on financial institution performance and risk in GCC countries, focusing on liquidity and profitability. Dependent variables were liquidity ratios and ROA, independent variables FinTech (blockchain, automated systems), controls for GDP. Population GCC banks, sample 50. Period 2017-2023, using propensity score matching. Findings showed no significant ROA effect but $\beta$=0.31 for liquidity. Critique notes the lack of ROA significance may stem from small sample size, and regional focus limits global applicability.

Deshi and Edmond (2025) examined the effect of ICT investments on the profitability of listed Deposit Money Banks in Sub-Saharan Africa adopting a quantitative research design. Data were drawn from the annual reports and financial statements of listed DMBs in the region. The study used purposive sampling to select 58 listed DMBs that met the criteria of having complete and reliable data. Secondary data were collected from reputable sources. Descriptive statistics, correlation analysis, and multiple regression were used as techniques for data analysis, supported by diagnostic procedures

to ensure the robustness and validity of the findings. The results revealed that ICT assets have no statistically significant effect on the profitability of listed DMBs in Sub-Saharan Africa; and ICT expenditure has a positive and significant effect on profitability of listed banks in Sub-Saharan Africa.

Muriithi and Moyi (2024) examined the effects of ICT adoption on financial performance of commercial banks in Kenya, aiming to assess efficiency gains from digital channels. Dependent variables were ROA and cost-to-income ratio, independent variables included internet banking penetration and ICT investment, with controls for market competition. The population was Kenyan commercial banks, sampling 30 via random selection. Spanning 2018 to 2023, the study used structural equation modeling. Findings showed a 0.42 path coefficient for ICT on ROA, moderated by cyber security. Critique notes the model's assumption of linearity, ignoring threshold effects in adoption, and sample bias toward larger banks.

Swapnilsingh, Shailesh, Neha, Pracheta, & Jyoti (2023) examined the impact of ICT on the profitability of banks operating in India for the period 2010 to 2019. A panel data analytical technique was adopted and results indicated that ICT adversely impacts banks' profitability (NIM) in India in a linear association. However, the quadratic association indicates a positive U-curved relationship between ICT and profitability. The study also revealed that the net of non-performing assets significantly but negatively impacts the connectivity of ICT and profitability.

Abu, Daniel and Kajo (2022) examined the impact of ICT usage on the performance of selected Deposit Money Banks in Nigeria. The study adopted quantitative research method for analysis and the population of the study was 170 respondents while the sample size used was 119 respondents. Simple regression and other statistical tools via SPSS were used to analyze the data collected. Findings showed that ICT usage has significant impact on strategic decision, competitive advantage and customers' satisfaction of Deposit Money banks in Nigeria.

Nwakoby, Sidi and Ofobruku (2019) examined the nexus between the use of information and communication technology and the performance of DMBs in Nigeria. ATM, POS, mobile money, web payment and interbank transfer web MM, WP and IBT were the forms of ICT considered while return on equity was used as a for measuring bank performance. Adopting the Ordinary Least Square (OLS) multiple regression approach, the study reported that the adoption of these forms of ICT has greatly influenced the quality of banking performance; it has specifically increased banks return on equity; and ICT usage can

sustain returns on equity of deposit money banks in the long run.

Chukwukaelo, Onyeiwu and Amah (2018) examined the relationship between different e-banking channels and the profitability of organisations in Nigeria. Four e-banking channels (ATM, POS, internet and internet banking transactions) were identified and regressed against return on equity (ROE) of DMBs operating in Nigeria between 2006 and 2016. A panel data regression model was formulated and tested using the Generalized Method of Moment Approach. The result revealed that the overall impact of electronic banking on profitability of Deposit Money Banks operating in Nigeria is significant and positive.

**Gap in Literature**

This most identified gap in literature is variable gap as existing studies reviewed failed to use profit after tax (PAT) or net income as a measure of bank performance. The popular measures of performance in these studies are return on asset (ROA), return on equity (ROE), and net interest margin (NIM).

**Methodology**

The quasi-experimental research design was adopted in this study. The research design of this study prompted the use of secondary data. These data were sourced from Central Bank of Nigeria (CBN) statistical bulletin for 2024 and Nigeria Deposit Insurance Corporation (NDIC) Annual Reports (2025).

Following preliminary analysis, the Autoregressive Distributed Lag (ARDL) model developed by Pesaran and Shin (1999) in analyzing the long-term impacts of explanatory variables on a dependent variable was adopted in this work.

**Model Specification**

This study adopted a multiple regression model which regressed profit after tax(PAT) on Automated Teller Machine (ATM) transactions, Point of Sales (POS) transactions, Mobile Banking Transactions(MBT) and Internet Banking Transactions (IBT) as expressed below:

$$PAT = F(ATM, POS, MBT, IBT) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$PAT = \beta_0 + \beta_1 ATM + \beta_2 POS + \beta_3 MBT + \beta_3 IBT + \mu \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where;

$\beta_0$ = Constant term, $\beta_1$ = Regression coefficient of ATM, $\beta_2$ = Regression coefficient of POS, $\beta_3$ = Regression coefficient of MBT, $\beta_4$ = Regression coefficient of IBT, $\mu$ = Stochastic error term.

**A priori Expectations:** $\beta_1, \beta_2, \beta_3, \beta_4 > 0$. This study expected ATM, POS, mobile and internet banking transactions to have positive (direct) effects on profit after tax of banks in Nigeria.

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**Data Estimations and Results**

**Table 4.1:** Yearly Data on Profit After Tax (PAT), Automated Teller Machine (ATM), Point of Sales (POS), Mobile Banking (MBT) and Internet Banking (IBT) Transactions in Nigeria (2009 -2024)

| YEAR | PAT (₦'Billion) | ATM (₦'Billion) | POS (₦'Billion) | MBT (₦'Billion) | IBT (₦'Billion) |
|---|---|---|---|---|---|
| 2009 | -667.3 | 548.60 | 11.03 | 1.27 | 84.15 |
| 2010 | 12.45 | 399.71 | 12.72 | 6.65 | 25.05 |
| 2011 | 189.2 | 1,561.74 | 31.02 | 18.98 | 59.61 |
| 2012 | 456.8 | 1,984.66 | 48.01 | 31.51 | 31.57 |
| 2013 | 520.1 | 2,828.94 | 161.02 | 142.80 | 47.32 |
| 2014 | 612.4 | 3,679.88 | 312.07 | 346.47 | 74.04 |
| 2015 | 495.6 | 3,970.25 | 448.51 | 442.35 | 91.58 |
| 2016 | 378.9 | 4,988.13 | 759.00 | 756.90 | 132.36 |
| 2017 | 542.7 | 6,437.59 | 1,409.81 | 1,102.00 | 184.60 |
| 2018 | 689.3 | 6,480.09 | 2,383.11 | 1,974.25 | 675.92 |
| 2019 | 748.5 | 6,512.61 | 3,204.75 | 5,080.96 | 478.14 |
| 2020 | 665.2 | 18,199.66 | 4,727.08 | 14,987.74 | 392,340.25 |
| 2021 | 810.4 | 21,230.93 | 24,455.42 | 53,208.27 | 545,039.69 |
| 2022 | 950.2 | 32,648.02 | 41,035.80 | 111,122.11 | 783,660.03 |
| 2023 | 2100 | 28,212.59 | 110,347.10 | 219,800.08 | 1,097,133.04 |
| 2024 | 3410 | 29,121.72 | 223,272.82 | 392,711.93 | 1,880,678.76 |

**Source:** Central Bank of Nigeria (CBN) Statistical Bulletin (2024) and Nigeria Deposit Insurance Corporation (NDIC) Annual Reports (2025)

The above table contains yearly time series data on the variables used for the study for the period 2009 – 2024. These data are given millions of naira but the graphical version of the data is given in the categorical graph below:

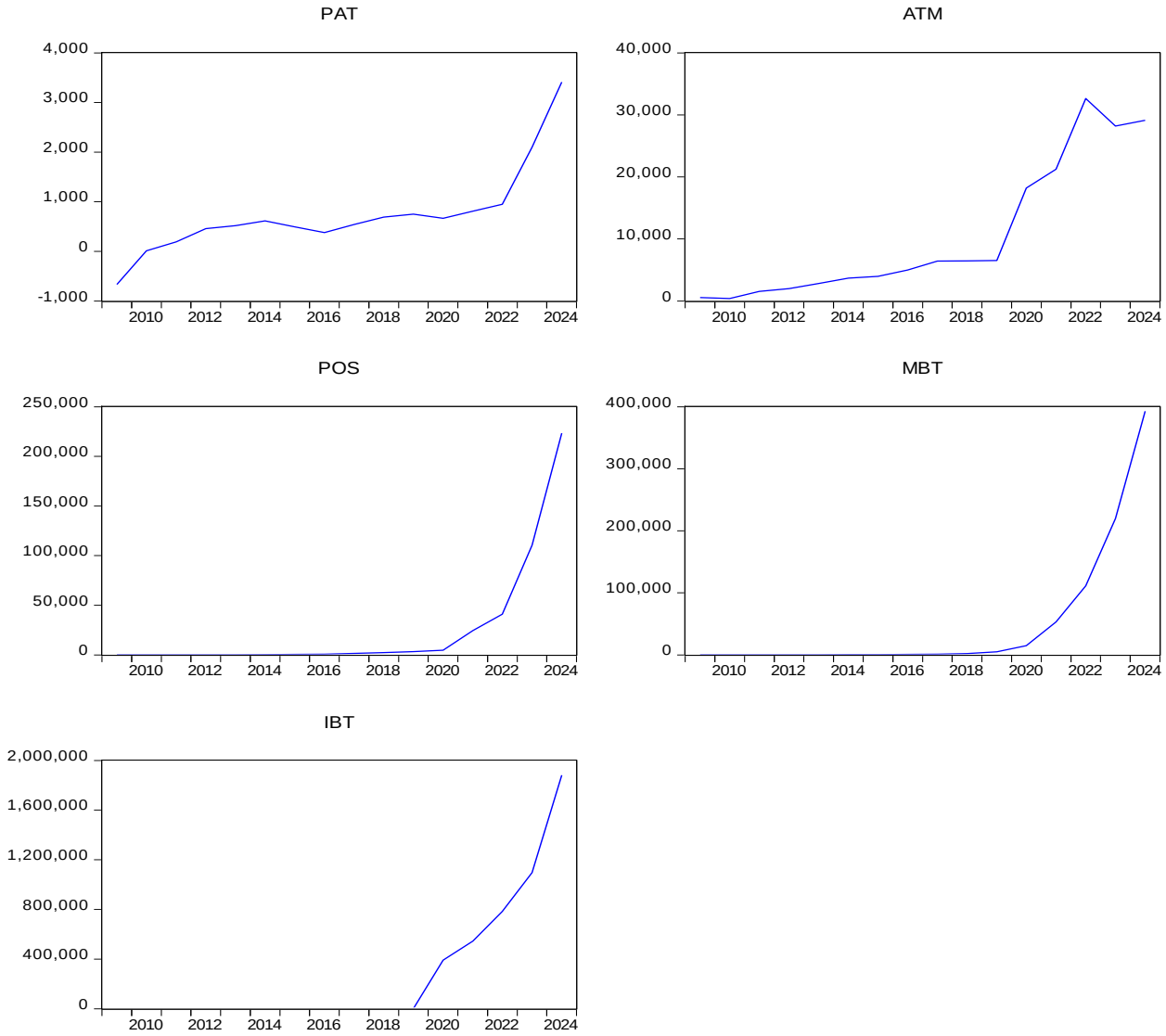



**Fig. 2.1:** Graphs of PAT, ATM, POS, MBT and IBT (2009 – 2024)
**Source:** E-Views 10 Output (2026)

## Data Analysis

### Descriptive Analysis

| | PAT | ATM | POS | MBT | IBT |
|---|---|---|---|---|---|

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| | | | | | |
|---|---|---|---|---|---|
| Mean | 744.6531 | 10550.32 | 25788.70 | 50108.39 | 293796.0 |
| Median | 577.5500 | 5712.860 | 1084.405 | 929.4500 | 158.4800 |
| Maximum | 3410.000 | 32648.02 | 223272.8 | 392711.9 | 1880679. |
| Minimum | -667.3000 | 399.7100 | 11.03000 | 1.270000 | 25.05000 |
| Std. Dev. | 902.6859 | 11271.87 | 59838.40 | 108872.0 | 543121.8 |
| Skewness | 1.679697 | 0.938747 | 2.612004 | 2.346013 | 1.878255 |
| Kurtosis | 6.236923 | 2.260365 | 8.745173 | 7.433582 | 5.639940 |
| | | | | | |
| Jarque-Bera | 14.50880 | 2.714695 | 40.19818 | 27.78117 | 14.05377 |
| Probability | 0.000707 | 0.257342 | 0.000000 | 0.000001 | 0.000888 |
| | | | | | |
| Sum | 11914.45 | 168805.1 | 412619.3 | 801734.3 | 4700736. |
| Sum Sq. Dev. | 12222626 | 1.91E+09 | 5.37E+10 | 1.78E+11 | 4.42E+12 |
| | | | | | |
| Observations | 16 | 16 | 16 | 16 | 16 |

**Source:** E-Views 10 Output (2026)

The above table contains the descriptive characteristics of the data used for the study. Amongst others, it shows the mean, median, standard deviation, skewness and kurtosis of the variables: PAT, ATM, POS, MBT and IBT. Accordingly, the means of these variables are: ₦744.6531 billion, ₦10550.32 billion, ₦25788.70 billion, ₦50108.39 billion and ₦293796.0 billion respectively. The table also shows that the variables are all positively skewed with skewness values of 1.679697, 0.938747, 2.612004, 2.346013 and 1.878255. Subsequently, all the variables except for ATM are leptokurtic as their kurtosis values are greater than 3. Finally, only the variable ATM, mirrors a normally distributed.

**Unit Root Test**

| Variables | ADF Statistic | 5% Critical Value | Prob. Value | Level of Integration |
|---|---|---|---|---|
| PAT | -4.941642 | -3.098896 | 0.0019 | I(0) |
| ATM | -5.365874 | -3.098896 | 0.0009 | I(1) |
| POS | -4.856551 | -3.098896 | 0.0022 | I(1) |
| MBT | -4.889745 | -3.175352 | 0.0036 | I(1) |
| IBT | -4.432618 | -3.098896 | 0.0047 | I(1) |

**Source:** Computation from E-Views 10 Output (2026)

The unit root test results as summarized in the above table shows that the variable PAT was stationary at level while the other variables (ATM, POS, MBT and IBT) were stationary at first difference. This implies that the variables had missed order of integration and this informed the need to adopt the ARDL analytical technique.

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**Short Run Analysis**

Dependent Variable: PAT
Method: ARDL
Date: 09/09/26 Time: 00:17
Sample (adjusted): 2011 2024
Included observations: 14 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): ATM POS MBT IBT
Fixed regressors: C
Number of models evalulated: 16
Selected Model: ARDL(1, 0, 0, 0, 0)

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| PAT(-1) | 0.372917 | 0.107399 | 3.472260 | 0.0084 |
| ATM | -1.242938 | 0.458690 | -2.709756 | 0.0267 |
| POS | 0.672764 | 0.267137 | 2.518421 | 0.0359 |
| MBT | -0.343491 | 0.324530 | -1.058427 | 0.3208 |
| IBT | 0.192828 | 0.066139 | 2.915469 | 0.0194 |
| C | 11.37011 | 3.035274 | 3.745992 | 0.0057 |

| | | | |
|---|---|---|---|
| R-squared | 0.939479 | Mean dependent var | 6.533590 |
| Adjusted R-squared | 0.901653 | S.D. dependent var | 0.701241 |
| S.E. of regression | 0.219911 | Akaike info criterion | 0.106341 |
| Sum squared resid | 0.386888 | Schwarz criterion | 0.380223 |
| Log likelihood | 5.255610 | Hannan-Quinn criter. | 0.080989 |
| F-statistic | 24.83709 | Durbin-Watson stat | 2.285730 |
| Prob(F-statistic) | 0.000112 | | |

*Note: p-values and any subsequent tests do not account for model selection.

**Source:** E-Views 10 Output (2026)

The above table shows that lagged profit after tax, PAT(-1), value of point of sales (POS) and internet banking transactions (IBT) have positive and significant effects on current year PAT while value of automated teller machine (ATM) transaction has a negative but significant influence on PAT and mobile banking transactions have a negative insignificant influence on PAT. From the same table, the variables, PAT(-1), ATM, POS, MBT and IBT have a joint significant effect of about 90.2% on profit

after tax. Finally, there is no presence of autocorrelation in the errors as the value of Durbin Watson statistic (2.285730) falls between the range of 1.5 and 2.5.

## Bounds Cointegration Test

F-Bounds Test — Null Hypothesis: No levels relationship

| Test Statistic | Value | Signif. | I(0) | I(1) |
|---|---|---|---|---|
| F-statistic | 31.32666 | 10% | 2.2 | 3.09 |
| K | 4 | 5% | 2.56 | 3.49 |
| | | 2.5% | 2.88 | 3.87 |
| | | 1% | 3.29 | 4.37 |

**Source:** E-Views 10 Output (2026)

Bounds test shows that there is a long-run equilibrium relationship between information and communication technology (ICT) and profitability of banks in Nigeria. This is because the value of F-statistic (31.32666) is greater than the upper bound value of F-statistic at 5% level of significance (3.49).

## Long Run Analysis

ARDL Long Run Form and Bounds Test
Dependent Variable: D(PAT)
Selected Model: ARDL(1, 0, 0, 0, 0)
Case 2: Restricted Constant and No Trend
Date: 089/09/26 Time: 00:25
Sample: 2009 2024
Included observations: 14

Conditional Error Correction Regression

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 11.37011 | 3.035274 | 3.745992 | 0.0057 |
| PAT(-1)* | -0.627083 | 0.107399 | -5.838813 | 0.0004 |
| ATM** | -1.242938 | 0.458690 | -2.709756 | 0.0267 |
| POS** | 0.672764 | 0.267137 | 2.518421 | 0.0359 |
| MBT** | -0.343491 | 0.324530 | -1.058427 | 0.3208 |
| IBT** | 0.192828 | 0.066139 | 2.915469 | 0.0194 |

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

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Levels Equation
Case 2: Restricted Constant and No Trend

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| ATM | -1.982095 | 0.860029 | -2.304684 | 0.0501 |
| POS | 1.072848 | 0.512297 | 2.094192 | 0.0696 |
| MBT | -0.547761 | 0.561498 | -0.975534 | 0.3579 |
| IBT | 0.307499 | 0.145774 | 2.109424 | 0.0679 |
| C | 18.13175 | 5.864003 | 3.092044 | 0.0148 |

EC = PAT - (-1.9821*ATM + 1.0728*POS -0.5478*MBT + 0.3075*IBT + 18.1318 )

**Source:** E-Views 10 Output (2026)

Results in the above table revealed that in the long-run, value of ATM and mobile banking transactions have negative effects on PAT while POS and internet banking transactions have positive effects on PAT. However, only the effect of value of ATM transactions was slightly significant with a p-value of 0.0501, which is equal to 5% (0.05) level of significance.

## ECM Estimation

ARDL Error Correction Regression
Dependent Variable: D(PAT)
Selected Model: ARDL(1, 0, 0, 0, 0)
Case 2: Restricted Constant and No Trend
Date: 09/09/26 Time: 00:29
Sample: 2009 2024
Included observations: 14

ECM Regression
Case 2: Restricted Constant and No Trend

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CointEq(-1)* | -0.627083 | 0.035881 | -17.47670 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.946463 | Mean dependent var | 0.400910 |
| Adjusted R-squared | 0.946463 | S.D. dependent var | 0.745582 |
| S.E. of regression | 0.172513 | Akaike info criterion | -0.607944 |
| Sum squared resid | 0.386888 | Schwarz criterion | -0.562297 |
| Log likelihood | 5.255610 | Hannan-Quinn criter. | -0.612170 |

| | |
|---|---|
| Durbin-Watson stat | 2.285730 |

* p-value incompatible with t-Bounds distribution.

**Source:** E-Views 10 Output (2026)

ECM estimation shows that the cointegrating equation has the desired negative (-0.627083) and significant (0.0000) signs. This suggests that in an event of any distortion to the established long-run equilibrium between ICT and profitability of banks in Nigeria, the speed at which equilibrium can be restored in the long-run is about 62.7% per annum.

**Diagnostic Tests**

| Test | Criterion | Test Statistic Value | Prob. Value |
|---|---|---|---|
| Normality | Jarque-Bera | 1.028821 | 0.597853 |
| Serial Correlation | Breusch-Godfrey | 1.062508 | 0.4027 |
| Heteroscedasticity | Breusch-Pagan-Godfrey | 0.100213 | 0.9893 |

**Source:** Extract from E-Views 10 Output (2026)

Diagnostic tests results revealed that first, the errors of the model are normally distributed as the P-value of Jarque-Bera statistic (0.597853) is greater than 5% (0.05); second, there is no serial correlation in the errors given that the p-value of Breusch-Godfrey statistic (0.4027) is greater than 5%; and third, heteroscedasticity is absent with the p-value of Breusch-Pagan-Godfrey statistic (0.9893) being less than 5%.

**Discussion of Findings**

This study amongst other things revealed that value of ATM transactions has a negative but significant effect on PAT of banks in Nigeria and this was also reported by Udom, Umanah, Udom & kainga (2025). This implies that these banks spend a lot on ATM maintenance, cash loading, security, and network; and these costs outweighs the transaction fees earned, reducing profit. This suggests that ATM encourages cash withdrawals which increase vault management cost, cash-in-transit risk, and leakage, and eats into profits (Muriithi & Moyi, 2024). In general, customers are shifting from ATM to POS, web and mobile banking. Thus, underutilized ATMs become a liability rather than revenue source.

Second, value of POS transactions has a positive and significant effect on profit after tax and this aligns with the position expressed by the likes of Al-Jaafreh and Aloudat (2025). This outcome of the study suggests that POS has lower setup and maintenance cost unlike ATM and generates merchant service charges and commissions which boost profit. Is also suggests that POS agents reach unbanked areas as more transactions implies more deposit

mobilization and this equates to more funds for banks to lend and earn interest. Put differently, banks earn on every POS transaction and this diversifies income away from interest income and improves profitability (Adam, 2020).

Third, value of mobile banking transactions has a negative insignificant effect on profit after tax of banks in Nigeria. This outcome which was equally reported by Olatunbosun (2026) in a recent study implies that banks invested heavily in mobile apps, USSD, and security but there is no commensurate increase in revenue from such investment. Thus, according to Nwakoby, Sidi and Ofobruku (2019), this is because mobile channels attract fraud and the cost of fraud prevention, customer compensation, and insurance reduce profit. Another possible explanation is that many customers in this part of the world still do not trust mobile banking as low volume means revenue from charges is too small to be significant.

Finally, the study reported that value of internet (web) banking transactions has a positive and significant effect on DMB's profit after tax. In essence, web transactions have the lowest cost per transaction as it is associated with no cash, no agent, and no machine. Thus, more web usage equates to higher profit margin. This result also suggests that internet banking is used for large transfers and bill payments, thus banks earn more fees from fewer high-value transactions. Also, it can be deduced that unlike branches/ATM, web banking runs with minimal staff, which reduces overheads and increases profit after tax (Nwakoby, Sidi & Ofobruku, 2019).

**Summary of Findings, Conclusion and Recommendations**

1. Value of ATM transactions has negatively and significantly affected the profit after tax (PAT) of DMBs.
2. The effect of the value of POS transactions on the profit after tax (PAT) of DMBs is positive and significant.
3. Value of mobile banking transactions has negative and insignificant effect on the profit after tax (PAT) of DMBs.
4. The extent to which the value of internet banking transactions has affected the profit after tax (PAT) of DMBs is positive and significant.

Conclusively, this study amongst other thing revealed that there is a long run relationship between ICT and profitability of DMBs in Nigeria. It also showed that in the short-run, value of ATM and mobile banking transactions have negative effects on profit after tax (PAT) of banks in the country while value of POS and internet banking transactions have positive effect on PAT of these banks. However, only the effect of value of mobile banking transaction was insignificant. On this note, the study concluded that information and communication technology have a

significant effect on the profitability of banks in Nigeria.

**Therefore, based on the findings herein:**

1. Banks should reduce ATM expansion and push customers toward cheaper digital channels to protect profitability.
2. Deposit Money Banks and fintechs should invest more in POS agent networks because it directly improves bottom line.
3. DMBs need better customer education and stronger security. This is because in the long-run, the effect of the value of mobile banking transactions may turn positive once adoption rises and cost per transaction falls.
4. Banks should also improve internet (web) platform user experience and security to migrate more customers online, as this channel is the most profitable.

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