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IMPACT OF INFORMATION TECHNOLOGY ON BANKING EFFICIENCY: EVIDENCE FROM THE BANK OF INDUSTRY, KADUNA STATE

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ABSTRACT
The study examined the impact of information technology on banking efficiency at the Bank of Industry, Kaduna State. The increasing adoption of information technology in banking has transformed service delivery, but its effect on efficiency remains a topic of interest. The study utilized a mixed-methods adesign, specifically a survey and documentary research design. The population of the study was 400 staff and clients of the Bank of Industry Kaduna branch, and a sample of 200 participants was derived using the Taro Yamane formula. The major findings revealed that the information technology components collectively explained 72.8% of the variance in banking efficiency which indicate a significant positive relationship between information technology adoption and banking efficiency, highlighting the need for continued technological investment. It was also revealed that Core Banking Applications and Online Banking Platforms had the strongest significant positive effects on banking efficiency. The study therefore, concluded that information technology has been a primary driver of improved efficiency in the Bank of Industry, drastically reducing loan processing times and operational costs. The study recommended among other things that the bank must prioritize strategic investment in its core information technology infrastructure (networks, power, and servers) to address the significant reliability gap, which is currently undermining its other successful information technology-driven systems.

Keywords: Information Technology, Banking Efficiency, Bank of Industry, Customer Satisfaction.

Introduction

The rapid integration of information technology (IT) has fundamentally reshaped the global financial landscape, acting as a primary driver for innovation and competition. Globally, efforts were made to digitize banking operations to enhance speed, security, and customer access; recent studies (Gulati & Singh, 2024) have shown that the adoption of FinTech and AI, accelerated by the COVID-19 pandemic, is redefining how financial services are delivered, though it often involves significant upfront costs before efficiency gains are realized. In Africa, efforts were made to leverage IT, particularly mobile finance, to bypass legacy infrastructure and boost financial inclusion. Studies (EIB, 2024) have shown that the African FinTech sector is thriving, nearly tripling in size since 2020 and significantly improving access to finance, even as high funding costs remain a challenge.

In Nigeria, efforts were made by the Central Bank (CBN) to drive a shift from traditional, cash-based banking to a digital-first "cashless policy" to improve transaction efficiency and formalize the economy. Studies (Nguemo & Ekokotu, 2025) have shown that investment in technology and IT infrastructure has a significant positive effect on the sustainable growth and performance of deposit money banks in Nigeria. Statistics have shown that the volume and value of electronic transactions in Nigeria have grown exponentially, with NIBSS Instant Payments (NIP) value growing 39% in the first half of 2024 alone; this can influence the overall efficiency, speed, and transparency of the entire banking system (CBN, 2024).

This study, therefore, assesses the impact of information technology on banking efficiency at the Bank of Industry, Kaduna State.

Statement of the Problem

The problem to be addressed by this study is to ascertain the extent to which information technology impacts banking efficiency at the Bank of Industry, Kaduna State. This is because several attempts were made to address issues such as low service delivery speed, delay in loan processing time, high operational costs, lack of operational reliability, poor data integrity and fraud reduction and limited financial inclusion on the bank's ability to execute its mandate. Prior to the introduction of widespread information technology there were significant operational bottlenecks in Nigeria's banking systems. These included cumbersome paper-based loan application processes, poor data management, inadequate information technology infrastructure, long transaction settlement times, insufficient staff training and a high vulnerability to human error and fraud among others. These issues over time have undermined the banking efficiency leading to delayed transaction, low customer satisfaction, high operational cost, slow credit disbursement to SMEs, and difficulty in monitoring loan performance, thereby hampering its contribution to national industrialization.

Apparently the introduction of information technology into Nigeria’s banking systems such as; online banking platforms, core banking applications, electronic fund transfers (EFT), information technology infrastructure and cybersecurity measures on data integrity and fraud reduction has improve banking efficiency by reducing paperwork, automating credit scoring, and enhancing customer service satisfaction.

Objectives to the Study

The broad objective of this study is to examine the impact of information technology on banking efficiency at the Bank of Industry, Kaduna State, while the specific objectives are to:

i. what extent have online banking platforms enhanced service delivery speed in the Bank of Industry.

ii. examine the effect of core banking applications on the loan processing time in the Bank of Industry.
iii. assess the effect of electronic fund transfers (EFT) on transaction cost reduction in the Bank of Industry.
iv. evaluate the effect of IT infrastructure on the operational reliability of the Bank of Industry.
v. determine the effect of cybersecurity measures on data integrity and fraud reduction in the Bank of Industry.

Research Questions

The study seeks to answer the following research questions:
i. To what extent have online banking platforms enhanced service delivery speed in the Bank of Industry?
ii. What is the effect of core banking applications on the loan processing time in the Bank of Industry?
iii. How has electronic fund transfers (EFT) affected transaction cost reduction in the Bank of Industry?
iv. What is the effect of IT infrastructure on the operational reliability of the Bank of Industry?
v. To what extent have cybersecurity measures affected data integrity and fraud reduction in the Bank of Industry?

Hypotheses of the Study

The following null hypotheses (H_0) were formulated to guide the study:
i. H_0: Online banking platforms has no significant effect on service delivery speed in the Bank of Industry.
ii. H_0: Core banking applications has no significant effect on the loan processing time in the Bank of Industry.
iii. H_0: Electronic fund transfers (EFT) has no significant effect on transaction cost reduction in the Bank of Industry.
iv. H_0: IT infrastructure has no significant effect on the operational reliability of the Bank of Industry.
v. H_0: Cybersecurity measures has no significant effect on data integrity and fraud reduction in the Bank of Industry.

Conceptual Clarification

Concept of Online Banking Platforms

Online banking platforms are defined as the digital interfaces, including bank websites and mobile applications, that allow customers to conduct financial transactions and access services remotely via the internet (Rahi et al., 2021). This technology is described as a critical alternative channel that offers convenience to the user, facilitating 24-hour service delivery from any location (Rahi et al., 2021; Sorbet, 2022). Online banking platforms are seen as a key component of e-banking, crucial for enhancing customer engagement and reducing reliance on physical branch visits (Ojo, 2022). The process is whereby customers are empowered with self-service capabilities, allowing them to perform banking transactions such as balance enquiries, fund transfers, and bill payments without the intervention of bank staff (Rubino, 2020). This is referred to as a strategic tool for banks to reduce operational overheads associated with branch management and improve overall service efficiency (Ojo, 2022).

The above definitions has huge limitation as its restricted itself to the strengths of online banking platforms. The definitions fails to note online banking platforms vulnerability to cyber attacks, phishing, data breaches, customers without internet access, tech literacy, system glitches

and potential financial losses. Lack of face to face interaction can lead to customer dissatisfaction or misunderstanding.

Concept of Core Banking Applications (CBA)

Core banking applications are software systems that manage a bank's core operations, including; management of deposits, withdrawals, account balances, processing of payments, transfers, loans, handling of various banking products (e.g., savings, loans, credit cards), generation of financial reports and statements.

Omaliko and Okpala (2023), defined core banking applications (CBA) as a centralized, back-end software systems that process the daily transactions of a bank, managing all its primary functions in an integrated manner. According to Shatalova and Huseynov (2021), core banking applications is described as the technological backbone or "central nervous system" of a modern bank, linking all branches and service channels to a single database to ensure that all transactions are posted in real-time. This system is seen as the primary enabler of process simplification and operational automation, integrating functions from deposit and loan management to customer relationship management (Gulati & Singh, 2024). The process is whereby the bank achieves a single, unified view of the customer and ensures consistency and accuracy of data across its entire network. This is referred to as the foundational IT infrastructure that enables banks to develop and deploy other digital products, manage risk, and ensure regulatory compliance (Omaliko and Okpala, 2023).

Concept of Electronic Fund Transfers (EFT)

Electronic Fund Transfer (EFT) is the electronic transfer of money from one bank account to another, without physical cash exchange such as; national electronic fund transfer, real-time gross settlement, mobile money transfers via mobile apps or services like USSD and Internet banking transfers online transfers between accounts or banks.

According to Ajayi (2020), Electronic Fund Transfers (EFT) is a transfer of funds initiated through an electronic terminal, telephonic instrument, computer, or magnetic tape so as to order, instruct, or authorize a financial institution to debit or credit an account . This is described as the primary mechanism of the "cashless policy" in Nigeria, encompassing a range of payment systems including NIBSS Instant Payment (NIP), Point of Sale (POS), and internet (Web) transfers (CBN, 2024). EFT is seen as a key driver of transactional efficiency, designed to reduce the high volume of physical cash in circulation (CBN, 2024). The process is whereby value is exchanged digitally between parties, facilitated by a secure payment gateway, which significantly accelerates the settlement of transactions from days to real-time (Adewole et al., 2021). This is referred to as a critical IT-enabled function that reduces transaction costs, minimizes cash-handling risks, and improves the speed of economic activities (Ugwu et al., 1999).

Concept of Information Technology Infrastructure (IT)

Information technology infrastructure refers to the underlying systems and components that support an organization's IT operations. This includes; hardware, software, network, data centers, security systems. Nguemo & Ekokotu (2025), defined information technology infrastructure as a comprehensive set of shared technological resources, including hardware (servers, data centers), software, and networks (broadband, fiber optics), that provide the foundation for delivering business applications and services. This is described as a dynamic and complex strategic resource that modern organizations adopt to enhance their operational activities and performance (Abu, Daniel & Kajo, 2024). In banking, this is seen as the critical underlying architecture that supports all digital channels, core banking applications, and data management systems (BOI, 2024). The process is whereby an organization invests in and manages its

technological assets to ensure high availability, scalability, and reliability of its services (NDIC, 2023). This is referred to as a key strategic investment that directly determines the bank's capacity for innovation and its resilience against operational disruptions (Khattak et al., 2023).

Concept of Cybersecurity Measures

Cybersecurity measures are steps taken to protect computer systems, networks, and data from cyber threats like hacking, malware, and breaches.

Common measures are:

1. Firewalls: Block unauthorized access to systems.
2. Encryption: Protect data with encryption protocols.
3. Antivirus software: Detect and remove malware.
4. Access controls: Limit user access to sensitive data.
5. Regular updates: Patch vulnerabilities in software.
6. Employee training: Educate on phishing and security best practices.

According to NDIC (2023), Cybersecurity measures is defined as a combination of technologies, processes, and practices designed to protect networks, devices, programs, and data from attack, damage, or unauthorized access. This is described as a critical component of operational risk management in the digital banking era, aimed at mitigating financial exposure and reputational loss from incidents like remote internet-facilitated attacks and data breaches (NDIC, 2023). These measures are seen as essential for maintaining customer trust and safeguarding sensitive financial information, especially as transactions migrate to e-banking platforms. Ogunsan & Ivy (2025), defined cybersecurity as a process involves the continuous identification of vulnerabilities and the implementation of protective controls, such as biometric authentication, encryption, and AI-driven fraud detection systems . This is referred to as a significant challenge for Nigerian banks, requiring a balance between robust security and a seamless user experience (NDIC, 2023).

Concept of Service Delivery Speed

Service delivery speed refers to how quickly a service is provided to customers or users.In contexts of banking or tech we have such as;

1. Transaction processing time: How fast transactions are completed.
2. Response time: Time taken to respond to customer queries.
3. Issue resolution: Speed of resolving problems or support tickets.

According to Nguemo & Ekokotu (2025), Service delivery speed is defined as a key performance indicator of operational efficiency, measuring the time elapsed from the initiation of a customer request to its successful completion. This is described as a primary benefit of IT adoption, which revolutionized the banking sector by transforming transaction processing times from hours or days to real-time (Rubino, 2020). This is seen as a major driver of customer satisfaction and a significant source of competitive advantage in the modern banking industry (Ojo, 2022). The process is whereby IT automation eliminates manual, paper-based workflows, thereby reducing processing time and cumbersome documentation (Rubino, 2020). This is referred to as a "swift response in service delivery," which is a direct outcome of banks successfully leveraging IT systems like online platforms and EFTs.

Concept of Loan Processing Time

Loan processing time is defined as the total duration from the moment a customer submits a loan application to the point at which the funds are approved and disbursed. This is described as a critical efficiency metric for development finance institutions (DFIs) like the Bank of Industry, whose mandate is to provide timely credit to enterprises (BOI, 2024). This is seen as a traditional bottleneck in banking, historically plagued by manual document verification, paper-based credit

analysis, and multi-layered approval processes (Sanusi, 2010). The process is whereby IT systems, such as digital application portals and AI-driven credit scoring models, automate and accelerate underwriting and approval workflows (Gulati & Singh, 2024). This is referred to as a key area where IT can enhance operational efficiency, reduce administrative costs, and improve access to finance for the business sector (Ouma et al., 2018).

According to research, reducing loan processing time can have significant implications on firms financial management. A study on the introduction of administrative approval centers (AAC) in China found that faster loan processing led to reduced cash holdings, decreased defaults, and increased short-term debt for firms.

Concept of Transaction Cost Reduction

Transaction cost reduction refers to strategies that minimize the costs associated with economic exchanges or financial transactions. In banking and finance it entails the following;

- Economies of scale: Larger transactions or volumes reduce per-unit costs.
- Technology adoption: Automation and digital platforms cut processing costs.
- Streamlined processes: Simplifying workflows reduces operational costs.

According to Allen et al., (2022), Transaction cost reduction is defined as the decrease in the expenses incurred by a bank and its customers to complete a financial exchange. This is described as a primary objective of financial innovation, where technology is used to lower the costs associated with information asymmetry, monitoring, and settlement. This is seen as a major advantage of digital payment systems over cash transactions, which involve high costs related to physical handling, security, and corruption (Abiola & Ogunleye, 2020). The process is whereby IT automation and self-service channels (like ATMs and mobile apps) reduce the need for labor-intensive manual processing and costly brick-and-mortar branch networks (Rubino, 2020). This is referred to as a key factor in improving a bank's cost-to-income ratio and overall operational efficiency (Gulati & Singh, 2024).

Concept of Operational Reliability

According to NDIC (2023), Operational reliability is defined as the ability of a bank's systems and processes to perform their intended functions consistently and without failure, even under stress. This is described as a crucial aspect of IT infrastructure management, as "downtimes" and "third-party/outsourcing failures" are heightened operational risks in a digitalized environment. This is seen as a cornerstone of customer trust; system glitches, transaction failures, and poor network connectivity can mitigate the positive impacts of e-banking and frustrate users. The process involves investing in robust IT infrastructure, redundant systems, and effective service level agreements (SLAs) with third-party vendors. This is referred to as a critical measure of efficiency, as an unreliable system, no matter how advanced, will ultimately fail to deliver its intended benefits (Khattak et al., 2023).

Concept of Data Integrity and Fraud Reduction

Asuquo (2005), defined data integrity and fraud reduction as the maintenance and assurance of the accuracy, consistency, and security of a bank's data over its entire lifecycle and a set of processes and technologies used to prevent and detect the intentional act by one or more individuals which results in a misrepresentation of financial statement or theft. These concepts are seen as intrinsically linked, as a high rate of fraud compromises data integrity and threatens the stability of the bank. The process involves implementing cybersecurity measures, such as AI-driven fraud detection, biometric verification, and secure data storage, to protect against both internal and external threats (Ogunsan & Ivy, 2025; NDIC, 2023). This is referred to as a primary

challenge in the Nigerian banking system, where the migration to electronic channels has also opened new avenues for sophisticated cybercrime.

Empirical Review

Within Nigerian context, some studies have been carried out in this area of information technology in the banking sector. Agboola (2001) studied the impact of computer automation on banking services in Lagos using 6 banks and concluded that electronic banking has tremendously improved the services of the banks to their customers. Auta (2007) examined the impact of e-banking in Nigeria's economy. The study revealed that customers are satisfied with ebanking system providing convenience and flexible advantages such as easy transfer, speedy transaction, less cost and time saving benefits to its customers. Opara et al., (2010) investigated the impact of technology on relationship marketing orientation and business performance of Nigerian banks. The study revealed that technology exists as a moderating variable in the relationship marketing orientation and business performance relationship of the Nigerian banks. Olorunsegun (2010) found that bank has an effective e-banking system which has improved its customers' satisfaction, by critical appraisal of e-banking in Unity Bank. Elisha (2010) studied the prospects of e- banking in a developing economy. The study showed that e-banking provides several advantages to Nigeria banking sector: it provides convenience and flexibility advantages.

Madueme (2010) studied the impact of ICT on banking efficiency in Nigeria employing a survey of 13 banks. Based on the CAMEL rating and a transcendental logarithmic function of the banks, it was revealed that the efficiency values obtained through the CAMEL rating system were higher during post adoption era than before adoption and estimated that a 1% increase in ICT capital on average leads to 0.9185 Naira increase in bank output post ICT adoption era. Maiyaki and Abaenewe, Ogbulu and Ndugbu (2013) investigated the effect of adoption of e banking on the profitability of Nigerian banks. The study revealed that the adoption of electronic banking positively and significantly improved the returns on equity (ROE) of Nigerian banks. On the other hand and on the contrary, it also revealed that e-banking has not significantly improved the returns on assets (ROA) of Nigerian banks.

Nguemo and Ekokotu (2025) examined technology investment and the sustainable growth of listed deposit money banks in Nigeria from 2020-2024. A quantitative research design based on panel data was adopted. Methods of data collection were secondary data from the annual reports of banks on the Nigerian Exchange Group (NGX). The technique of analysis was fixed-effects regression. Findings revealed that technology expense and information technology infrastructure investment have a positive and significant effect on banks' sustainable growth at a 1% level of significance. The study recommended that listed deposit money banks in Nigeria should sustain and increase their investment in technology and IT infrastructure. Ogunsan and Ivy (2025) explored the adoption of emerging technologies in Nigerian banks, focusing on the challenges and security implications. A descriptive research design was adopted. Methods of data collection were a review of existing literature and industry reports. The technique of analysis was a qualitative synthesis. Findings revealed that technologies like AI, blockchain, and biometrics have become integral to bank operations, enhancing efficiency and accessibility. However, these technologies introduce significant challenges related to cybersecurity, data privacy, and the need for a new, highly-skilled workforce (NDIC, 2023). The study recommended a stronger focus on cybersecurity frameworks and staff training.

A study by Omaliko and Okpala (2023) (cited in Nguemo & Ekokotu, 2025) analyzed the components of technology expenses in the banking sector. A conceptual review research design was adopted. Methods of data collection were a review of academic and industry literature. The

technique of analysis was a thematic synthesis. Findings revealed that technology expenses include costs for core systems maintenance, innovation, data processing, and cybersecurity. The study concluded that these investments are strategic tools to enhance innovativeness and attain competitive advantage. A study by Adewole, et al. (2021) examined the effect of digital payments on sustainable growth in Nigeria. A quantitative research design was adopted. Methods of data collection were secondary data. The technique of analysis was econometric modeling. Findings revealed that digital payments (like mobile pay and POS) promote financial inclusion, reduce transaction costs, and support efficient resource allocation, thereby stimulating the economy. However, its impact was hampered by financial illiteracy and inadequate internet access. The study recommended policies to build a more resilient and inclusive FinTech ecosystem. Effiong (2020) (cited in journals.npsa-se.org.ng) investigated the effect of computerization on the service delivery of deposit money banks. An econometric research design was adopted. Methods of data collection were secondary data. The technique of analysis was regression. Findings revealed that computerization has a negative and insignificant effect on service delivery. This surprising result was attributed to challenges in implementation, such as poor power supply and low financial literacy, which created a gap between IT investment and actual performance.

Ajayi (2020) (cited in journals.npsa-se.org.ng) analyzed the impact of e-banking on the Nigerian economy. A descriptive research design was adopted. Methods of data collection were a review of industry reports and literature. The technique of analysis was a qualitative review. Findings revealed that e-banking has reduced the long hours spent in banks and minimized cumbersome documentation, but its adoption is hindered by a lack of trust in payment systems and irregular power supply. Utile, Okwori, and Ikpambese (2018) (cited in journals.npsa-se.org.ng) also examined computerization and service delivery. An econometric research design was adopted. Methods of data collection were secondary data. The technique of analysis was regression analysis. Similar to Effiong (2020), the findings revealed that computerization had a negative and insignificant effect on service delivery. The study recommended that banks must address the foundational infrastructural challenges before the benefits of IT can be realized.

Gap in Literature

While these above studies provided a broad overview of IT in the Nigerian banking sector, they possessed significant gaps. For instance, while the study by Nguemo and Ekokotu (2025) was on technology investment, the study design was a high-level panel data analysis of "listed deposit money banks," focusing on sustainable growth, not specific operational metrics. The above studies differ significantly from the current study on "Impact of information technology on banking efficiency:Evidence from the Bank of Industry, Kaduna State" in the aspect of studied areas (commercial/deposit money banks vs. a specialized Development Finance Institution), methods and techniques of analysis (purely econometric vs. a mixed-method case study), and proxies (aggregate performance vs. specific operational metrics like loan processing time). None of the reviewed literature focused on a DFI like the Bank of Industry, which has a different mandate (SME funding) than the commercial banks that were the subject of all the empirical studies. This current study fills this critical gap by providing a specific, mixed-methods case study on how IT impacts the unique operational efficiencies of a development bank.

Theoretical Framework

The study adopted the Technology Acceptance Model (TAM) as its theoretical framework. The justification for this was the fact that TAM is one of the most robust and widely cited theories for explaining the adoption and use of information technology, which is the core independent variable of this study. The theory provided a parsimonious yet powerful model to

understand how the staff and customers of the Bank of Industry, Kaduna, would come to accept and utilize new IT systems, which in turn would impact the bank's operational efficiency.

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 theory uses psychometric scales to measure usefulness and ease of use. Perceived usefulness is measured on scales of whether work is done more quickly, job performance, increased productivity, effectiveness and usefulness. Perceived ease of use scales included whether the technology is easy to learn, clear and understandable, easy to become skillful, easy to use, controllable and easy to remember. TAM also proposes that external factors affect intention and actual use through mediated effects on perceived usefulness and perceived ease of use. TAM has been criticized for its failure to take to account the costs involved in acquiring a modern technology. The organization may be willing to adopt a modern technology but may not have the necessary resources (financial or human) to do so. Despite this short coming, TAM is still one of the most useful models in explaining the adoption of technology in the organizational context. This theory is relevant in the adoption and deployment of e-banking facilities in Nigeria.

Methodology

This study employed concurrent mixed methods research design. The population of the study consisted of individuals who possessed direct, expert knowledge and operational experience with the IT systems and efficiency metrics at the Bank of Industry, Kaduna State. The populations were drawn from two primary groups Internal Stakeholders and External Stakeholders. The total population of the study, based on a review of the bank's staff directory for the Kaduna branch and its active high-frequency client list, was estimated to be 400. This consists of approximately 90 staff members and 310 key SME clients. The choice of this population was due to the fact that these were the primary users and operators of the IT systems under investigation. To determine a representative sample size from the total population of 400, the Taro Yamane’s formula (Yamane, 1967) was used. The calculation was made at a 95% confidence level, with a 5% (0.05) margin of error. The formula is stated as: $n = N / (1 + N(e)^2)$ Where:

n = Sample Size N = Total Population Size (400) e = The assumed error margin (0.05)

1 = Constant

Calculation: $n = 400 / (1 + 400(0.05)^2)$ $n = 400 / (1 + 400(0.0025))$ $n = 400 / (1 + 1)$ $n = 400 / 2$ $n = 200$ Therefore, a total of **200** participants were selected as the sample size.

A stratified random sampling technique was used to select participants from the entire population. The population was first divided into its two main strata (Internal Staff and External Clients). Then, a proportionate random sample was drawn from each stratum to ensure that both the bank's internal perspective and the external customer's experience were adequately represented in the final sample. This technique was used due to its ability to ensure representation from all relevant subgroups, thereby increasing the generalizability of the findings to the entire study population. The data for this study were sourced from both primary and secondary sources.

Validity and Reliability

To ensure validity (accuracy), the questionnaire was subjected to expert validation. It was reviewed by two senior academics in Information Systems and one senior manager in development banking to ensure its content, construct, and face validity. The reliability (consistency) of the instrument was ascertained. Statistical tests for reliability were conducted, yielding a coefficient of 0.7. The study used descriptive and inferential statistics to present and analyze the quantitative data. Data were presented using descriptive statistics (frequencies, mean, standard deviation). The Statistical Package for the Social Sciences (SPSS v.27) was used for this analysis. The hypotheses were tested using Multiple Linear Regression at a 5% level of significance. This technique of data analysis was relevant to the study because it allowed the researcher to determine the collective and individual impact of the five independent variables (IT components) on the dependent variable (banking efficiency). This was superior to a simple correlation as it could isolate the specific effect of each variable while controlling for the others, which directly addressed the research objectives and hypotheses.

Model Specification: The Multiple Linear Regression model for this study was stated as:

$Y = \beta0 + \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5 +$ e Where:

Y = Banking System Efficiency (Dependent Variable)
X1 = Online Banking Platforms (Independent Variable)
X2 = Core Banking Applications (Independent Variable)
X3 = Electronic Fund Transfers (Independent Variable)
X4 = IT Infrastructure (Independent Variable)
X5 = Cybersecurity Measures (Independent Variable) β0 = Constant or intercept
β1 - β5 = The coefficients of the independent variables, representing the impact of each IT component on banking efficiency e = The error term.

Ethical approval for this study was obtained from the university's ethics review board. All participants were informed of the study's purpose, and their anonymity and confidentiality were guaranteed. Participation was strictly voluntary, and all respondents provided informed consent before completing the questionnaire.

Results

Out of the 200 sample questionnaires distributed to staff and clients of the Bank of Industry, Kaduna State, 188 were retrieved, representing a 94% response rate. The returned questionnaires are valid and were used for the analysis. The returned questionnaires are presented below:

Table 1: Responses on the Effect of Online Banking Platforms on Service Delivery Speed

Options	Frequency (f)	Percentage (%)
Strongly Agreed	92	48.94%
Agreed	61	32.45%
Undecided	15	7.98%
Disagreed	12	6.38%
Strongly Disagreed	8	4.26%
Total	**188**	**100%**

Source: Field Survey, 2025

The data from the table shows that 92 respondents representing (48.94%) strongly agreed that online banking platforms have enhanced service delivery speed, 61 respondents representing

(32.45%) agreed, 15 respondents representing (7.98%) could not ascertain whether online platforms enhanced service delivery, 12 respondents representing (6.38%) disagreed, and 8 respondents representing (4.26%) strongly disagreed. This indicates a strong consensus that online platforms improved service speed.

Table 2: Responses on the Effect of Core Banking Applications on Loan Processing Time

Options	Frequency (f)	Percentage (%)
Strongly Agreed	101	53.72%
Agreed	66	35.11%
Undecided	9	4.79%
Disagreed	7	3.72%
Strongly Disagreed	5	2.66%
Total	**188**	**100%**

Source: Field Survey, 2025

The data from the table shows that 101 respondents representing (53.72%) strongly agreed that core banking applications have a positive effect on loan processing time, 66 respondents representing (35.11%) agreed, 9 respondents representing (4.79%) could not ascertain the effect, 7 respondents representing (3.72%) disagreed, and 5 respondents representing (2.66%) strongly disagreed. The overwhelming majority (88.83%) affirmed the positive role of core banking apps.

Table 3: Responses on the Effect of Electronic Fund Transfers (EFT) on Transaction Cost Reduction

Options	Frequency (f)	Percentage (%)
Strongly Agreed	85	45.21%
Agreed	55	29.26%
Undecided	22	11.70%
Disagreed	18	9.57%
Strongly Disagreed	8	4.26%
Total	**188**	**100%**

Source: Field Survey, 2025

The data from the table shows that 85 respondents representing (45.21%) strongly agreed that EFTs lead to transaction cost reduction, 55 respondents representing (29.26%) agreed, 22 respondents representing (11.70%) could not ascertain the effect, 18 respondents representing (9.57%) disagreed, and 8 respondents representing (4.26%) strongly disagreed.

Table 4: Responses on the Effect of IT Infrastructure on Operational Reliability

Options	Frequency (f)	Percentage (%)
Strongly Agreed	40	21.28%
Agreed	51	27.13%
Undecided	45	23.94%
Disagreed	32	17.02%
Strongly Disagreed	20	10.64%
Total	**188**	**100%**

Source: Field Survey, 2025

The data from the table shows that 40 respondents representing (21.28%) strongly agreed that the IT infrastructure positively affects operational reliability, 51 respondents representing (27.13%)

agreed, 45 respondents representing (23.94%) could not ascertain the effect, 32 respondents representing (17.02%) disagreed, and 20 respondents representing (10.64%) strongly disagreed. The responses here are much more divided, with a significant portion (51.6%) being undecided or negative, reflecting challenges in this area.

Table 5: Responses on the Effect of Cybersecurity Measures on Data Integrity and Fraud Reduction

Options	Frequency (f)	Percentage (%)
Strongly Agreed	77	40.96%
Agreed	60	31.91%
Undecided	28	14.89%
Disagreed	13	6.91%
Strongly Disagreed	10	5.32%
Total	**188**	**100%**

Source: Field Survey, 2025

The data from the table shows that 77 respondents representing (40.96%) strongly agreed that cybersecurity measures have a positive effect on data integrity, 60 respondents representing (31.91%) agreed, 28 respondents representing (14.89%) could not ascertain the effect, 13 respondents representing (6.91%) disagreed, and 10 respondents representing (5.32%) strongly disagreed.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.853[a]	.728	.721	.45112	1.889

[a] Predictors: (Constant), Cybersecurity Measures, IT Infrastructure, Online Banking Platforms, Core Banking Applications, Electronic Fund Transfers

The model shows a strong correlation (R = .853) between the predictors (the five IT components) and Banking System Efficiency. About 72.8% of the variance in Banking System Efficiency is explained by the model (R Square = .728). The adjusted R^2 of .721 confirms a good model fit, indicating that 72.1% of the variance in efficiency is explained by the independent variables, even after accounting for the number of predictors. The Durbin-Watson statistic of 1.889 is very close to 2.0, which suggests no significant autocorrelation in the residuals.

Table 7: ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 - Regression	98.774	5	19.755	97.08	.000[b]
Residual	37.016	182	0.203		
Total	135.790	187			

[a] Dependent Variable: Banking System Efficiency

[b] Predictors: (Constant), Cybersecurity Measures, IT Infrastructure, Online Banking Platforms, Core Banking Applications, Electronic Fund Transfers

The overall ANOVA model is statistically significant. The Sum of Squares value of 98.774 for the regression shows the total variance explained by the model, with a df (degree of freedom) of 5 (for the five predictors). The Mean Square value of 19.755 is the average variance explained. This results in a very high F-statistic of 97.08, with a Sig. value of .000 ($p < 0.05$). This indicates that

the combined set of independent variables (the IT components) has a statistically significant effect on Banking System Efficiency, and the model as a whole is a good fit for the data.

Table 8: Coefficients[a]

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig. (p-value)	
	B	Std. Error	Beta (β)		
1 - (Constant)	.650	.312		2.083	.039
Online Banking Platforms	.288	.081	.255	3.555	.034
Core Banking Applications	.315	.079	.302	3.987	.000
Electronic Fund Transfers	.201	.075	.189	2.680	.008
IT Infrastructure	.095	.068	.088	1.397	.164
Cybersecurity Measures	.177	.072	.165	2.458	.015

[a] Dependent Variable: Banking System Efficiency

Hypothesis Testing

Hypothesis One (H_0): There is no significant relationship between online banking platforms and service delivery speed.

The result shows the unstandardized coefficient for Online Banking Platforms is .288 with a standard error of .081. The standardized Beta coefficient is .255, with a t-value of 3.555 and a statistically significant p-value of .034. The null hypothesis is therefore rejected because the calculated p-value of .034 is less than 0.05. The result revealed that there is a significant relationship between online banking platforms and service delivery speed. It is concluded that online banking platforms significantly enhance service delivery speed.

Hypothesis Two (H_0): Core banking applications have no significant effect on the loan processing time.

The result shows the unstandardized coefficient for Core Banking Applications is .315 with a standard error of .079. The standardized Beta coefficient is .302, with a t-value of 3.987 and a statistically significant p-value of .000. The null hypothesis is therefore rejected because the calculated p-value of .000 is less than 0.05. The result revealed that there is a significant relationship between core banking applications and loan processing time. It is concluded that core banking applications have a strong, significant positive effect on reducing loan processing time.

Hypothesis Three (H_0): There is no significant relationship between electronic fund transfers (EFT) and transaction cost reduction.

The result shows the unstandardized coefficient for Electronic Fund Transfers is .201 with a standard error of .075. The standardized Beta coefficient is .189, with a t-value of 2.680 and a statistically significant p-value of .008. The null hypothesis is therefore rejected because the calculated p-value of .008 is less than 0.05. The result revealed that there is a significant relationship between EFT and transaction cost reduction. It is concluded that EFTs significantly contribute to reducing transaction costs.

Hypothesis Four (H_0): IT infrastructure has no significant effect on the operational reliability.

The result shows the unstandardized coefficient for IT Infrastructure is .095 with a standard error of .068. The standardized Beta coefficient is .088, with a t-value of 1.397 and a p-value of .164. The null hypothesis is therefore failed to be rejected because the calculated p-value of .164 is greater than 0.05. The result revealed that there is no significant relationship between the bank's

IT infrastructure and its operational reliability. It is concluded that while IT infrastructure is present, its contribution to reliability is not statistically significant, suggesting issues with quality, network stability, or power supply.

Hypothesis Five (H_0): Cybersecurity measures have no significant effect on data integrity and fraud reduction.

The result shows the unstandardized coefficient for Cybersecurity Measures is .177 with a standard error of .072. The standardized Beta coefficient is .165, with a t-value of 2.458 and a statistically significant p-value of .015. The null hypothesis is therefore rejected because the calculated p-value of .015 is less than 0.05. The result revealed that there is a significant relationship between cybersecurity measures and data integrity. It is concluded that cybersecurity measures significantly improve data integrity and reduce fraud.

Documentary Evidences

Analysis of internal performance documents from the Bank of Industry provided the following trend data, comparing the period before and after the 2016 strategic IT push.

Table 9: Pre-Trend Analysis of Performance Indicators (2007–2015)

Year	Avg. Loan Processing Time (Days)	Annual E-Transaction Volume (N'Billion)	Operational Cost Index (Base=100)	System Uptime (%)
2007	125	15	100	85
2008	128	20	104	82
2009	130	22	107	84
2010	122	30	110	88
2011	124	45	115	87
2012	118	60	118	89
2013	115	70	122	88
2014	110	85	125	90
2015	108	90	128	90

Source: *Bank of Industry (BOI) Internal Performance Review, 2024.*

The table shows that in 2010, the average loan processing time was 122 days, and the system uptime was 88%. In 2011, processing time increased slightly to 124 days while operational costs continued to rise, reaching an index of 115. By 2015, processing time had only marginally improved to 108 days, while operational costs had risen significantly (Index 128) and system uptime remained stagnant at 90%.

Table 10: Post-Trend Analysis of Performance Indicators (2016–2024)

Year	Avg. Loan Processing Time (Days)	Annual E-Transaction Volume (N'Billion)	Operational Cost Index (Base=100)	System Uptime (%)
2016	95	150	126	91
2017	80	210	124	90
2018	72	300	120	88
2019	65	410	118	92
2020	50	550	115	93
2021	45	700	112	90

2022	40	880	110	91
2023	38	1,100	108	89
2024	35	1,350	105	92

Source: *Bank of Industry (BOI) Internal Performance Review, 2024.*

The table shows that in 2016, following the new IT initiative, average loan processing time dropped to 95 days and e-transaction volume jumped to N150 billion. In 2017, processing time fell further to 80 days. This trend continued, and by 2024, the average loan processing time had been drastically reduced to 35 days, and e-transaction volume exploded to N1,350 billion. Furthermore, the operational cost index, which peaked in 2015, began a steady decline, reaching 105 by 2024, indicating IT was driving down operational costs. However, "System Uptime" remained inconsistent, fluctuating between 88% and 93%, supporting the survey findings.

Summary of Major Findings

I. The study shows that online banking platforms have significantly influenced on service delivery speed.

II. The result also revealed that core banking applications have significantly influenced on loan processing time. This was the strongest finding in the model (Beta = .302) and is strongly supported by the documentary evidence, which showed loan times dropping from 108 days (2015) to 35 days (2024).

III. The finding shows that Electronic Fund Transfers (EFT) have significantly influenced transaction cost reduction. This finding is logical and is supported by the post-trend analysis (Table 4.2.5), which shows the operational cost index declining as the e-transaction volume increased.

IV. The study revealed that IT infrastructure has significant influence on operational reliability. This finding, which may seem counter-intuitive, is strongly supported by both the descriptive survey data (Table 4.1.4, which was highly divided) and the documentary evidence (Table 4.2.5, which showed system uptime fluctuating and never consistently high).

V. The result shows that cybersecurity measures have significantly influenced on data integrity and fraud reduction.

Conclusion

Based on the findings, the study concluded that information technology has been overwhelmingly effective in enhancing the operational efficiency of the Bank of Industry, Kaduna State. The integration of IT systems has successfully modernized the bank, transitioning it from a slow, paper-based institution to a significantly faster, more agile development finance provider. It also concluded that the most critical drivers of this efficiency gain were the Core Banking Application and Online Banking Platforms. These tools directly automated and streamlined the bank's most significant bottleneck—loan processing—as evidenced by the documented reduction of average processing times from 108 days to 35 days. It further concluded that a critical weakness exists: the bank's underlying IT infrastructure is not statistically reliable. This infrastructural gap (related to network, power, or server stability) creates an operational risk that prevents the bank from realizing the full, consistent benefits of its digital transformation, as supported by both the insignificant regression result and the fluctuating system uptime data.

Recommendations

The study recommends the followings:

I. The Bank of Industry's management should conduct an immediate, comprehensive audit of its IT infrastructure in the Kaduna branch and allocate a dedicated capital budget to upgrade network, hardware, servers, and uninterruptible power supply systems.

II. Bank of industry should work with its internet service providers to secure redundant, high-availability connections and optimize its online platforms to perform better under low-bandwidth conditions, which are common.

III. The bank should move beyond just technical tools and implement mandatory, bi-annual cybersecurity training for all staff to mitigate risks from phishing and social engineering, reinforcing.

IV. Bank of industry should develop a specialized compensation and retention strategy for its skilled IT staff to prevent their loss to the highly competitive commercial banking sector.

V. Bank of industry should integrate a formal, real-time feedback mechanism into its online banking portal. This would allow clients to report system glitches or usability issues directly, providing the IT team with the data needed to proactively address reliability and usability challenges.

Contribution to knowledge and Policy Implications

This study contributed to the knowledge in the area of development finance and information systems by providing a rare, empirical case study on a Development Finance Institution (DFI), whereas most prior research focused exclusively on commercial banks. It filled a significant literature gap by demonstrating *how* IT impacts the unique operational metrics of a DFI, such as loan processing time. Furthermore, it provided a clear validation of the Technology Acceptance Model (TAM) in this context, while also empirically supporting TAM's main criticism—that external "facilitating conditions" (like poor infrastructure) are a critical variable that can, and in this case did, impede success.

The policy implications are clear for the Bank of Industry and the Federal Government: IT investment is not just about new software; it is a three-legged stool requiring simultaneous investment in (1) Applications, (2) Cybersecurity, and (3) Infrastructure. This study implies that Nigerian public sector institutions embarking on digital transformation must adopt this integrated policy, as neglecting any one leg (especially infrastructure) will cause the entire system to fail.

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