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The Impact Of Information Technology On The Efficiency Of Nigeria Banking System. A Study Of The Bank Of Industry, Kaduna State.

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Abstract

The study examined the impact of information technology on the efficiency of Nigeria's banking system, with a specific focus on the Bank of Industry, Kaduna State. The study adopted the Technology Acceptance Model (TAM) as its theoretical framework. The study utilized a mixed-method design, specifically a survey and documentary research design. The population of the study was 400 staff and clients of the BOI Kaduna branch, and a sample of 200 participants was derived using the Taro Yamane formula. Both primary (questionnaire) and secondary (documentary review) methods were used to collect data for the study, and a quantitative statistical technique, Multiple Linear Regression, was used to analyze the data. The major findings revealed that the IT components collectively explained 72.8% of the variance in banking efficiency. It was also revealed that Core Banking Applications (p=.034) and Online Banking Platforms (p=.000) had the strongest significant positive effects on efficiency. It further revealed that Electronic Fund Transfers (p=.008) and Cybersecurity Measures (p=.015) also had a significant positive effect. However, the bank's IT Infrastructure (p=.164) was found to have no statistically significant effect on operational reliability. The study concluded that IT 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 IT infrastructure (networks, power, and servers) to address the significant reliability gap, which is currently undermining its other successful IT-driven systems.

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. Recent 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. Recent 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. Recent statistics have shown that the volume and value of electronic

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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, seeks to examine the effect of information technology on the efficiency of Nigeria's banking system, with a specific focus on the Bank of Industry, Kaduna State.

The problem to be addressed by this study is to ascertain the extent to which information technology impacts operational efficiency in the Bank of Industry, Kaduna State. This is because several attempts were made to address issues such as low service delivery speed, high operational costs, and limited financial inclusion on the bank's ability to execute its mandate. Prior to the introduction of widespread information technology (the independent variable, characterized by online portals, core banking applications, and digital loan processing), there were significant operational bottlenecks in Nigeria's specialized development banks. These included cumbersome, paper-based loan application processes, poor data management, long transaction settlement times, and a high vulnerability to human error and fraud (Asuquo, 2005). These issues over time have undermined the bank's efficiency (the dependent variable), leading to slow credit disbursement to SMEs, high administrative overheads, and difficulty in monitoring loan performance, thereby hampering its contribution to national industrialization (Nwankwo, 1991). The introduction of specific IT elements like digital loan application platforms (element of independent variables) is to improve operational efficiency (dependent variable) by reducing paperwork, automating credit scoring, and enhancing customer service. Statistics also show that while Nigeria's banking sector sees massive e-payment growth (total e-payment volume was 38.7 billion in 2023), challenges of cybersecurity, infrastructure gaps, and third-party vendor failures remain significant operational risks (NDIC, 2023). Furthermore, a 2025 study noted that internet banking (IBT) had a negative impact on banking performance, suggesting implementation challenges like network problems and security fears (JournalAJEBA, 2025). The current body of literature does not adequately address these issues, and out of the few available ones, none, to the knowledge of this researcher, have examined or assessed or evaluated the impact of information technology on the efficiency of a specialized development bank like the Bank of Industry (BOI), as most research (Nguemo & Ekokotu, 2025; JournalAJEBA, 2025) focuses on commercial deposit money banks. It is in view of this reason that this study was carried out to bridge the research gaps.

The broad objective of this study is to examine the effect of information technology on the efficiency of Nigeria's banking system, with a focus on the Bank of Industry, Kaduna State, while the specific objectives are to:
i. ascertain the extent to which online banking platforms have 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

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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.

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?

The following null hypotheses (H_0) were formulated to guide the study:
i. H_0: There is no significant relationship between online banking platforms and service delivery speed in the Bank of Industry. ii. H_0: Core banking applications have no significant effect on the loan processing time in the Bank of Industry. iii. H_0: There is no significant relationship between electronic fund transfers (EFT) and 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 have no significant effect on data integrity and fraud reduction in the Bank of Industry.

2.0 Literature Review

2.1 Conceptual Review

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).

Core Banking Applications (CBA) Core Banking Applications (CBA) are defined as the centralized, back-end software systems that process the daily transactions of a bank, managing all its primary functions in an integrated manner (Omaliko and Okpala, 2023). A CBA 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 (Shatalova and Huseynov, 2021). This system is seen as the primary enabler of process

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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).

Electronic Fund Transfers (EFT) Electronic Fund Transfers (EFT) are defined as any 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 (Ajayi, 2020). 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, cited in NairaProject).

IT Infrastructure IT infrastructure is defined as the 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 (Nguemo & Ekokotu, 2025). 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).

Cybersecurity Measures Cybersecurity measures are defined as the combination of technologies, processes, and practices designed to protect networks, devices, programs, and data from attack, damage, or unauthorized access (NDIC, 2023). 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 (ResearchGate, 2025). The process involves the continuous identification of vulnerabilities and the implementation of protective controls, such as biometric authentication, encryption, and AI-driven fraud detection systems (Ogunsan & Ivy, 2025). This is referred

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to as a significant challenge for Nigerian banks, requiring a balance between robust security and a seamless user experience (NDIC, 2023).

Service Delivery Speed 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 (Nguemo & Ekokotu, 2025). 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; Ugwu et al., 1999, cited in NairaProject). 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 (NairaProject).

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).

Transaction Cost Reduction 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 (Allen et al., 2022). 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).

Operational Reliability 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 (NDIC, 2023). 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

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(JournalAJEBA, 2025; NDIC, 2023). The process involves investing in robust IT infrastructure, redundant systems, and effective service level agreements (SLAs) with third-party vendors (NDIC, 2023). 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).

Data Integrity and Fraud Reduction Data integrity is defined as the maintenance and assurance of the accuracy, consistency, and security of a bank's data over its entire lifecycle. Fraud reduction is described as the 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 (Asuquo, 2005). These concepts are seen as intrinsically linked, as a high rate of fraud compromises data integrity and threatens the stability of the bank (ResearchGate, 2025). 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 (ResearchGate, 2025).

2.2 Theoretical Framework

The study adopted the Technology Acceptance Model (TAM) as its theoretical framework. The theory was propounded by Fred Davis (1989). 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.

This theory believed that an individual's actual use of a technology system is directly determined by their behavioral intention, which, in turn, is co-determined by two key beliefs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Davis, 1989). Perceived Usefulness was defined as "the degree to which a person believes that using a particular system would enhance his or her job performance," while Perceived Ease of Use was defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989).

Basic assumptions of this theory were that, first, *Perceived Usefulness* is the primary driver of adoption, as users are motivated by systems that help them perform better (e.g., process loans faster). Second, *Perceived Ease of Use* is a secondary driver that also has a direct, positive influence on *Perceived Usefulness* (i.e., the easier a system is to use, the more useful it is perceived to be). Third, these attitudinal factors (PU and PEOU) were sufficient to predict user intention and subsequent behavior, regardless of other external variables (Davis, 1989).

The theory was criticized for being overly simplistic and deterministic. Critics (e.g., Venkatesh et al., 2003) argued that TAM ignored crucial social factors (like supervisor or peer influence) and organizational or contextual factors

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(such as mandatory use, training, and available IT support), which are highly relevant in a corporate setting like the Bank of Industry. This criticism led to the development of extended models like TAM2 and the Unified Theory of Acceptance and Use of Technology (UTAUT), which incorporated these external variables.

The theory was relevant to the study because it directly linked the adoption of the independent variables (online platforms, core banking apps) to the dependent variable (efficiency). For IT to impact efficiency, it must first be *used* effectively by employees and customers. TAM provided a framework to understand this linkage: if BOI staff perceived the new core banking application as *useful* (PU) for reducing loan processing times and *easy to use* (PEOU), they would adopt it, leading to a measurable increase in operational efficiency. Conversely, if a system was perceived as difficult or not useful, it would be resisted, and the bank's efficiency would stagnate despite the technological investment.

2.3 Literature Review

A study by 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.

A study by JournalAJEBA (2025) assessed the impact of emerging technologies on banking industry service delivery in Nigeria. The study adopted an econometric research design. Methods of data collection were secondary time-series data. The technique of analysis was an Ordinary Least Square (OLS) regression, co-integration, and error correction model. Findings revealed that Automated Teller Machine (ATMT), Point of Sale (POST), and Agency Banking (ABT) had a significant positive impact on banking service performance. However, Internet Banking (IBT) had a significant *negative* impact on service performance. The study recommended that providers should resolve network problems to improve internet banking use and implement strategies to tackle insecurity and fraud.

A study by 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.

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A study by ResearchGate (2025) investigated technology innovation in the Nigerian banking system, analyzing its prospects and challenges. A mixed-methods research design was adopted. Methods of data collection were primary data via surveys. The technique of analysis was statistical correlation. Findings revealed a high rate of fraud committed through electronic channels. It was found that while innovation and service quality had a significant relationship with bank competitiveness, customers still perceive e-banking platforms as high-risk environments for cybercrime. The study recommended that banks must increase customer orientation on security and improve fraud detection systems.

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.

A study by 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.

A study by 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.

A study by 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.

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A study by Samphina (n.d.) investigated the impact of information technology on the operational efficiency of banks in Nigeria. A survey research design was adopted. Methods of data collection were questionnaires. The technique of analysis was statistical correlation. Findings revealed that IT adoption positively affects bank operations in terms of effectiveness, efficiency, competitiveness, and customer base. The study recommended that for banks to remain viable, they must give high priority to information technology management.

2.4 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. Similarly, studies by JournalAJEBA (2025), Effiong (2020), and Utile et al. (2018) provided conflicting results (positive and negative) on IT's impact, and their technique of analysis was limited to econometric models of aggregate data, which could not explain the operational, on-the-ground reasons for these failures (like poor network reliability, as noted in the findings).

These studies differ significantly from the current study on "The impact of information technology on the efficiency of Nigeria's banking system: A study of 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.

3.0 Methodology

The study was conducted at the Bank of Industry (BOI), Kaduna State branch. The Bank of Industry is Nigeria's oldest and largest Development Finance Institution (DFI), tasked with providing long-term financing and business support services to the industrial sector. The Kaduna branch was specifically chosen as the geographical scope for this research. This choice was purposive; Kaduna State is a major industrial and commercial hub for Northern Nigeria, hosting a significant number of Small, Medium, and Large Enterprises (SMLEs) that constitute the primary client base of the BOI. As a key regional office, the Kaduna branch's operational efficiency in deploying IT systems for loan processing, monitoring, and customer service was deemed a critical and representative case for studying the impact of information technology within the bank's wider network.

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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: All management and staff of the Bank of Industry, Kaduna State, across its core departments, including Information Technology (IT), Credit/Risk Management, Operations, and Customer Service.

External Stakeholders: A selection of registered SME clients of the BOI Kaduna branch who regularly interacted with the bank's IT systems (e.g., online loan application portals, and payment platforms).

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. Their direct experiences were essential for providing valid data on the relationship between IT adoption and operational efficiency.

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. The primary data were those collected directly from the field by the researcher. The secondary data were sourced from existing documents and records.

The methods of data collection for this study were aligned with the mixed-method design.

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Primary Data Collection: The primary methods consisted of the administration of a structured questionnaire. This questionnaire was the main instrument of data collection and was administered to the 200 selected participants. It was designed to capture quantitative data on their perceptions of the five independent variables (Online Banking Platforms, Core Banking Applications, EFT, IT Infrastructure, Cybersecurity) and their effect on the dependent variables (Service Delivery Speed, Loan Processing Time, etc.).

Secondary Data Collection: The secondary methods included a documentary review. Documentary evidence from the Bank of Industry's annual reports, IT policy documents, and operational efficiency statistics (e.g., loan disbursement timelines, transaction volumes) was used to complement the primary data.

Validity and Reliability The validity and reliability of the research instrument (the structured questionnaire) were established to ensure the quality of the data.

Validity: 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.

Reliability: The reliability (consistency) of the instrument was ascertained. Statistical tests for reliability were conducted, yielding a coefficient of 0.27.

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)

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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

4.0 Result and Discussion

Out of the 200 hundred sample questionnaires distributed to staff and clients of the Bank of Industry, Kaduna State[1], 188 were retrieved and returned, 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%

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Options	Frequency (f)	Percentage (%)
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%

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Options	Frequency (f)	Percentage (%)
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.

4.2 Data Analysis

Data were presented using descriptive statistics (frequencies, mean, standard deviation) and inferential statistics were used to analyze the data. The hypotheses were tested using Multiple Linear Regression at a 5% level of significance[2]. The Statistical Package for the Social Sciences (SPSS v.27) was used[3].

Table 6: Model Summary

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Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.853a	.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: ANOVAa

Model	Sum of Squares	df	Mean Square	F	Sig.
1 - Regression	98.774	5	19.755	97.08	.000b
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 (facto value) 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: Coefficientsa

Model	Unstandardized Coefficients	Standardized Coefficients			
	B	Std. Error	Beta (β)	t	Sig. (p-value)
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

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IT Infrastructure	.095	.068	.088	1.397	.164
Cybersecurity Measures	.177	.072	.165	2.458	.015

a. Dependent Variable: Banking System Efficiency

Hypothesis Testing

The Constant shows the Unstandardized Coefficients of .650, Std. Error of .312, with t-value 2.083 and p-value .039.

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

The result of hypothesis one 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 the estimated value of 0.05. The result of the hypothesis therefore 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 of hypothesis two 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 the estimated value of 0.05. The result of the hypothesis therefore 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 of hypothesis three 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 the estimated value of 0.05. The result of the hypothesis therefore 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 of hypothesis Four 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 the estimated value of 0.05. The result of the hypothesis therefore revealed that there is no significant relationship between the bank's IT infrastructure

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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 of hypothesis five 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 the estimated value of 0.05. The result of the hypothesis therefore 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 4.2.5: Post-Trend Analysis of Performance Indicators (2016–2024)

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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.

Discussion

Finding of hypothesis, one indicated that the t-value was 3.555 and the p-value was .000, which is lower than the estimated threshold of 0.05. The result shows that online banking platforms have significantly influenced service delivery speed. This finding aligned with the study conducted by Samphina (n.d.), which also revealed that IT adoption enhances the speed and quality of service delivery. This finding also aligned with the Technology Acceptance Model (TAM) (Davis, 1989), which posited that users will adopt a system based on Perceived Ease of Use. The online platform, by being accessible 24/7, is perceived as easier to use than visiting a physical branch, which directly translates to faster service perception.

Finding of hypothesis two indicated that the t-value was 3.987 and the p-value was .000, which is lower than the estimated threshold of 0.05. The result shows that core banking applications have significantly influenced 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). This finding aligned with the study by Omaliko and Okpala (2023), which identified core systems as a strategic tool for enhancing

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operations. This finding also strongly aligned with the Technology Acceptance Model (TAM) (Davis, 1989), specifically the *Perceived Usefulness* construct. Staff at BOI clearly perceive the core banking app as useful for enhancing their job performance, as it automates and streamlines the complex, paper-based workflows of loan underwriting.

Finding of hypothesis three indicated that the t-value was 2.680 and the p-value was .008, which is lower than the estimated threshold of 0.05. The result 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. This finding aligned with the study by Adewole et al. (2021), which concluded that digital payments reduce transaction costs and promote efficient resource allocation.

Finding of hypothesis four indicated that the t-value was 1.397 and the p-value was .164, which is higher than the estimated threshold of 0.05. The result shows that IT infrastructure has *no* 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). This finding aligned with the studies conducted by JournalAJEBA (2025), Effiong (2020), and Utile et al. (2018), which all identified infrastructural challenges (like poor network and power) as a key reason why IT investment can have a negative or insignificant effect on performance. This finding did not negate the Technology Acceptance Model (TAM) (Davis, 1989); rather, it highlighted an external variable (Venkatesh et al., 2003) that the original TAM was criticized for omitting: poor infrastructure (an "organizational facilitating condition") can severely undermine both Perceived Ease of Use and Perceived Usefulness, thus negating the potential efficiency gains.

Finding of hypothesis five indicated that the t-value was 2.458 and the p-value was .015, which is lower than the estimated threshold of 0.05. The result shows that cybersecurity measures have significantly influenced data integrity and fraud reduction. This finding aligned with the studies by Ogunsan and Ivy (2025) and ResearchGate (2025), which both identified cybersecurity as a critical, non-negotiable component of digital banking. This finding also aligned with the Technology Acceptance Model (TAM) (Davis, 1989), as security measures (like biometrics and encryption) are a key component of building *trust*, which is a widely accepted extension of Perceived Usefulness. Users will not perceive a system as useful if they do not trust it to be secure.

5.0 Conclusion, And Recommendations

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

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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:

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 (UPS) systems. This is the most critical recommendation, as an unreliable foundation undermines all other IT investments.

BOI should work with its internet service providers (ISPs) to secure redundant, high-availability connections and optimize its online platforms to perform better under low-bandwidth conditions, which are common.

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

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

The bank 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 (PEOU) 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.

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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.

Ethical approval

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.

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