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Technological Innovation and Customers' Patronage of Selected Deposit Money Banks in Abeokuta, Ogun State

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ABSTRACT

This study examined the effect of technological innovation on customer patronage in selected deposit money banks in Abeokuta, Ogun State, Nigeria. It explored the significant relationship between technological innovation tools such as Automated Teller Machines (ATM), Mobile Banking (MB), E-Transfers (ET), and Point of Sale (POS) systems and customer patronage. To achieve this, the study used simple random sampling to select nine banks: First Bank Plc., United Bank of Africa Plc., Guarantee Trust Bank Plc., Access Bank, First City Monument Bank, Wema Bank, Keystone Bank, Diamond Bank, and Fidelity Bank Plc. A convenience sampling method was used to select 30 customers from each bank, resulting in 270 respondents. The data were analyzed using the Statistical Package for Social Science (SPSS), with Pearson's correlation coefficient and linear regression analysis employed to test the hypotheses and determine whether a significant relationship existed between technological innovation tools and customer patronage. The findings revealed a positive relationship between technological innovation tools and customer patronage, with three independent variables ATM, Mobile Banking (MB), and E-transfer showing strong positive effects on customer patronage, with coefficients of 0.780, 0.737, and 0.705, respectively. Point of Sale (POS) systems had a moderate effect with a coefficient of 0.524, all at a 1% level of significance. The study concluded that ATM, MB, E-transfer, and POS systems significantly impact customer patronage. Therefore, technological innovations adopted by the selected deposit money banks in Abeokuta would help increase customer patronage. The study recommended that the management of these banks address issues related to customer complaints on POS transaction errors promptly and ensure the efficient operation of ATM, mobile banking, and E-transfer systems to retain and attract more customers, fostering continuous patronage and loyalty.

1. Introduction

The severe rivalry in the banking business in the twenty-first century, along with the compelling need to cut personnel overheads and improve service efficiency, has prompted a significant change from old banking procedures to modern computerized technologies. This transition is driven by technical advancements that attempt to improve service delivery while maintaining competitiveness. However, customer integration into electronic banking remains a barrier (Farayibi, 2016; Simon & Thomas, 2016).

Technological innovation has had a substantial impact on the performance of Nigerian banks. Over the past fifteen years, advancements in areas such as networking, service delivery, profitability, and customer satisfaction have been substantial (Dauda, 2016). Crane (2014) emphasizes that for banks to succeed in the future, retaining high levels of customer patronage is crucial, as acquiring new customers is far more costly than maintaining existing ones. Rogers (2014) defines technological innovation as the commercialization of improved processes, services, or products that enhance production.

On a global scale, technological innovation is seen as a critical factor in gaining competitive advantage, as well as in fostering customer loyalty and retention (Kwashie, 2012). Innovations such as mobile banking, smart card technology, ATMs, and internet banking have become standard practices in the global banking industry, significantly improving customer service and engagement (Frei & Kalakota, 2016). Through the adoption of such innovations, banks can differentiate their services, leading to increased customer patronage and competitive positioning (Govori, 2013).

Innovation is driven by human creativity, where the application of knowledge results in the development of new processes, machines, and methods that enhance product and service quality. Ovia (2015) argues that innovation is essential to meeting the evolving demands of a dynamic environment. In the context of global banking, employees must adapt to the increasing role of information and communication technologies (ICT). According to Lerner and Tufano (2011), improved networking and service delivery due to technological innovations have bolstered bank competitiveness and profitability. However, despite these technological strides, several Nigerian banks have encountered financial difficulties, with some even facing insolvency.

The Nigerian banking sector has been selected for this study for multiple reasons. As a key player in the country's economic landscape, the banking sector contributes significantly to Nigeria's GDP, yet it remains a highly competitive and dynamic environment (CBN, 2012). Given that managing and leveraging information is central to banking operations, the role of technological innovations especially IT-driven process re-engineering has the potential to surpass that of other sectors (David-West, 2018). Customer patronage is critical in the banking industry. Lovelock, Christopher, and Jochen (2015) define it as the benefits customers gain from using a bank's services. East and Robert (2013) suggest that patronage is closely linked to customer satisfaction, with loyal customers less likely to switch banks. Sivadas (2017) further posits that customer satisfaction serves as a primary indicator of patronage intention, while Bolton and Drew (2013) argue that increasing customer satisfaction is key to fostering greater patronage. As Dahlia and Hanwin (2014) note, attitudinal loyalty plays a significant role in maintaining customer relationships.

Despite efforts to enhance service quality and customer satisfaction, many Nigerian banks have faced challenges in effectively utilizing technological innovations, which has resulted in reduced customer patronage and profitability (Abdullahi, 2016). As the competitive landscape continues to evolve, banks must adopt innovative technologies to maintain a competitive edge. However, as Siam (2013) highlights, the process of innovation often comes with uncertainties, and many banks' initiatives to enhance service quality and performance have failed to yield the anticipated results. The lack of effective implementation of these innovations has diminished returns on investment and performance outcomes (Abdi, 2014). Njenga (2016) adds that poor customer service, even with the availability of innovative technologies, often leads to reduced customer satisfaction and lower profits for banks. Technological innovations such as ATMs are prone to failure, and rising instances of fraud have further strained customer trust and patronage. Consequently, banks must address these challenges to improve their competitive standing and customer retention. This study aims to examine the effect of technological innovation on customer patronage in deposit money banks in Abeokuta, Ogun State, Nigeria, addressing a critical gap in the literature regarding the relationship between technological advances and customer behavior in the Nigerian banking sector.

Objectives of the Study

The main objective of this study is to assess the impact of technological innovation on customer patronage in selected deposit money banks within the Abeokuta Metropolis, Ogun State.

The specific objectives of the study are:

1. To evaluate the relationship between technological innovation tools and customer patronage of selected deposit money banks in Abeokuta, Ogun state, Nigeria.
2. To examine the effect of technological innovation tools on customer patronage of selected deposit money banks in Abeokuta, Ogun state, Nigeria.

2. Literature Review

2.1 Technological Innovation

In today's era of globalization and technological advancement, the banking sector must continually update its management systems by integrating modern information and communication tools. Technological innovation plays a crucial role in improving performance, attracting new customers, and enhancing satisfaction (Baker, 2012). Innovation refers to any new product, service, or idea perceived as novel by someone (Kotler, 2013). Rogers (2011) defines innovation diffusion as the process through which new ideas spread from their creators to potential users. Key drivers of innovation in the banking sector include financial pressures, increased competition, evolving customer expectations, and the constant demand for more efficient technologies (Baker, 2012). As innovations emerge, they are communicated to target groups and, if adopted, lead to continued use (Rogers, 2011).

Historically, the evolution of technology in banking began with mechanization (e.g., note counters and calculators), progressing to data processing with punched cards in the 1950s and 1960s. The 1970s brought Management Information Systems (MIS) and Decision Support Systems (DSS). By the 1980s, telecommunication and networking technologies merged, revolutionizing banking operations (Ibikunle & James, 2012). The use of information technology in banking processes is known as electronic banking. Ovia (2011) defines electronic banking as an e-commerce product in the financial services industry that includes a variety of services such as balance inquiries, cheque book requests, and account administration. E-banking has had a substantial impact on bank turnover, profitability, and customer service (Josiah and Nancy, 2012).

Technological advancements in banking, such as Automated Teller Machines (ATMs), Electronic Fund Transfer (EFT), smart cards, and telephone banking, are critical to enhancing bank performance. Banks that efficiently use these technologies can gain a competitive edge through product diversification (Agboola, 2006; Ehikhamenor, 2003). Technological innovations have significantly transformed banking operations, especially in enhancing distribution channels. Below are the key innovations along with their functional definitions:

a) Automated Teller Machines (ATMs)

ATMs are electronic devices that combine computer terminals with cash vaults to allow customers to perform banking transactions without the need for a human teller, available 24/7. ATMs enable various services such as cash withdrawals, deposits, fund transfers, and bill payments (e.g., DSTV). These machines are typically located outside bank branches, at airports, shopping malls, and other locations. Initially designed to dispense cash, ATMs now provide a broader range of services, offering greater convenience and saving customers' time, which can be invested in other activities (Rose, 2012).

b) Point of Sale (POS)

POS systems are electronic platforms that enable instant, real-time transfer of funds from customers' bank accounts to merchants' accounts during purchases using debit or credit cards. POS systems allow customers to complete transactions quickly without the need for cash or cheques, and they function even beyond banking hours. This system has enhanced banking productivity by offering continuous service outside traditional banking times (Chorafas, 2018).

c) Mobile Banking (MB)

Mobile banking refers to the use of mobile devices to access and conduct banking services remotely, providing customers with convenience and reducing the need to visit bank branches. Mobile banking allows customers to perform a wide range of banking activities such as account transfers, bill payments, and balance inquiries from their mobile phones or tablets. For banks, it offers significant cost savings compared to traditional in-branch services and enables 24/7 access, increasing operational efficiency (Balachandher, 2011).

d) Electronic Transfer (ET)

Electronic Funds move (EFT) refers to the use of electronic means to move funds from one bank account to another, bypassing paper-based processes and human intermediaries. EFTs enable customers to conduct various banking transactions such as credit/debit card payments, direct deposits, and online purchases with ease. This method improves transaction efficiency and customer convenience, making banking services quicker and more accessible (Chorafas, 2018).

2.2 Customer Patronage

Murphy (2001) defines a customer as an individual who pays for and regularly uses goods and services, while users are those affected by or influencing the products or services. All organizational processes should center around the customer, as they must be understood and identified to ensure business success (Brink & Berndt, 2018). Customers are a critical source of profit, driving growth for the firm. For instance, in a bank, depositors and borrowers, each with distinct needs, must both be satisfied for the institution to thrive (Cannie & Caplin, 2012). A customer-driven organization focuses on meeting customer needs, with service management centered around creating a customer-oriented business (Brink & Berndt, 2018). Ozor (2014) defines patronage as the internal desire and impulse in consumers that drives them to purchase from specific outlets, with their purchase intentions reflecting a strong attachment to the product.

Mathwick, Malhotra, and Rigdon (2011) define customer patronage as the desire to consider, recommend, or make future purchases from a retailer, coupled with the willingness to recommend the retailer to others. Purchase intention predicts the likelihood that a consumer will buy certain goods or services in the future (Schiffman & Kanuk, 2014), and it serves as a mediator between a consumer's attitude and actual purchase behavior. Zenithal and Singh (2016) suggest that satisfied customers are more likely to have higher repurchase intentions. Additionally, customers with positive attitudes toward a service provider exhibit repeat purchase behavior and prefer that provider exclusively when a need arises (Gremler & Brown, 1996).

The Nigeria Banking Survey (2013) emphasizes that banks should focus on factors such as excellent customer service, financial stability, reputation, employee satisfaction, branch proximity, pricing, support services, and efficient credit processing to maintain customer patronage. Customers typically choose banks that provide the greatest benefits or rewards at the lowest cost based on their preferences (Aregbeyen, 2016). To maintain high customer patronage, banks must foster strong personal relationships with customers by being courteous, upholding business integrity, rewarding loyalty, and adding value through corporate social responsibility. This can include offering scholarships and creating business opportunities within the community.

2.3 Factors that Attract Customer Patronage

Numerous research has been conducted to discover the aspects that influence customers' decisions while choosing a bank. According to Aregbeyen (2016), human aspects such as staff friendliness and approachability play an important role in bank choosing. Similarly, Omar and Orakwue (2016) assessed the relative relevance of key parameters for bank selection among Nigerian clients. Their findings indicate that the safety of cash, efficient service quality, and transaction speed are important elements influencing client decisions. A more recent study by Rao (2012) found that recommendations from parents, friends, and peers play a significant role in customers' bank choices. In Iran and Pakistan, bank customers emphasize three critical factors: customer service, the convenience of ATM locations, and online banking services (Rehman & Ahmed, 2008).Shelving and Graeber (2014) also explored factors influencing customers' bank choices, highlighting that ATM service availability significantly affects decisions. In Bahrain, Almossawi (2011) conducted a study focusing on college students and found that reputation, the availability of parking near banks, staff friendliness, and ATM locations were key determinants for bank selection. Similarly, Cicic (2014) emphasized that younger customers particularly value good reception and customer service in their bank choices. Customers are likely to choose the bank that they believe provides the most rewards or perks at the lowest cost, based on their preferences (Aregbeyen, 2016).

Customer Patronage in Banking

Customers' motivations, tastes, and preferences significantly affect their decision to patronize a bank. As these factors vary, it is crucial for banks to identify the determinants of patronage. Understanding these factors enables banks to adopt appropriate marketing strategies to attract potential customers and retain existing ones. The growing competition among banks, especially with the similarity of services offered, underscores the importance of identifying the dynamics that drive customer choices.

Patronage Intention

According to East and Robert (2012), patronage intention can be inferred from customers' switching behavior, with satisfied customers remaining loyal to their banks. Sivadas (2000) argues that customer satisfaction is a key indicator of patronage intention, while Bolton and Drew (2016) suggest that improving customer satisfaction by adding value to services is crucial to fostering patronage. Dahlia and Hanwin (2014) assert that attitudinal loyalty plays an essential role in ensuring customer retention.
Service organizations can enhance customers' purchase behavior by adding value to their offerings, thereby meeting customers' expectations and satisfying their needs. Fishbein and Ajzen (2016) view purchase intention as an important predictor of consumer behavior. Zeithaml (2016) notes that consumers' perceptions of product value strongly influence their purchase intentions and behavior.

Patronage Action

Patronage action refers to the psychological principles that influence consumer decisions. Consumer decision-making is often described in five stages: need recognition, information search, evaluation of alternatives, purchase decision, and post-purchase processes (Grewal & Levy, 2012). A decision is essentially the selection of an action from various options, and each decision is influenced by the consumer's basic emotional and cognitive state.

Repeat Purchase

Repeat purchase refers to a consumer's decision to place order after order from the same company or brand. This behavior typically indicates satisfaction, whether emotional, intellectual, or physical. Wirtz and Lwin (2012) describe repeat purchase as "re-patronage intention," referring to an individual's willingness to continue patronizing a service organization. Trust plays a crucial role in repeat purchases, as customers are more likely to return to companies they believe have their best interests at heart (Caudill & Murphy, 2014).Repeat purchases are often a measure of customer loyalty. Higher repeat purchase values signal stronger customer retention, which in turn leads to higher profitability as organizations avoid the costs of acquiring new customers. Organizations can encourage repeat purchases by listening to customer feedback and continually adding value to the customer experience. Ultimately, repeat purchase behavior serves as an indicator of long-term business sustainability and profitability, highlighting the importance of customer satisfaction and retention.

2.3 Components of Customer Patronage in Banking with Respect to Technological Innovation Tools

Excellent Customer Service and Technological Innovation Tools

Excellent customer service is described as service that handles clients in a nice manner and seeks to address their concerns efficiently. It plays a crucial role in customer-oriented businesses, with many employers emphasizing customer service in their recruitment processes. In customer service roles, staff must listen attentively to customers, even when the customer is agitated, and refrain from taking complaints personally. Apologizing for any inconvenience and making customers feel valued are key elements in delivering a positive customer service experience.

Financial Stability with Respect to the Use of Bank Technological Innovation Tools

Financial stability is a system that satisfies the needs of individuals and businesses by ensuring consistent access to loans, savings, and other financial services. For consumers, this means the ability to finance major expenses such as homes or education, while businesses rely on loans to expand and manage operations. The banking system should be functional and efficient, ensuring that people can access these services without much effort or concern.

Ease of Use of Bank Technological Innovation Tools

Ease of use relates to an individual's belief that using a system is simple. This concept is an essential component of the Technology Acceptance Model (TAM), which has been used in a variety of disciplines to forecast the acceptance of technological advancements. According to studies, when people perceive a website or system to be easy to browse, their trust and confidence in the system increases. Trust and simplicity of use are inextricably linked, with user-friendly technologies lowering perceived risks and increasing trust.

Accessibility and Reliability of Bank Technological Innovation Tools

Accessibility encompasses several dimensions, including the availability of necessary equipment, access to information, system reliability, and the ease with which users can interact with the system. It also relates to the physical access to terminals and the usability of electronic banking applications. When systems are accessible and reliable, they contribute to trust in the service, with users more likely to engage in transactions and return for future use.

Effects of Trust of Customers on the Use of Bank Technological Innovation Tools

Trust plays a critical role in the continued use of online banking tools. When customers trust a financial institution, they are more likely to use its technological innovations. Trust reduces uncertainty and increases the likelihood that customers will engage with digital banking systems, spending less time scrutinizing the system and more time conducting their transactions. Trust, therefore, has a positive influence on the perceived usefulness and acceptance of new technologies in banking.

2.4 Challenges of Technological Innovation Tools in the Banking Sector

Technological innovation in the banking industry holds great potential to enhance customer experiences and improve operational efficiency. However, Nigerian banks continue to face several challenges in effectively implementing these innovations. Despite growing dependence on internet technology, Nigeria still struggles with slow and unreliable connectivity. Although wireless systems have improved efficiency, the country's overall internet penetration remains low, limiting the reach and effectiveness of online banking platforms. Another major obstacle is the country's low tele-density. With one of the lowest mobile and landline access rates globally, many Nigerians still lack reliable telecommunications services. This weak infrastructure restricts the expansion of digital banking services and constrains the broader growth of the financial sector.

Additionally, there is a shortage of skilled professionals equipped to drive and manage technological advancements. Nigeria ranks low on the UNDP's technological achievement index, reflecting limited IT expertise and inadequate adoption of best practices in technology utilization. Building a competent and well-trained digital workforce is essential to harnessing the full benefits of innovation in the banking industry. Security concerns further complicate the situation. Issues such as unauthorized access to banking systems, cyber fraud, and other digital crimes pose significant threats to the safe and effective use of technology. Beyond acquiring sophisticated systems, banks must prioritize strong cybersecurity measures to safeguard data, build customer trust, and ensure the stability of digital financial operations.

2.5 Theoretical Review

The Technology Acceptance Model (TAM), developed by Davis in 1989, explores how individuals' behavioral intentions shape their use of information and communication technologies. It posits that actual technology use is determined by a person's intention to use it, which in turn is influenced by perceived usefulness and ease of use. Essentially, the easier and more beneficial a technology appears, the more likely users are to adopt it. TAM underscores the importance of understanding users' needs for both functionality and usability. However, the model has been criticized for focusing too heavily on technological factors while overlooking social and contextual influences that also affect technology adoption. In response to these limitations, Wang et al. (2003) extended the model by incorporating "perceived credibility," addressing users' concerns about security and privacy—particularly in internet banking. Their study revealed that perceived usefulness, ease of use, and credibility significantly affect users' intentions to adopt online banking, while computer self-efficacy also indirectly shapes behavioral intentions through these factors.

The theoretical foundation of customer patronage behavior draws from the broader field of consumer behavior, a concept popularized by Philip Kotler (1972). Kotler defines consumer behavior as the study of how individuals, groups, and organizations select, purchase, use, and dispose of goods, services, or ideas to satisfy their needs and desires. This theory emphasizes the decision-making process behind consumer choices and the influence of demographic, psychological, and behavioral factors. Consumers play dual roles as both users and purchasers, with a strong focus on satisfaction, retention, and long-term relationship management. The Black Box Model of consumer behavior further illustrates how external stimuli—such as cultural, social, and economic factors—interact with internal cognitive processes to shape purchasing behavior. Consumers evaluate products or services based on both functional and psychological benefits before making decisions.

For this study, the Technology Acceptance Model (TAM) and the Theory of Consumer Behavior are jointly employed to understand customer behavior and technology adoption in the Nigerian banking sector. TAM highlights the technological and usability dimensions that influence adoption, while the Theory of Consumer Behavior provides insight into the psychological and social drivers of customer decision-making. By integrating these frameworks, the study adopts a holistic approach to analyzing how technological innovations affect customer satisfaction, loyalty, and patronage within Nigeria's banking industry.

Empirical Review

Technological innovation has become a pivotal force in transforming the global banking landscape, reshaping operational efficiency, customer experience, and financial performance. Both developed and developing countries have witnessed extensive empirical research examining how innovations such as electronic banking, mobile banking, and automated systems influence banking performance and customer outcomes. Reviewing these empirical studies helps establish an understanding of prevailing research trends, methodological approaches, and contextual gaps, all of which inform the present investigation. A summary of key empirical studies relevant to this research is presented in the table below.

Table 1. Summary of key empirical studies

S/N	Author(s) & Year	Title of Study	Objective	Methodology	Key Findings
1	Mawutor, J. (2023)	Impact of e-banking on the profitability of banks in Ghana	To determine the influence of e-banking on the profitability of Ghanaian banks.	Quantitative analysis using bank performance data	Revealed that e-banking adoption led to higher profitability, efficiency, and customer retention rates.
2	Ejike, S. I. (2019)	Effect of bank innovations on financial performance of commercial banks in Nigeria	To identify the effect of bank innovation on income, liquidity, efficiency, and profitability.	Survey research design	Discovered that banking innovations positively influenced income generation, liquidity, and profitability of commercial banks.
3	Laurence, U. O., Omankhanlen, A. E., Okoh, J. I., & Isibor, A. A. (2018)	Technology-based financial service delivery and customer satisfaction: A study of the Nigerian banking sector	To identify how technology has influenced customer satisfaction in the Nigerian banking sector.	Survey research design	Found significant improvements in customer satisfaction due to technology-based financial services.
4	Nwakoby, N. P., Philip, S. C., & Ofobruku, S. A. (2018)	Impact of information and communication technology on the performance of deposit	To assess the impact of ICT on the performance of Nigerian commercial banks.	Econometric method	ICT enhanced ease of transactions and improved customer service through self-service platforms.

		money banks in Nigeria (2006–2015)			
5	William, A. (2017)	Innovation in bank payment systems and related services among selected commercial bank branches	To examine how innovation in bank payment systems contributes to banking sector development.	Purposive and convenience sampling	Found that innovations in electronic payment systems positively improved banking services.
6	Maureen, N., Akuku, C., & Kennedy, N. O. (2016)	Effect of technological innovations on customer loyalty among commercial banks in Eldoret Town	To examine the impact of technological innovation on customer loyalty in Kenyan banks.	Quantitative research design	Revealed that technological innovation significantly improved customer satisfaction and loyalty within the Kenyan banks.
7	Oluwagbemi, O., Abah, J., & Achimugu, P. (2016)	The impact of information technology in Nigeria's banking industry	To analyze current IT applications in Nigeria's banking sector and their effect on service quality.	Qualitative research method	Found that IT adoption brought fundamental changes in the quality and efficiency of banking operations.
8	Ilo, J. U. C., Ani, W. U., & Chijioke, N. L. S. (2016)	Impact of technological innovation on the delivery of banking services in Nigeria	To explore the effect of technological innovation adoption in Nigeria's banking sector.	Descriptive survey design	Found a significant relationship between technological innovation and improved service delivery.
9	Musara, M. & Fakoki, O. (2015)	Has technological innovation resulted in increased efficiency and cost savings for banks' customers?	To determine how technological innovation impacts efficiency and cost savings.	Descriptive survey design	Found that technological advancements improved customer welfare and reduced operational costs.
10	Suganthi, B. B. (2015)	Internet banking patronage: An empirical investigation in Malaysia	To identify factors influencing the adoption of internet banking in Malaysia.	Survey research design	Found that trust, security, awareness, and ease of use significantly affect internet banking adoption.
11	Yunus, A. D. & Akingbade, W. A. (2014)	Technology innovation and Nigerian bank performance: The assessment of employees and customers' responses	To examine the effect of technological innovations on employee performance and customer satisfaction.	Survey research design	Found that technological innovation positively affected employee performance, customer satisfaction, and profitability.
12	Idowu, P. A., Alu, A. O., & Adegunodo, E. R. (2012)	The effect of information technology on the growth of the banking industry in Nigeria	To analyze the effect of information technology on banking industry growth in Nigeria.	Survey research design	Found that IT facilities such as LANs and computer systems improved banking operations and growth.

Conceptual Framework

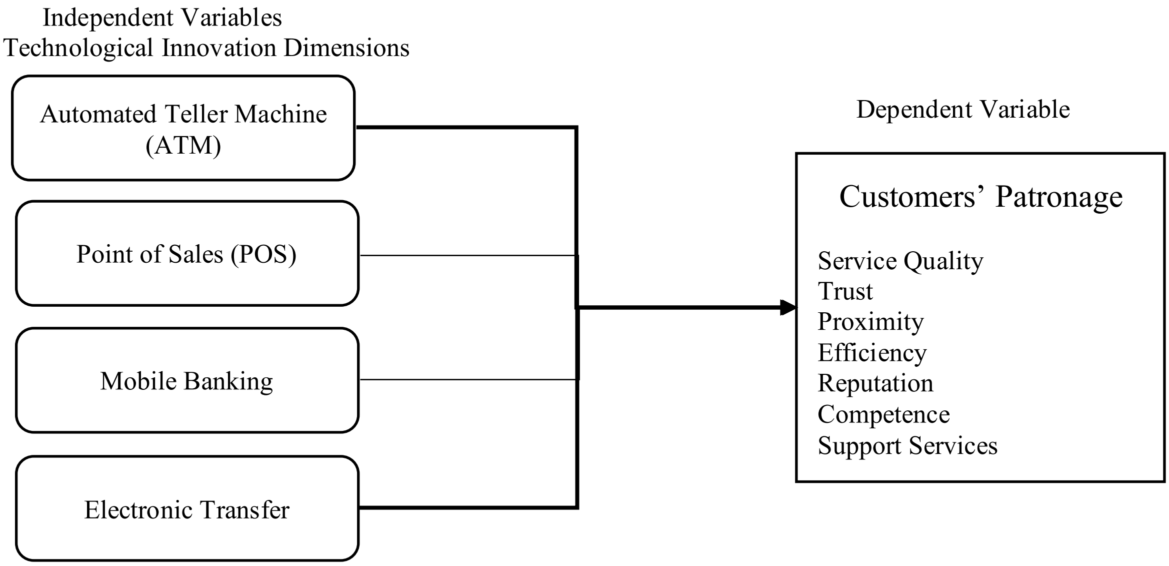

Figure 1. Conceptual Framework
Adopted from Nekesa, Akuku, and Otiso (2016), and Aregbeyen (2011).

3. Research Methodology

This study used a survey methodology to determine the impact of technological innovation on customer patronage at Deposit Money Banks (DMBs) in Abeokuta, Ogun State. The population included consumers who frequented the selected commercial banks in Abeokuta and engaged in a variety of banking activities, offering a full picture of the impact of technological developments on patronage. A simple random selection procedure was utilized to select nine (9) commercial banks from the sample frame of Abeokuta-based banks. The banks chosen were: First Bank Plc, United Bank for Africa Plc, Guarantee Trust Bank Plc, Access Bank Plc, First City Monument Bank Plc, Zenith Bank Plc, Wema Bank Plc, Polaris Bank, and Diamond Bank Plc. Simple random selection of banks ensured an unbiased range of institutions ranging in size, technical offerings, and consumer segments.

Following bank selection, quota sampling was used to select 240 customers across the nine banks. Quotas were determined as follows: where branch-level or bank-level customer population data were available, respondent quotas were allocated proportionally to each bank's relative customer base to improve representativeness. Where such data were not available, equal quotas were applied across banks and rounded to whole respondents, resulting in an allocation of respondents that totals 240 (for operational practicality, six banks were assigned 27 respondents and three banks 26 respondents, giving $6\times27 + 3\times26 = 240$). This quota procedure guarantees that each bank contributes to the sample and reduces over-representation of more accessible branches that can occur under convenience sampling.

Within each bank quota, respondents were selected using a systematic random sampling procedure during the period of data collection: the survey team established a random start (e.g., using a random number table or app) and then selected every kth customer who met the inclusion criteria (where k was determined by the expected customer flow and the quota for the day) until the quota for that bank was met. Data collection days and times were varied (morning, mid-day, and late afternoon; weekdays and, as practicable, selected weekend times) to reduce time-of-day bias and capture customers with different transaction patterns. Only customers who voluntarily consented to participate and were 18 years or older were included.

Data were collected using the Customer Patronage Index (CPI) Model developed by Aregbeyen (2011). The CPI instrument assesses seven factors that influence customer patronage: excellent customer service; financial stability and image/reputation; employee competence and requirements; proximity of branches; trust; bank support services; and efficiency of credit processing. Respondents' answers were recorded according to the CPI model to ensure a consistent framework for evaluating customer perceptions of technological innovations in the banking sector.

The collected data were analyzed with the Statistical Package for Social Sciences (SPSS). Multiple regression analysis was used to evaluate the study hypotheses and assess whether there is a significant association between technical improvements and client patronage at Deposit Money Banks in Abeokuta. Statistical significance was determined at the 0.05 level. Participation was voluntary; respondents were told of the study's goal, ensured of confidentiality and anonymity, and provided verbal (and, if necessary, written) agreement prior to completing the questionnaire.

4. Findings

$$\mathbf{CP} = \boldsymbol{\beta 0} + \beta_1\mathbf{ATM} + \beta_2\mathbf{POS} + \beta_3\mathbf{MB} + \beta_4\mathbf{ET} + ei$$

Table 2. Reliability

Variables	Cronbach's Alpha
ATM	.878
Mobile banking	861
Electronic transfer	.832
P.O.S	.811

Source: Field Survey, 2024.

Table 2. demonstrates how the completed surveys were edited, categorized, and analyzed with the Statistical Package for Social Sciences (SPSS). Cronbach's alpha was used to assess the reliability of the four components of technological innovation. This study adopts a minimum acceptable alpha value of 0.7 (Yusoff, 2015; Parsian & Dunning, 2016), and the results show that each component has strong internal consistency.

Table 3. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change
1	.836[a]	.699	.697	1.64742	.699

a. Predictors: (Constant), TITs

b. Dependent Variable: CP

Source: Researcher's Computation, 2025

The R-square value of 0.699 shows that the predictor variable (Technological Innovation Tools) accounts for around 70% of the variation in the outcome variable (Customer Patronage).

Table 4. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1056.897	1	1056.897	389.426	.000[b]
	Residual	455.950	168	2.714		
	Total	1512.847	169			

a. Dependent Variable: CP

b. Predictors: (Constant), TITs

Source: Researcher's Computation, 2025

The associated P-value ($P < 0.5$) indicates that the null hypothesis, which suggests no significant relationship between technological innovation tools and customer patronage, is rejected at the 5% significance level. The alternative hypothesis is therefore accepted, confirming the presence of a significant relationship [$F(1,168) = 389.426$, $P < 0.5$].

Table 5. Regression Model Table (Regression model compares table for the TITs)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Constant 2.896	B	Std. Error	Beta		
ATM	.780	.048	.798	16.135	.000
MB	.737	.057	.731	13.026	.000
ET	.705	.061	.689	11.568	.000
POS	.524	.072	.511	7.237	.000

Source: Researcher's Computation 2025

The regression analysis shows that ATM (B = 0.780, Std. Error = 0.048, Beta = 0.798, T-statistics = 16.135, Sig. = 0.000) has the highest significant effect on customer patronage. Mobile Banking (MB) comes next (B = 0.737, Std. Error = 0.057, Beta = 0.731, T-statistics = 13.026, Sig. = 0.000). E-transfer (ET) follows (B = 0.705, Std. Error = 0.061, Beta = 0.689, T-statistics = 11.568, Sig. = 0.000), with Point of Sale (POS) having the lowest but still significant effect (B = 0.524, Std. Error = 0.072, Beta = 0.511, T-statistics = 7.237, Sig. = 0.000).

Regression Model Interpretation

The model can be expressed as:

$$\mathbf{CP = 2.896+0.780\ ATM+ 0.737\ MB +0.705\ ET+0.524\ POS+0.05}$$

The results indicate that customer patronage is positively impacted by the four technological innovation tools: ATM, Mobile Banking (MB), E-Transfer (ET), and POS, with ATM having the strongest positive effect, followed by Mobile Banking and E-Transfer.

5. Discussion

The outcomes of this study reflect prior research by Kwashie (2023), who discovered that the use of technological innovation tools in the banking sector promotes customer loyalty and improves bank image. However, the impact of customer service on patronage may be influenced by factors other than technological innovations, as noted by Hafeez and Muhammed (2021), Aregbeyen (2016), and others, who identified customer satisfaction, service quality, and reputation as key drivers of customer loyalty. This study is consistent with the findings of Bright and Wireko (2024), who investigated the impact of technological innovations on customer satisfaction in the Ghanaian banking sector, as well as Iluno and Saheed (2018), who discovered that technological innovations have a significant impact on customer patronage in Nigeria.

6. Conclusion

This study concludes that technological innovations, particularly Automated Teller Machines (ATM), Mobile Banking (MB), Electronic Transfers (E Transfer), and Point of Sale (POS) systems, have a strong and positive impact on customer patronage among deposit money banks in Abeokuta, Ogun State, Nigeria. The findings show that these technologies not only improve convenience and accessibility but also build customer satisfaction, loyalty, and trust in banking services. By embracing digital solutions, banks can enhance service delivery, reduce transaction costs, and strengthen their competitive position both locally and internationally.

The study further reveals that the convenience of mobile and online banking, as well as the ease of accessing reliable and user-friendly ATMs, plays a vital role in shaping customer experiences. Security and privacy assurances also encourage greater customer confidence in using these platforms. However, ongoing issues such as transaction delays and POS errors need to be addressed promptly to maintain customer trust and ensure smooth service operations.

In conclusion, the effective adoption and management of technological innovations can significantly increase customer patronage and support Nigeria's broader goals of digital financial inclusion. By improving efficiency, advancing the cashless policy, and aligning with global banking standards, technological innovation can help strengthen the Nigerian banking sector's contribution to economic growth, competitiveness, and the overall ease of doing business.

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Conflict of interest statement

The authors declare that there is no conflict of interest concerning the research, authorship, or publication of this article.

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