# ARTIFICIAL INTELLIGENCE-DRIVEN AND CUSTOMER PATRONAGE OF COMMERCIAL BANKS IN NIGERIA

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**Abstract**

*Artificial intelligence (AI) is becoming a major concern for the Nigerian banking operators as they face challenges like data infrastructure, inadequate AI experts, and lack of clarity from the stakeholders. This study examined only one specific objective from the general objective; impact of artificial intelligence-driven on the customer patronage of commercial banks in Nigeria. The specific objective was to assess the influence of chatbot (AI-driven product) on the customer retention of commercial banks. The study adopted a cross-sectional research design, and the population comprised the customers patronising selected commercial banks in Nigeria. The sample size of three hundred and eighty-four (384) was derived from the Godden formula but only two hundred and ninety-eight (298) questionnaires were found usable for the analysis which accounted for 77.6% response rate and the purposive sampling technique adopted for the study. The null hypothesis formulated was tested. The p-value is < 0.05, hence, the null hypothesis is rejected and alternative hypothesis accepted. The finding revealed that Chatbot enhances customer retention, and the study concluded that the Nigerian banking sector must embrace AI adoption in their service delivery. Hence, it was recommended that the key stakeholders in the banking industry should be proactive about the adoption of AI and work more on its awareness among their existing customers.*

**Keyword**s: Artificial intelligence, chatbot, commercial, customer patronage, retention

## 1.0 Introduction

Nigeria's commercial banks have stayed on top of the financial market by constantly coming up with new ideas and providing great service. This has brought in more customers and improved performance (Akinbode et al., 2025). These banks have a big impact on how money moves about, and they are very important to the Nigerian economy's growth. They were allowed to work from 1960 to 1980, and since then they have been providing their customers with high-quality, efficient, and effective services. In Nigeria, second-generation banks include Access Bank Plc, Fidelity Bank, Zenith Bank, Guaranty Trust Bank, and other innovative, customer-focused businesses (AbdulGaniyu et al., 2023). But in this changing world, they have unique chances and problems, especially when it comes to innovative thinking and building infrastructure. Akinbo et al., (2021) asserted that agility, technology adoption, and aggressive market positioning are characteristics of second-generation banks, in contrast to first-generation banks that relied on old systems and conventional customer connections.

These banks are leading the way in implementing AI-driven technologies in areas such as automated customer service (chatbot), fraud detection, credit risk assessment, personalised financial advice, and intelligent payment solutions. Nevertheless, Nigerian banks are still in the early phases of introducing and integrating artificial intelligence (AI) into product innovation, with differing degrees of adoption. This is because of the lack of digital literacy experts, stringent regulatory frameworks, and inadequate infrastructure. However, recent events around the world indicate that AI-powered financial products can greatly increase client retention and engagement (Dunka, 2021). Since it reveals how technology developments translate into market performance, understanding this link is essential for Nigerian banks looking to grow sustainably and boost consumer patronage. The perceived value, convenience, self-service alternatives, and trust associated with innovative products have steadily influenced client patronage in Nigeria's banking market. In a market where consumers have a lot of banking choices and switching costs are low, AI-driven product innovation might be a key way to stand out.

In addition, banks can increase customer happiness, encourage loyalty, and draw in new business by providing goods that are not only technologically sophisticated but also in line with the demands and preferences of their consumers. However, little is known about how much these innovations affect patronage in Nigeria's changing financial environment, especially for 2$^{nd}$ generation banks that are up against both digital-first entrants and legacy businesses (Okeke et al., 2024). The diffusion of innovation theory, which is also the study's theoretical underpinning, has a big effect on how willing customers are to accept new ideas. It is hoped that this study would help financial professionals and stakeholders come up with new, game-changing ideas. The study investigated the impact of artificial intelligence-driven on the customer patronage of commercial banks based on the aforementioned premise.

**Research Objective**:

The specific objective was to evaluate the influence of chatbot (AI-driven product) on the customer retention of the commercial banks.

## 2.0 Literature Review

### Artificial Intelligence (AI)

Artificial intelligence represents a significant technological advancement comparable to electricity or the internet, with the potential to reshape industries, societies, and everyday life in a relatively short period (Kumar et al., 2024). It operates more rapidly than the human brain, efficiently processing activities and delivering timely results. The potential benefits are substantial; however, without stringent regulation, transparency, and ethical design, significant harm may also ensue. Ali (2024) identified the primary challenge as the need to balance innovation with responsibility and regulation.. AI can be classified into three types: (i) narrow (weak AI that focuses on specific tasks like recommendation engines and chatbot), (ii) general (strong AI deals with theoretical forms that can match human-level intelligence across a wide range of events. (iii) Super intelligent AI: this operates like hypothetical AI that surpasses human intelligence in every domain. This replication of human intelligence in machines includes a lot of different technologies that let computers do things that usually need human intellect such as learning, solving problems, and making decisions in all areas of human life. AI thinks like humans and replicates their actions (Dandotiya, et al., 2024).

Artificial intelligence, which was first thought of as an academic theory in the 1950s, didn't really get people's attention until decades later when it started to be used in real life. In its early years, AI was largely talked about in academic circles, through mathematical models, and through a few computer programmes that scientists thought were cool but that most people didn't know about. The big change happened in the late 1990s, when IBM's Deep Blue beat global chess champion Garry Kasparov in 1997. This famous win was one of the first instances AI showed it could do better than people at a hard, intellectual activity, which got a lot of people interested (Cooper, 2024). Also, AI became popular again in the early 2010s with the rise of big data and machine learning.

The availability of vast datasets, combined with more powerful processors, allowed AI systems to learn and improve with remarkable speed. People began interacting with AI daily, often without realising it through search engines, voice assistants like Siri and Alexa, personalised recommendations on platforms like Netflix and Amazon, and facial recognition on smartphones. By the middle of the 2010s, advances in deep learning, such as Google's Alpha Go beating Go champions, made many even more sure that AI was no longer just a made-up idea but something that was happening in real life. In the 2020s, this trend reached new heights with the arrival of generative AI systems that could write, create, compose music, and even have conversations that sounded like they were real (Cooper, 2024). In addition, Patel & Indurkhya (2025) asserted that nowadays, this human-like machine enjoys not just popularity but cultural influence, shaping industries, redefining workplace activities, and becoming a subject of everyday discussion from classrooms to corporate boardrooms.

### AI-Driven Product Innovation

Artificial intelligence technologies are thought to be integrated into the design, development, and improvement processes of goods in order to enhance functionality, performance, a seamless customer experience, and healthy market competitiveness (Cooper, 2024). Businesses leverage AI capabilities, including machine learning, natural language processing, computer vision, and predictive analytics, to enhance traditional research and development processes, resulting in smarter, more adaptable, and customer-centric products and services (Dunka, 2021). Quan,et al., (2023) observed that data is the raw material, and algorithms are the toolkit used in AI-driven product creation to find unmet consumer demands, improve product performance and design, and allow for large-scale personalization and predict erratic demand and market patterns.

As AI speeds up the entire product development process and continuously improves new product designs, it is actually revolutionising product innovation. Artificial intelligence (AI) algorithms estimate market demand, examine customer complaints, and other data to recommend new product designs and interfaces (Hulugh & Ikeh, 2025). Product development becomes more agile, faster, and less expensive as a result. By automating procedures and improving decision-making, artificial intelligence (AI) is transforming industries, spurring more innovation and saving time compared to old processes.

### Application of Chatbot Artificial Intelligence in the Financial Industry

The banking industry is experiencing a major upheaval due to advancement in digital technologies and artificial intelligence (AI). AI-powered chatbots are one of these innovations that have turned into a strategic tool for enhancing customer experiences, boosting operational effectiveness, and enhancing service delivery (Cimpeanu et al., 2023). A chatbot is a conversational interface driven by artificial intelligence (AI) that speaks or text with users in natural language, providing real-time assistance and automating tasks that have traditionally needed human intervention (Polireddi, 2024). In the past, financial institutions mainly relied on human customer service agents to

answer questions, complete transactions, and offer financial guidance. But banks, insurance companies, and investment firms are increasingly looking into smart automation solutions because they need to provide customer care 24 hours a day, their costs are going up, and they are facing more competition from Fintech companies (Bhattacharya & Sinha, 2022).

These issues are addressed by chatbots which are driven by machine learning (ML) and natural language processing (NLP) and provide quick, personalised, and affordable customer service. In addition, Kediya, et al., (2023) asserted that chatbots find numerous applications in the financial industry, including account administration, transaction processing, loan application assistance, fraud detection, and investment advising services. For example, "Erica" from Bank of America and "Eno" from Capital One demonstrate how AI chatbots facilitate account access, provide proactive notifications, and deliver expenditure data. Similarly, payment providers like PayPal have integrated chatbots into messaging applications to enable quick transactions. Cimpeanu et al. (2023) elucidated that AI-powered chatbots provide advantages that surpass mere user convenience. Decreased expenses, scalable services, enhanced data analytics, and insights into consumer behaviour are all beneficial to financial institutions. Moreover, by reducing waiting times and delivering dependable responses, AI chatbots enhance customer happiness (Bhattacharya & Sinha, 2022). Nevertheless, despite its benefits, their use poses questions around cybersecurity, data privacy, the use of AI ethically, and the possible loss of human contact in delicate or sophisticated financial transactions.

**Customer Patronage of the Nigerian Commercial Banks**

The second generation banks in Nigeria generally denote a cohort of privately held, technologically advanced and driven financial institutions that rose during banking reforms in the late 1980s to 1990s. In a saturated market, they distinguish themselves by digital proficiency, service excellence, rapidity, price clarity, security, and brand experience (Ekwe, 2025). Awah et al., (2024) asserted that customer patronage means the extent to which customers choose, use, retain, deepen, and advocate a bank (repeat usage, share of wallet, cross-buy, and word-of-mouth). The prominent 2nd-generation banks in Nigeria comprise Access Bank Plc, Fidelity Bank, Zenith Bank, Guaranty Trust Bank, Eco Bank, First City Monument Bank, etc. These banks experience a surge in customer patronage as a result of quality service delivery and adoption of modern technological infrastructure in serving their clients and maximisation of shareholders' funds (Awah et al., (2024). Financial institutions are utilising technology to distinguish themselves in this competitive landscape (Eze, 2025). Self-service technologies such as automated teller machines, 24/7 online/internet banking, telephone banking, mobile banking, and SMS banking are being employed to meet diverse customer needs, focusing on convenience, transaction security, user-friendliness, information quality, and technology reliability.

**Customer Retention**

Artificial intelligence-driven products banking solutions enhanced by intelligent algorithms are transforming the competitive landscape for financial institutions in a technology-driven market, facilitating customer engagement, and optimising risk management (Onchiri, 2024). Over the past ten years, the Central Bank of Nigeria's (CBN) cashless policy, the rise of Fintech firms, and shifting customer demands for speed, convenience, and personalisation have all contributed to a major technological upheaval in Nigeria's banking industry. In Nigeria's financial sector, second-generation banks like Guaranty Trust Bank (GTBank), Zenith Bank, Access Bank, Fidelity Bank, United Bank for Africa (UBA), and First City Monument Bank (FCMB) hold a special place. Institutions established during the banking sector's liberalisation in the late 1980s and early 1990s tend to exhibit greater flexibility than first-generation banks, while still possessing the requisite scale and resources to adopt new techniques (AbdulGaniyu, et al., 2023).

Furthermore, to preserve market share and enhance customer happiness, these institutions must rapidly adopt AI-driven products in response to competition from agile Fintech firms and digital-only banks (Dunka, 2021). Intelligent chatbots for client support, advanced fraud detection systems, predictive credit scoring models, customised financial product suggestions, and process automation in back-office operations exemplify the applications of AI in banking (Ridha, & Haura Maharani, 2022). Such solutions can help Nigerian second-generation banks tackle sector-specific issues such as high operating costs, low financial inclusion in rural areas, fraud risks, and the requirement to cater for a tech-savvy, mobile-first clientele. AI-driven real-time fraud detection can examine millions of transactions to identify suspicious behaviours, while credit scoring methodologies utilising alternative data can assist in lending to individuals lacking conventional credit histories (Awah et al., 2024). Additionally, by tailoring product offerings to each customer's unique financial demands and behaviours, AI-driven personalisation can greatly enhance customer satisfaction and loyalty. This is consistent with the notable change in Nigerian customer expectations, particularly among Generation Z and millennials, who demand banking services that are as streamlined and customised as those provided by international digital companies. Second-generation banks may improve customer loyalty and operational agility by

incorporating AI into their customer service channels, internet banking platforms, and mobile banking apps. The Nigerian banking sector has experienced a significant transformation in the last thirty years, evolving from conventional branch-focused operations to digital, customer-centric service delivery (Ekwe, 2025). The commercial banks emerged during and after the banking liberalisation period of the late 1980s and 1990s distinguished this group from the first-generation banks by adopting modern technologies, aggressive retail strategies, and innovative products tailored to diverse customer needs. Akinbode et al., (2025) submitted that in the modern highly and dynamic financial environment, technology alone is no longer sufficient; the integration of artificial intelligence (AI) into banking operations is redefining how these institutions create value, enhance efficiency, and sustain competitiveness in the environment. Artificial Intelligence denotes the emulation of human cognitive functions by machines, particularly computer systems, to execute activities including problem-solving, learning, reasoning, and decision-making (Dunka, 2021). Bhattacharya and Sinha (2022) asserted that the utilisation of AI-driven solutions in the financial sector encompasses digital onboarding, fraud detection, credit scoring, automation of customer service, personalised financial advising, and predictive analytics for risk management. Globally, banks are leveraging AI, not only to minimise operational costs but also to improve customer experience and engagement, ensure regulatory compliance, and develop data-driven insights for strategic decision-making.

For Nigerian second-generation banks including Zenith Bank, GTCO, Access Bank, and Fidelity Bank, the integration of AI-driven product innovation has become imperative due to the evolving financial landscape (Ogar, 2024). The increasing demography of technologically adept and digitally orientated consumers, especially Millennials and Generation Z, necessitates efficient, rapid, and customised services. Furthermore, the escalating complexity of cyber fraud, substantial regulatory compliance expenses, and the imperative to enhance financial inclusion have made the use of AI a strategic facilitator (Bhattacharya & Sinha 2022). Polireddi (2024) indicated that AI-driven apps, including chatbots for round-the-clock customer care, biometric authentication systems, predictive credit score models utilising alternative data, and fraud detection algorithms, are assisting banks in decreasing client attrition while mitigating risks. These improvements have markedly decreased service turnaround time, improved operational precision, and created chances for cross-selling financial goods. Moreover, AI augments strategic decision-making by delivering predictive insights regarding customer behaviour, market trends, and portfolio risks, therefore, enhancing the overall competitiveness of second-generation banks.

## 2.1 Theoretical Review

### Diffusion of Innovation Theory

The Diffusion of Innovation (DOI) Theory was propounded by Everett M. Rogers in 1962 in his book Diffusion of Innovations. The theory explains how new ideas, technologies, or practices spread within a social system over time through communication channels. Rogers (1962) grouped adopters into five categories: innovators, early adopters, early majority, late majority, and laggards. This theory assists stakeholders in the banking industry in enhancing customer engagement and retention. Early adopters of AI-driven mobile apps, chatbots, and digital lending tools can influence the early majority, accelerating customer patronage.

## 2.2 Empirical Review

Ekwe (2025) conducted a study on developing an AI-powered sales framework for the digital transformation of B2B banking in Nigeria. The study investigated the strategic application of artificial intelligence (AI) technologies to improve sales processes, customer engagement, and overall efficiency within the Nigerian B2B banking sector. The research employed a mixed-method approach. The findings indicated that AI-driven frameworks, including predictive analytics, intelligent chatbots, and recommendation engines, enhance lead generation, optimise customer relationship management, and augment cross-selling opportunities in B2B banking. The outcome revealed that AI-driven frameworks possess significant potential to transform sales operations by offering Nigerian banks scalable solutions that enhance efficiency, competitiveness, and customer satisfaction in the digital age.

Dunka (2021) examined AI-based customer retention and engagement strategies in retail banking, focusing on the utilisation of machine learning and behavioural analytics for personalised financial services. The research utilised a quantitative design, drawing on secondary data from retail banking operations and case studies of AI-driven financial services. The study's findings indicated that AI-enabled personalisation markedly enhanced customer satisfaction and loyalty through the provision of customised products and timely interventions.

## 3.0 Methodology

This study was guided by a cross-sectional research design using the quantitative method to gather information and analyse it with the aim of investigating the impact of artificial intelligence on the customer patronage of second-generation banks. The population comprised the customers patronising the following banks: Access Bank Plc, Zenith Bank, GTCO and Fidelity Bank. The study population was infinite as the exact population of the listed banks

cannot be ascertained because the customer base continues to surge as a result of the seamless process of opening the account even without their physical presence in the bank. The criteria for choosing these banks are that they are established between late 1980s to the 1990s, licensed and commenced operations during the 1986–1999 deregulation period, privately owned money deposit banks, early IT-driven banking services, retail banking and aggressive expansion, introducing new customer service approaches at the time, and accessibility of primary and secondary data, especially on non-financial activities. The study employed the proportionate stratified sampling technique first and then used the simple random sampling technique to select respondents from the selected banks. Bill Godden's (2004) formula was adopted in selecting the sample size since the researcher was constrained in examining the whole population. The primary source of data was employed through a structured questionnaire administered to the target respondents, and the secondary source from journals, textbooks and online sources was used to substantiate the findings. The reliability test through the Cronbach's alpha co-efficient table gives an average value of 0.87. The study's independent variables (construct) are chatbots and the construct for the dependent variable (customer retention).

$$SS = \frac{Z^2 x (p) x (1 - p)}{C^2}$$

Where:

SS = Sample Size
Z = Z-value (e.g., 1.96 for a 95 percent confidence level)
P =Percentage of population picking a choice, expressed as decimal in this case (0.5)
C = Confidence interval, expressed as decimal (e.g., .05 = +/- 5 percentage points)
In calculating the sample size, the following result was obtained:

$$SS = \frac{1.96^2 \times 0.5 (1 - 0.5)}{0.05^2}$$

$$SS = \frac{3.8416 \times 0.5 \times 0.5}{0.0025}$$

$$SS = \frac{0.9604}{0.0025}$$

Therefore: SS = 384.16
Sample size = **384**

## 4.0 Results and Discussion

**$H_{01}$:** There is no significant relationship between the chatbot AI and the customer retention for the commercial banks.

**Table 1 Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .814[a] | .663 | .661 | .539 |
| a. Predictors: (Constant), Chatbot AI | | | | |

**Source:** SPSS Output, 2025**.**

The model summary in Table 1 shows that 66% of variation in the dependent variable (customer retention) could be attributed to the value of $R^2$ of the independent variable (chatbot) while the remaining 34% is explained by other variables that are not reflected in the model. The correlation co-efficient is 0.814. This value suggests that there is significant relationship between the chatbot AI and the customer retention of the selected commercial banks.

**Table 2 ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 209.925 | 1 | 209.925 | 722.590 | .000[b] |
| | Residual | 107.202 | 241 | .291 | | |
| | **Total** | **317.127** | **242** | | | |
| a. Dependent Variable: Customer retention | | | | | | |
| b. Predictors: (Constant), Chatbot AI | | | | | | |

**Source:** SPSS Output, 2025**.**

As represented in Table 2, the probability value of 0.000 is less than Alpha value of 0.05 which implies that the model is fit and implied null hypothesis rejected and alternative hypothesis accepted

**Table 3 Co-efficient[a]**

| Model | | Unstandardised Co-efficient | | Standardised Co-efficient | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .658 | .090 | | 7.322 | .000 |
| | Chatbot | .788 | .029 | .814 | 26.881 | .000 |
| a. Dependent Variable: Customer Retention | | | | | | |

**Source:** SPSS Output, 2025**.**

From the co-efficient of Table 3, it could be seen that the overall significant effect for the independent and the dependent variable is less than 0.05 significant levels. The Beta value of 0.814 for chatbot AI (independent variable) implies that there is 0.8 increase in the customer retention of the selected back as a result of the adoption of chatbot.

## 5.0 Discussion of Findings

The null hypothesis ($H_{01}$) asserted that there is no significant correlation between chatbot AI and customer retention in commercial banks. The model summary Table 1 presents a correlation co-efficient (R) of 0.814, indicating a strong positive relationship between the chatbot and the customer retention. The co-efficient of determination ($R^2$) = 0.663, suggesting that 66.3% of the variance in customer retention can be explained by chatbot AI, whereas the remaining 33.7% can be attributed to other factors not captured in the model. The ANOVA results in table II reveal that the model is statistically significant (F= 722.590, P=0.000). This implies that the model fits the data and that chatbot AI is a significant predictor of customer retention. Co-efficient table III shows that the unstandardised co-efficient for chatbot AI is 0.788 and the standardised co-efficient is 0.814, with a significant value of 0.000. These findings revealed that the null hypothesis is rejected and the alternative hypothesis accepted: that chatbot AI tools positively influence customer retention. This result aligns with the previous study conducted by Ekwe (2025) and Dunka (2021) that AI-powered frameworks have transformative potential for sales operations, as they provide Nigerian banks with scalable solutions for improving efficiency, competitiveness, and customer satisfaction in the digital era.

## 6.0 Conclusion and Recommendations

Following the findings about the effect of artificial intelligence-driven product innovation on customer patronage in commercial banks in Nigeria, particularly the role of chatbots in client retention, a conclusion was drawn and some recommendations were suggested. The study elucidated the substantial effects of artificial intelligence (AI)-driven product driven on customer patronage in second-generation banks in Nigeria, particularly examining the role of chatbots in customer retention. The study concluded that the implementation of AI-powered chatbots has enhanced the customer-staff interaction by improving service delivery, ensuring real-time responsiveness, and offering tailored support to customers. Chatbots diminish wait times and streamline basic interactions to satisfy the changing demands of tech-savvy consumers, ultimately improving customer retention and enticing prospective customers.
This study advocated that second-generation banks should consistently enhance chatbot-AI systems to deliver straightforward, user-friendly, rapid, precise, and solution-oriented templates. Integration of advanced natural language processing (NLP) is essential to improve communication and diminish consumer complaints. Moreover, the survey suggested that certain customers continue to favour personal involvement for intricate matters. Consequently, banks ought to develop a digital service platform that enables customers to effortlessly escalate complex issues from chatbots to human agents as required.

### Limitations

This study examined one specific objective due to paucity of data, one hypothesis, limited sample size from the selected four banks, potential convenience sampling bias, and cross-sectional design limitations.

### Suggestions for Further Studies

The study focus can be extended to the faith-based banks by future researchers and the mixed method research can be employed as against the quantitative research approach adopted by this study.

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