
ARTIFICIAL INTELLIGENCE DISCLOSURE AND FINANCIAL PERFORMANCE IN THE BANKING SECTOR

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ABSTRACT

The study examined the effect of artificial intelligence (AI) disclosure on the financial performance of banks in Nigeria from 2020 to 2024. Specifically, the study sought to: determine the effect of AI applications disclosures on financial performance, investigate the effect of AI products disclosures on financial performance, and examine the effect of AI services disclosures on financial performance within the Nigerian banking sector. A review of relevant conceptual, theoretical, and empirical literature was conducted, and the study was anchored on agency theory. The research adopted an ex post facto design. The population comprised all listed commercial banks in Nigeria, from which a sample of six banks was selected using a convenience sampling technique. Data were sourced from the annual reports of the sampled banks. Descriptive statistics, correlation analysis, and multiple regression analysis were employed to analyze the data. The findings indicate that AI applications disclosure had a significant positive effect on the financial performance of banks. Similarly, AI products disclosure also exhibited a significant positive effect on financial performance. However, AI services disclosure was found to have no significant effect on financial performance. The study concludes that overall, AI disclosure positively influences the financial performance of banks in Nigeria. It recommends that policies promoting the disclosure of AI applications and products such as mandatory reporting on AI initiatives should be encouraged, as these disclosures have been shown to enhance banks' financial performance.

Key Words: Artificial Intelligence, Disclosure, Financial Performance

INTRODUCTION

The introduction of Artificial Intelligence (AI) has brought significant transformations across various sectors globally, with the banking industry being one of the most affected (Ali, Swiety & Mansour, 2022). In recent years, financial institutions have increasingly adopted AI technologies to improve operational efficiency, customer service, and decision-making processes. However, the impact of AI adoption on the financial performance of banks remains underexplored, particularly in emerging economies such as Nigeria. AI encompasses a wide range of applications in the banking sector, including automated customer service chatbots, fraud detection systems, predictive analytics, and robo-advisors. The deployment of AI technologies can lead to efficiency gains, cost reductions, and innovations that potentially enhance profitability, return on assets (ROA), and return on equity (ROE). In this regard, AI serves as a strategic tool that banks can leverage to strengthen their competitive advantage (Elegunde & Oladimeji, 2020).

The Nigerian banking sector has undergone rapid transformation over the last decade due to the integration of digital technologies. Among these innovations, AI stands out for its transformative potential. AI technologies including machine learning, natural language processing, robotics, and data analytics can improve operations, optimize decision-making, and enhance customer experiences (Kunduru, 2023). AI enables more efficient data analysis, automation of repetitive tasks, personalized marketing strategies, new communication channels such as chatbots, voice recognition systems, and advanced risk management tools for fraud detection and maintenance predictions (Vieira & Sehgal, 2017).

In Nigeria, the adoption of AI in banking has been driven primarily by the need for operational efficiency, risk management, personalized services, and competitiveness in a crowded market. Banks have invested in AI-driven solutions such as chatbots, credit scoring algorithms, fraud detection systems, and automated financial advisory services. When effectively implemented, these technologies can increase profitability, reduce operational costs, and enhance customer satisfaction (Satheesh & Nagaraj, 2021).

Despite its benefits, AI adoption in banking raises concerns related to transparency, regulatory compliance, ethical considerations, and its actual impact on financial performance (Omar, Hasbolah & Ulfah, 2017). AI disclosure refers to the practice of banks providing stakeholders with information on the AI technologies they use, their implementation, and the outcomes of these investments. Globally, the importance of AI disclosure is growing, with frameworks emerging that encourage transparency regarding AI adoption (Shiyyab, Alzoubi, Obidat & Alshurafat, 2023). In Nigeria, there is increasing demand for banks to disclose how AI is leveraged in operations, given the sector's significant economic role. This study investigates the relationship between AI disclosure and financial performance in Nigerian banks. It examines whether transparency in AI applications, products, and services fosters stakeholder trust, enhances market confidence, and potentially improves profitability, market share, and brand value.

Statement of Problem

The rapid integration of AI technologies has transformed many industries, with banking being a key sector. In Nigeria, financial institutions increasingly adopt AI to enhance operational efficiency, customer service, risk management, and decision-making processes. However,

despite these advancements, the effect of AI adoption and disclosure on the financial performance of banks remains insufficiently understood. The Nigerian banking sector faces challenges including financial inclusion, cybersecurity threats, regulatory compliance, and the need for continuous innovation while maintaining profitability. AI technologies, if properly adopted and disclosed, could address many of these challenges by streamlining operations, improving decision-making, and enhancing customer service, which may lead to better financial outcomes.

A major problem lies in the lack of empirical evidence on the relationship between AI disclosure and financial performance. While AI adoption may positively influence cost reduction, revenue generation, and customer satisfaction, the level and manner of disclosure can affect investor confidence, market perception, and ultimately, the bank's financial results (Singh, 2020). Given the novelty and complexity of AI in Nigerian banking, it is necessary to assess whether increased AI disclosure strengthens or undermines a bank's competitive advantage, profitability, and long-term sustainability. Without a clear understanding of this relationship, regulators, investors, and bank management may face challenges in making informed decisions regarding AI investments and disclosure strategies.

Objectives of the Study

The broad objective of the study is to investigate the effect of artificial intelligence disclosure on financial performance in the banking sector in Nigeria. The specific objectives include to:

1. Ascertain the effect of artificial intelligence applications disclosures on financial performance in the banking sector in Nigeria.
2. Investigate the effect of artificial intelligence products disclosures on financial performance in the banking sector in Nigeria.
3. Examine the effect of artificial intelligence services disclosures on financial performance in the banking sector in Nigeria.

Research Question

The following research questions guided this study.

1. To what extent does artificial intelligence applications disclosure affect financial performance in the banking sector in Nigeria?
2. What is the effect of artificial intelligence products disclosures on financial performance in the banking sector in Nigeria?
3. What is the effect of artificial intelligence services disclosures on financial performance in the banking sector in Nigeria?

Research Hypotheses

The following null hypotheses were formulated to guide this study.

1. Artificial intelligence applications disclosure has no significant effect on financial performance in the banking sector in Nigeria.
2. Artificial intelligence products disclosure has no significant effect on financial performance in the banking sector in Nigeria.
3. Artificial intelligence services disclosure has no significant effect on financial performance in the banking sector in Nigeria.

LITERATURE REVIEW

Conceptual Review

Artificial intelligence Disclosure

In recent decades, research in artificial intelligence (AI) has primarily focused on developing intelligent systems capable of performing tasks that traditionally require human intelligence. AI involves the use of computers and software designed to learn, reason, and make decisions based on data (Duan, Edwards & Dwivedi, 2019). Essentially, AI leverages technical knowledge to simulate human intelligence, serving as analytical tools, functional aids, and general support across diverse disciplines. It encompasses the science and techniques of creating machines that exhibit characteristics typically associated with human cognitive abilities. Significant advancements in practical AI applications have emerged in the twenty-first century, driven by the availability of powerful computing systems and vast amounts of data (Korteling, van de Boer-Visschedijk, Blankendaal, Boonekamp & Eikelboom, 2021).

Given the growing integration of AI in business processes, there is a need for transparent disclosure of AI-related activities. Financial disclosure, a cornerstone of financial reporting, is mandated by regulatory authorities worldwide to provide stakeholders with clear information on an organization's financial position. Companies that incorporate AI into their operations must ensure that their financial reporting adequately reflects AI-related activities. Such disclosures are crucial for demonstrating how AI contributes to operational efficiency and the overall performance of the organization. Conversely, improper disclosure or misalignment with reporting standards can undermine company performance and create financial instability (Chen & Zhang, 2022).

Artificial Intelligence (AI) Disclosure refers to the practice of providing transparent and detailed information about the development, deployment, and functioning of AI systems (Ali, Swiety & Mansour, 2022). The primary objective of AI disclosure is to ensure that key stakeholders including developers, users, regulatory bodies, and the general public have access to essential information that helps them understand how AI operates and its potential societal, ethical, and privacy implications. This practice has become increasingly critical as AI technologies proliferate across sectors such as healthcare, finance, transportation, and entertainment (Shiyyab, Alzoubi, Obidat & Alshurafat, 2023).

AI disclosure also involves providing comprehensive information on the scope and manner in which organizations deploy AI technologies. It explains how and why AI is used, the purposes it serves, and the potential benefits and risks involved. The practice is gaining traction due to growing public demand for corporate accountability and governance in technological innovation. While AI disclosure can serve as a means of showcasing technological expertise, it is also essential for establishing trust with investors, customers, and regulatory authorities (Felzmann, Fosch-Villaronga, Lutz & Tamò-Larrieux, 2020). The increasing emphasis on transparency, fairness, and ethics in AI has prompted organizations and governments to prioritize AI disclosure. Global initiatives, such as the European Union's Artificial Intelligence Act, are establishing standards and guidelines for AI deployment that include disclosure requirements. As AI becomes further integrated into daily life, the demand for clear, honest, and accessible disclosure is expected to grow. In conclusion, AI disclosure is fundamental to the responsible development and deployment of AI systems (Hacker, 2023). By making information about how AI operates, makes decisions, and impacts society readily available to users, developers,

regulators, and the public, this practice enhances trust, accountability, and societal benefits while minimizing potential harm (Mishra, 2024).

However, the absence of binding legislation and standardized best practices has made AI disclosure largely a voluntary process. In the context of the Australian disclosure system, organizations enjoy significant discretion in determining both the level and method of reporting, which often results in an incomplete representation of AI activities. Companies may include AI-related information in annual reports, sustainability reports, or technology reports, but the extent of disclosure typically depends on corporate tradition, regulatory requirements, and strategic priorities (Hacker, 2023). AI disclosure can be particularly valuable in the banking sector, where trust and transparency are central to operations. Implementing AI in functions such as fraud detection, customer service, and risk management poses challenges in translating technical capabilities into cultural, legal, and business frameworks. Proper disclosure enables banks to demonstrate a commitment to responsibly regulating AI while simultaneously cultivating a reputation as innovative and accountable organizations (Lappeman, Marlie, Johnson & Poggenpoel, 2022).

Artificial Intelligence Applications Disclosures

Artificial Intelligence Applications Disclosures involve informing stakeholders including users, regulators, investors, and the public about the usage, purpose, functionality, limitations, and potential impacts of AI systems (Abdelraouf, Mohamed & Ahmed, 2025). Essentially, these disclosures communicate how AI technologies are applied in real-world systems and services, employing techniques such as machine learning, deep learning, natural language processing, computer vision, and robotics to perform tasks that emulate human intelligence (Mohamed & Akram, 2023). Such transparency is critical for fostering trust, ensuring accountability, and maintaining compliance, particularly as AI adoption continues to expand across sectors.

Artificial Intelligence Product Disclosures

Artificial Intelligence product disclosure refers to the practice of providing detailed information about software, systems, or applications that leverage AI technologies to perform tasks typically requiring human intelligence (Shiyyab, Abdallah, Qais & Hashem, 2023). Such disclosures generally cover the purpose and functionality of the AI system including its intended use, limitations, and whether it operates autonomously or under human supervision as well as information on data usage, model behavior and performance, user interaction and transparency, and safety considerations, including risks and mitigation measures.

Artificial Intelligence Services Disclosures

Artificial Intelligence (AI) services disclosures refer to the information that companies or service providers offer regarding the operation of their AI-powered services, particularly in ways that may affect users, customers, or third parties (Alzeghou & Alsharari, 2024). These disclosures are essential for promoting transparency, trust, compliance, and ethical responsibility. They typically include explanations of how the AI service functions (beyond the underlying model), the data it uses, the decision-making or outcome-generating processes, associated risks and limitations, and the ways in which users are informed or impacted.

Financial Performance

Financial performance refers to the extent to which a company or organization is achieving its financial objectives and maintaining overall financial health. It is typically assessed

using various metrics and indicators that provide insights into profitability, efficiency, and stability (Ezeagba, John-Akamelu & Umeoduagu, 2017). Different researchers adopt different approaches to measuring financial performance. For instance, Mandy (2014) suggested that performance can be evaluated based on effectiveness, growth and productivity, efficiency, employee sales, export value, total assets, and operating profit ratio. Similarly, Arshada et al. (2014) measured financial performance using financial indicators such as sales, market share, number of employees, return on capital employed, inventory turnover, return on investment, growth, and profits. In this study, Return on Equity (ROE) is employed as the measure of financial performance.

Return on Equity (ROE) is one of the most widely used indicators of corporate financial performance (Firer, Ross, Westerfield & Jordan, 2004). Monteiro (2006) emphasized its importance, stating that ROE is perhaps the most critical ratio for investors to consider. Its popularity among analysts, financial managers, and shareholders stems from the fact that ROE represents the culmination of structured financial ratio analysis (Correia, Flynn, Uliana & Wormald, 2003). ROE measures the extent to which a company effectively utilizes its equity to generate profits, reflecting the profitability of shareholders' investments (Ang, 2001; Sawir, 2005). ROE indicates how efficiently a firm employs shareholders' capital, showing the proportion of net income returned as a percentage of equity. A high ROE signals effective capital management and the company's ability to generate internal cash, whereas a low ROE may indicate inefficiencies in maximizing shareholder wealth. It is calculated as Profit Before Tax ÷ Average Common Stock (Equity). Overall, ROE provides investors and stakeholders with a clear measure of business profitability and the efficiency of using shareholders' resources.

Theoretical Framework

This study is anchored on agency theory, which was first proposed by Jensen and Meckling (1976). Agency theory introduces the concept of the agency relationship, which arises when one party, known as the principal, delegates decision-making authority to another party, the agent. Conflicts of interest can emerge between the principal and the agent due to differing goals, priorities, or risk preferences. The key elements of agency theory include:

- Principal-Agent Relationship – the delegation of decision-making authority from owners to managers or agents.
- Information Asymmetry – a situation in which agents have more information than principals, potentially leading to suboptimal decisions.
- Conflicts of Interest – divergent objectives between principals and agents that can affect organizational outcomes.
- Agency Costs – costs incurred to monitor and align agent behavior with the principal's interests.
- Incentives and Contracts – mechanisms designed to motivate agents to act in the best interest of principals.
- Moral Hazard – the risk that agents may act opportunistically when their actions are not fully observable.

Agency theory is particularly relevant to this study because it highlights the challenges of information asymmetry between managers (agents) and shareholders (principals), which can be mitigated through effective disclosures. According to signaling theory, firms can use voluntary disclosures to signal their quality and value to investors. Managers of high-quality firms often

employ voluntary disclosures to differentiate themselves from lower-quality firms, while poorly performing companies may delay or conceal such disclosures due to their potential negative impact on market perception.

In the context of this study, examining the impact of AI disclosures on financial performance requires understanding how bank governance and shareholders influence these disclosures. Since AI implementation directly affects shareholders and the board of directors, applying agency theory provides insight into whether these parties are aligned in supporting AI adoption and disclosure in annual reports, or whether conflicting interests exist. This theoretical framework thus helps explain the mechanisms through which AI-related information is communicated to stakeholders and how it may influence financial outcomes.

Empirical Review

This section reviews related empirical studies on the impact of artificial intelligence (AI) disclosure on financial performance in the banking sector. Alzeghou and Alsharari (2024) examined how AI disclosure affects financial reporting and performance using empirical evidence from the top 10 banks in the United States. The study combined qualitative and quantitative analyses, utilizing SEC and NASDAQ databases to scrutinize AI-related disclosures. AI-related terms were treated as the independent variable and categorized into three groups: (1) digital awareness, transformation, and capabilities; (2) AI applications, products, services, and processes; and (3) AI information challenges and cybersecurity threats. Financial performance metrics, including return on assets (ROA), return on equity (ROE), and net interest income, served as the dependent variables, while control variables included board size, proportion of independent board members, long-term debt to total debt ratio, bank size, and bank age. Using multiple regression analysis, the study found that AI influences financial performance only when moderated by the interaction of shareholders, the board of directors, and independent board members. The findings also indicate a growing trend in AI disclosure within financial reports, highlighting its impact on ROA, ROE, and net interest income.

Napitupulu (2024) investigated the effect of AI disclosure on the financial performance of banks listed on the Indonesia Stock Exchange from 2020 to 2022. AI disclosures were categorized into the same three groups: digital awareness, transformation, and capabilities; AI applications, products, services, and processes; and AI information challenges and cybersecurity threats. The study constructed an AI disclosure index based on the frequency of AI-related terms in annual reports. Multiple linear regression analysis revealed a consistent increase in AI disclosure since 2020. While digital awareness, transformation, and capabilities had no significant effect on ROA, price-earnings ratio, or total operating expenses, AI applications, products, services, and processes positively affected total operating expenses but not ROA or price-earnings ratio. Additionally, disclosures on AI information challenges and cybersecurity threats positively impacted ROA and total operating expenses but negatively affected the price-earnings ratio.

Fadi, Abdallah, Qais, and Hashem (2023) explored AI disclosure and its effect on financial performance in Jordanian banks. The study assessed the extent to which banks refer to and utilize AI technologies in their operations and analyzed the impact of AI-related disclosures on financial performance. Using content analysis of textual data from 115 annual reports of 15 banks listed on the Amman Stock Exchange between 2014 and 2021, coupled with regression

analysis, the study found a steady increase in AI-related disclosures over the period. However, disclosure levels remain weak for some banks, indicating that Jordanian banks are still in the early stages of AI adoption. The results show that AI-related keyword disclosures positively influence accounting performance, particularly ROA and ROE, while negatively affecting total expenses.

Abdelraouf, Mohamed, and Ahmed (2025) examined AI disclosure and financial performance in 17 Egyptian banks listed under the Central Bank of Egypt from 2017 to 2023. Using content analysis of annual reports, AI-related terms were identified, and regression analysis was applied to assess their impact on financial performance. The results revealed that AI disclosure has been gradually improving, although some banks still maintain low levels of disclosure, indicating that extensive AI application is in its early stages. The study found that AI disclosure positively affects accounting performance specifically return on assets (ROA) and return on equity (ROE) while reducing total operational costs.

Mohamed and Akram (2023) investigated the impact of AI applications such as Expert Systems, Genetic Algorithms, Artificial Neural Networks, and Intelligent Agents on financial services quality and financial performance in the Egyptian banking sector. Employing a survey design with 384 bank managers and analyzing data through structural equation modeling (SEM), the study found that AI applications generally enhance financial services quality. However, artificial neural networks had no significant effect on tangibility and reliability, and intelligent agents showed no significant effect on responsiveness. The study also demonstrated that AI applications positively influence the financial performance of Egyptian banks.

Priya, Nidhi, and Andrés (2024) explored the effect of AI on financial performance in 12 Indian banks listed in the NIFTY Bank Index over a five-year period. Using a mixed-methods approach, the study combined quantitative dynamic panel data modeling with qualitative content analysis of annual reports to assess AI-related disclosures. AI was the independent variable, while return on assets (ROA), return on equity (ROE), and net interest margin served as dependent variables. Control variables included bank ownership type, age, and total assets. The findings indicate that AI integration significantly enhances financial performance, particularly ROE. The study highlighted that improved operational efficiency and reduced errors contribute to profitability, emphasizing the importance of transparent AI-related disclosures in building stakeholder confidence.

Shiyyab, Abdallah, Qais, and Hashem (2023) examined AI disclosure and financial performance in 15 Jordanian banks listed on the Amman Stock Exchange between 2014 and 2021. The study analyzed the frequency of AI-related terms in annual reports using content analysis and measured accounting performance through ROA, ROE, and net interest income. Independent variables included AI-related term disclosure frequency, while control variables comprised board size, board independence, bank ownership structure, cost of capital attributes, and bank level. Results showed a steady increase in AI-related disclosures over the period; however, some banks still exhibited low disclosure levels, indicating early-stage AI adoption. The study concluded that AI-related disclosures positively impact accounting performance (ROA and ROE) and reduce total expenses, supporting the view that AI improves revenue and cost efficiency, consistent with prior research.

Amar (2024) examined the impact of artificial intelligence (AI) on the performance and quality of accounting information systems (AIS) and the accuracy of financial data reporting in India. This cross-sectional study involved 566 accountants and finance officers responsible for handling and reporting financial data, selected through purposive sampling across various locations in India. Data analysis was conducted using partial least squares structural equation modeling (PLS-SEM). The findings indicate that relevance, accuracy, variability, and timeliness significantly influence the quality of AIS. Moreover, both AI and internal control systems were found to positively affect AIS quality and serve as significant mediators between AIS quality and the accuracy of financial data reporting. Additionally, AIS quality, internal control systems, and AI significantly and positively influence the accuracy of financial data reporting.

Qian and Chenghao (2023) investigated the effect of AI strategy on corporate financial performance in the Chinese auto industry. The study analyzed 140 annual reports from 20 A-share listed auto companies covering the period 2013–2019. Profitability indicators, including return on assets (ROA) and return on equity (ROE), were used as dependent variables, while the emphasis on AI strategy served as the explanatory variable. The results show a significant positive correlation between AI and both ROA and ROE, indicating that prioritizing AI in corporate strategy can effectively enhance financial performance. The study suggests that integrating AI into future company strategies can play a critical role in improving overall corporate profitability.

Gap in Literature

A major gap identified in the literature is that most studies focus on AI adoption, implementation, and its general impact on the financial sector, but pay limited attention to how AI disclosure particularly through annual reports affects the financial performance of banks. While AI adoption in the banking sector is increasing globally, research specifically examining the disclosure of AI technologies and its direct impact on financial performance in Nigeria remains scarce. Most existing studies on AI disclosure have been conducted in developed markets, such as the United States and various Asian countries, leaving a significant gap in understanding the phenomenon in developing economies. In particular, there is a lack of research investigating how AI disclosure encompassing AI application, AI product, and AI services disclosures affects the financial performance of Nigerian banks. Furthermore, many studies on AI's impact on financial performance draw data from multiple sectors, rather than focusing exclusively on banking. Given the unique characteristics of the Nigerian banking sector, including its regulatory framework, financial inclusion objectives, and diverse customer base, there is a critical need for research that specifically examines how AI disclosure influences the financial performance of banks in this context.

METHODOLOGY

The study adopted an ex post facto research design and relied on secondary data obtained from the published financial statements of the selected commercial banks. The data covered a five-year period from 2020 to 2024. The population of the study comprised all quoted commercial banks in Nigeria, from which a sample of six banks was selected using the convenience sampling technique. The selected banks include Union Bank of Nigeria Plc, First Bank of Nigeria Plc, United Bank for Africa Plc, Fidelity Bank Plc, Zenith Bank Plc, and Stanbic IBTC Plc.

Descriptive statistics were employed to evaluate the characteristics of the data, including mean, maximum, minimum, and standard deviation, and to assess the normality of residuals. Correlation analysis was conducted to examine the association between variables and to identify potential multicollinearity issues. To test the causal relationship between the independent and dependent variables, the study employed multiple regression analysis. The ordinary least squares (OLS) estimation technique was chosen due to its desirable properties of unbiasedness, consistency, efficiency, sufficiency, and best linear estimation (Gujarati, 2004). To ensure the validity of the regression coefficients and the reliability of the results for recommendations and conclusions, the regression outcomes were tested for common econometric issues, including autocorrelation, heteroskedasticity, and multicollinearity.

The models for this work are based on the objective of the study. The model measured the effect of artificial intelligence disclosure on financial performance of deposit money banks in Nigeria. His model is stated in functional form as:

$$ROE = f(AIAD, AIPD, AISD, FS)$$

Where

ROE = Return on Equity

AIAD = Artificial Intelligence Applications Disclosures

AIPD = Artificial Intelligence Products Disclosures

AISD = Artificial Intelligence Services Disclosures

FS = Firm Size

From functional form, the econometric form is stated thus:

$$ROE = \beta_0 + \beta_1 AIAD + \beta_2 AIPD + \beta_3 AISD + \beta_4 FS + \mu \quad (1)$$

Where

β_0 = Intercept

β_1 = Coefficient of Parameter Artificial Intelligence Applications Disclosures

β_2 = Coefficient of Parameter Artificial Intelligence Products Disclosures

β_3 = Coefficient of Parameter Artificial Intelligence Services Disclosures

β_4 = Coefficient of Parameter Firm Size

μ = Stochastic disturbances or error term

RESULTS

In this section, data are analyzed and results presented. The results of the models are presented and the parameter estimates subjected to statistical and econometric tests. The estimation was carried out using the E-views software.

Descriptive Statistics

This measure the individual characteristics of the variables used in this study. The result of the descriptive statistics is presented in the table below.

Table 1 Descriptive Statistics

ROE	AIAD	AIPD	AISD	FS
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Mean	0.078523	0.058175	0.457128	0.158233	8460164.
Median	0.032000	0.475000	0.463000	0.102400	492981.0
Maximum	0.778000	0.846000	0.834000	0.960100	9670760.
Minimum	0.001000	0.220000	0.322000	0.432500	3973.000
Std. Dev.	0.123360	24.10777	0.052893	0.160234	26673239
Jarque-Bera	2787.518	5464.810	3.569454	407.4618	4054.525
Probability	0.092731	0.341215	0.167843	0.126541	0.250892
Observations	30	30	30	30	30

Source: E-view 9.0

Table 1 presents the descriptive statistics, including the mean, median, maximum, minimum, standard deviation, and count for each variable of interest. These results provide insights into the nature of artificial intelligence (AI) disclosure and the financial performance of the commercial banks included in the study. Return on Equity (ROE) has a mean value of 0.078523, with a minimum of 0.01000 and a maximum of 0.032000. The standard deviation of 0.123360, which is higher than the mean, indicates substantial variability in ROE over the period under review. Additionally, ROE recorded a Jarque-Bera statistic of 2387.518 with a probability value of 0.092731, which falls within the acceptable threshold, suggesting that ROE is approximately normally distributed.

Artificial Intelligence Application Disclosure (AIAD) has a mean value of 0.058175, with a maximum of 0.834000 and a minimum of 0.220000. The standard deviation of 24.10777, which exceeds the mean, indicates a high variability in AI application disclosure over the period under review. The Jarque-Bera statistic of 5464.810 with a probability value of 0.341215 suggests that AIAD is approximately normally distributed. Table 1 also shows that Artificial Intelligence Product Disclosure (AIPD) has a mean value of 0.457128, with a maximum of 0.834000 and a minimum of 0.220000. The standard deviation of 0.052893 indicates relatively slow growth in AIPD during the period under review. The Jarque-Bera statistic of 3.569454 with a probability value of 0.1677843 confirms that AIPD data is approximately normally distributed.

Artificial Intelligence Services Disclosure (AISD) recorded a mean value of 0.158233, with a maximum of 0.960100 and a minimum of 0.432500. The standard deviation of 0.160243, which exceeds the mean, indicates rapid growth in AISD over the period under review. The Jarque-Bera statistic of 407.4618 with a probability value of 0.126541 suggests that AISD is approximately normally distributed. Similarly, Firm Size (FS) recorded a mean value of 8,460,164.0, with a maximum of 9,670,760 and a minimum of 3,973.0. The standard deviation of 26,673,239, which is substantially higher than the mean, indicates significant growth variability in firm size during the period. The Jarque-Bera statistic of 4,054.525 with a probability value of 0.250892 confirms that firm size data is approximately normally distributed.

Correlation Analysis

A correlation matrix was employed to examine the strength and direction of the relationships between the variables used in the study, as well as to assess the presence of multicollinearity among the explanatory variables. Multicollinearity is a concern because it inflates standard errors, which in turn lowers the t-statistics and can affect the reliability of regression results. The results of the correlation analysis are presented in Table 2 below.

Table 2 Correlation Matrix for the Model

	ROE	AIAD	AIPD	AISD	FS
ROE	1.000000				

AIAD	0.445450	1.000000			
AIPD	0.637901	-0.247325	1.000000		
AISD	0.619807	-0.117739	0.077109	1.000000	
FS	0.128908	-0.121091	0.018840	-0.070558	1.000000

Source: E-view 9.0

Table 2 shows that all the variables are positively correlated with Return on Equity (ROE). Specifically, Artificial Intelligence Application Disclosure (AIAD) has a correlation coefficient of 0.445450, indicating a strong positive relationship with ROE. Artificial Intelligence Product Disclosure (AIPD) recorded a correlation coefficient of 0.637901, while Artificial Intelligence Services Disclosure (AISD) had a coefficient of 0.619807, both reflecting very strong positive relationships with ROE. In contrast, Firm Size (FS) recorded a correlation coefficient of 0.128908, suggesting a very weak relationship with ROE. According to the rule of thumb, a correlation coefficient greater than 0.8 indicates potential multicollinearity, whereas a coefficient below 0.8 suggests no multicollinearity. Based on this criterion, we conclude that the explanatory variables in Model One are not perfectly linearly correlated.

Estimation Results

The model formulated in the study was estimated using multiple regression analysis and the results are presented below.

Table 3 Regression Estimate for the Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.987024	0.362051	13.77436	0.0000
AIAD	0.069576	0.018845	3.691940	0.0000
AIPD	0.035660	0.034816	2.024232	0.0008
AISD	0.176643	0.044869	1.936898	0.2781
FS	0.250807	0.064668	3.878369	0.0006
R-squared	0.772110	Mean dependent var		3.824044
Adjusted R-squared	0.724743	S.D. dependent var		0.224308
S.E. of regression	0.093904	Akaike info criterion		-1.655894
Sum squared resid	0.238084	Schwarz criterion		-1.181856
Log likelihood	42.46198	Hannan-Quinn criter.		-1.487235
F-statistic	18.41185	Durbin-Watson stat		2.062011
Prob(F-statistic)	0.000000			

Source: E-view 9.0

Using the estimated results of the fitted regression model presented in Table 3, the following observations were made:

Artificial Intelligence Application Disclosure (AIAD): The regression coefficient for AIAD is 0.069576, with a t-statistic of 3.691940 and a probability value of 0.0000, indicating statistical significance. This suggests that AIAD has a positive and significant effect on financial performance, as measured by return on equity (ROE), for banks in Nigeria during the period under review.

Artificial Intelligence Product Disclosure (AIPD): The coefficient for AIPD is 0.035660, with a t-statistic of 2.024232 and a probability value of 0.0008, which is statistically significant. This

implies that AIPD has a significant positive effect on the financial performance of quoted banks in Nigeria.

Artificial Intelligence Services Disclosure (AISD): The regression coefficient for AISD is 0.176643, with a t-statistic of 1.936898 and a probability value of 0.2781, indicating statistical insignificance. This suggests that AISD has an insignificant positive effect on the financial performance of banks within the period under review.

Firm Size (FS): The coefficient for firm size is 0.250807, with a t-statistic of 3.878369 and a probability value of 0.0006, indicating high statistical significance. This shows that firm size has a significant positive effect on the financial performance of Nigerian banks.

Coefficient of Determination (R^2)/Adjusted R^2 : The model's R^2 is 0.772110, with an adjusted R^2 of 0.724743, indicating that approximately 72.5% of the variation in financial performance is explained by the independent variables included in the model.

F-Statistic: The F-test was used to assess the overall significance of the model. The F-statistic value of 18.41185 is highly significant, indicating that the AI disclosure variables collectively have a significant effect on the financial performance of banks, all else being equal.

Durbin-Watson (DW) Statistic: The DW statistic of 2.062011, which approximates 2, suggests the absence of autocorrelation in the model. This confirms that the model is reliable for realistic forecasting.

Diagnostic Statistics

The reliability of the econometric models of estimation and data analysis were determined using Serial Correlation and Heteroskedascity and the results according to models were presented below.

Serial Correlation Test

Serial correlation investigates whether there is a correlation between one time period and another over time in the time series used for the analyses.

Table 4: Serial Correlation Test for the Model

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.089289	Prob. F(2,25)	0.9149
Obs*R-squared	0.269512	Prob. Chi-Square(2)	0.8739

Source: Author's Computation from E-view 9.0

Table 4 shows an F-statistic value of 0.089289 with a probability value of 0.9149, which is greater than 0.05. This indicates the absence of serial correlation in the model. Consequently, the nature of the relationships, whether positive or negative observed in the regression results is reliable and accurately reflects the model's characteristics. This confirms that the hypothesis test results correctly represent the effect of artificial intelligence disclosure on the financial performance of banks in Nigeria, as measured by return on equity (ROE).

Heteroskedasticity Test

Heteroskedasticity was also tested in the linear regression analysis. The presence of heteroskedasticity indicates that the estimated regression coefficients may be biased and inefficient. Specifically, it implies that the variance of the error terms is not constant across observations, which can affect the reliability of the model's estimates.

Table 5: Heteroskedasticity Test for the Model

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.171089	Prob. F(10,27)	0.3514
Obs*R-squared	11.49583	Prob. Chi-Square(10)	0.3202
Scaled explained SS	7.570712	Prob. Chi-Square(10)	0.6707

Source: Author's Computation from E-view 9.0

The Breusch-Godfrey Serial Correlation LM test yielded an F-statistic of 1.171089 with a probability value of 0.3514. Since the probability value exceeds 0.05, we fail to reject the null hypothesis, indicating that the residuals are homoscedastic. Therefore, there is no evidence of heteroskedasticity in the model, implying that the estimated results are unbiased and reliable.

4.5 Test of Research Hypotheses

In this section, the hypotheses formulated earlier in the study were tested for empirical significance and the results are presented below.

Hypothesis 1: Artificial intelligence applications disclosure has no significant effect on financial performance in the banking sector in Nigeria.

Based on the t-statistic of 3.691940 and a probability value of 0.0010 in Table 3, which is statistically significant, we reject the null hypothesis and accept the alternative hypothesis. This indicates that artificial intelligence application disclosure has a significant effect on financial performance in the Nigerian banking sector.

Hypothesis 2: Artificial intelligence products disclosure has no significant effect on financial performance in the banking sector in Nigeria.

Based on the t-Statistics value of 2.024232 and its probability value of 0.0008 in Table 3 which is statistically significant, we reject the null hypothesis and accept the alternative hypothesis. This implies that artificial intelligence products disclosure has no significant effect on financial performance in the banking sector in Nigeria.

Hypothesis 3: Artificial intelligence services disclosure has no significant effect on financial performance in the banking sector in Nigeria.

Based on the t-Statistics value of 1.936898 and its probability value of 0.2781 in Table 3 which is statistically insignificant, we accept the null hypothesis and reject the alternative hypothesis. This implies that artificial intelligence services disclosure has no significant effect on financial performance in the banking sector in Nigeria.

CONCLUSION

The study examined the effect of artificial intelligence disclosure on financial performance in the banking sector. Data sourced from five commercial banks were subjected to empirical analysis and the following were discovered. The study found that artificial intelligence applications disclosure had significant positive effect on financial performance in the banking sector in Nigeria. The study also found that artificial intelligence products disclosure had significant positive effect on financial performance in the banking sector in Nigeria. The study further found that artificial intelligence services disclosure had no significant effect on financial performance in the banking sector in Nigeria. The study concludes that artificial intelligence applications disclosure and artificial intelligence products disclosure have significant positive effect on financial performance while artificial intelligence services disclosure had no significant effect on financial performance of banks in Nigeria.

Based on the findings of the study, the following were recommended.

1. Policies that will sustain AI application disclosure (such as mandatory disclosure on AI matters) should be encouraged because this has shown to be beneficial to the financial performance of banks.
2. Banks should have positive disposition towards AI product disclosure in their annual reports as the level of disclosure of this information has influenced their financial performance over the years.
3. Since AI service disclosure was found to have an insignificant effect on financial performance, the recommendation in this direction is that valuable financial, material and human resources should be channeled less on policies that relates to improving AI services if the desire is to gain improved return on equity.

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