Effect of Artificial Intelligence on the Financial Performance of Deposit Money Banks in Nigeria

Omole Ilesanmi Isaac[1], Diisu Jimoh[2]

Department of Accountancy, Federal Polytechnic, Ileoluji, Ondo State, Nigeria

Department of Accounting, University of Calabar, Cross River State, Nigeria

Abstract

This study investigates the effect of Artificial Intelligence (AI) on the financial performance of deposit money banks in Nigeria, using Earnings Per Share (EPS) as the primary measure of profitability. The research focuses on three AI-related indicators: Software Book Value (SBV), AI-Related Keyword Disclosures (AKD), and Software Expenses Disclosed (SED). Descriptive statistics reveal substantial disparities in AI software investments (SBV), with some banks reporting significant asset values and others showing impairments or negative values. Keyword disclosures and software expense reporting were more uniformly distributed across banks. Using a fixed effects regression model, the study found that AI-related variables collectively have a statistically significant impact on EPS (F-statistic = 18.40, $p < 0.0000$), explaining 72.44% of the variation in profitability. Among the individual variables, SBV exhibited a positive and statistically significant effect on EPS ($p < 0.05$), indicating that higher tangible AI investments enhance financial performance. However, AKD and SED showed no significant individual influence on EPS, suggesting that superficial or nominal AI engagements do not translate into improved earnings. The study concludes that the financial performance of Nigerian deposit money banks is significantly enhanced by actual AI integration, rather than by disclosure or reporting alone. It recommends that banks increase tangible AI investments, embed AI into core operational areas, and align disclosures with substantive implementation. Regulatory and industry support should focus on fostering genuine adoption, while capacity building in AI expertise should be prioritized to ensure sustainable performance improvements in the banking sector.

Keywords: Artificial Intelligence (AI), Financial Performance, Earnings Per Share (EPS), Deposit Money Banks, Nigeria, Software Book Value (SBV), AI Disclosures, Software Expenses Disclosed (SED), Fixed Effects Model, Fintech Integration, Profitability, AI Investment, Banking Sector.

1.1 Background to the Study

The global financial landscape has undergone a profound transformation in recent decades, driven by the advent of advanced technologies that have redefined operational paradigms across industries. In Nigeria, the financial technology (fintech) sector has emerged as a pivotal force in this evolution, propelled by the rapid integration of Artificial Intelligence (AI). This technological shift marks a departure from traditional, labor-intensive methods toward automated, intelligent systems capable of addressing complex challenges with unprecedented efficiency. Chukwu and Nwachukwu (2022) observe that there has been a paradigm shift from primitive techniques to technology-driven operations, with AI taking a prominent position in modern organizations. They define AI as a computer-assisted analytical process that seeks to create automated systems exhibiting intelligent behavior, a perspective echoed by Mohammad and Gang (2019), who describe it as a tool for intellectual problem-solving using sophisticated computer systems. This conceptualization underscores AI's role as a transformative force, particularly in Nigeria's burgeoning fintech industry, where listed companies are increasingly leveraging its capabilities to enhance service delivery and financial outcomes.

AI encompasses a broad spectrum of technologies, including machine learning, natural language processing, robotic process automation, and predictive analytics, all of which enable organizations to process vast datasets, automate routine tasks, and derive actionable insights. Adejola, Noguera, and Lambe (2024) emphasize that AI has become a strategic necessity rather than a mere trend, particularly in financial sectors like banking and fintech, where efficiency, customer satisfaction, and risk management are paramount. In Nigeria, fintech companies—ranging from digital payment platforms to lending and investment firms—have embraced AI to meet the demands of a tech-savvy population and a rapidly digitizing economy. The application of AI in this context is not only about operational efficiency but also about achieving a competitive advantage, a point Chukwu and Nwachukwu (2022) highlight as a key motivator for organizations adopting intelligent systems. They argue that firms use AI to enhance their financial position, aligning technological investments with broader organizational goals of profitability and sustainability.

The Nigerian fintech sector has witnessed exponential growth, fueled by a youthful demographic, widespread mobile penetration, and a pressing need for inclusive financial services. This growth has been accompanied by an increasing reliance on AI-driven solutions to address challenges such as fraud detection, credit scoring, and customer personalization. Nwala et al. (2020) examined the adoption of AI in emerging markets, including Nigeria, and found that investments in machine learning and natural language processing positively influenced financial performance metrics like return on equity (ROE). Although their study focused on banking, the parallels with fintech are evident, as both sectors prioritize innovation and customer-centric solutions. Similarly, Omoruyi and Orobator (2022) explored the relationship between software investments—often a proxy for AI—and profitability in Nigerian banks, concluding that such investments enhance ROE by facilitating automation and improved data management. These findings suggest that AI's benefits extend beyond operational enhancements to tangible financial gains, a hypothesis this study seeks to test within the fintech domain.

Historically, the integration of technology into financial services has been a catalyst for economic development, a trend Chude (2015) documented in his evaluation of technology investments in Nigerian banks. He found that AI-driven initiatives significantly boosted profitability and efficiency, underscoring their role in modernizing financial operations. Oyewobi and Lawal (2023) further corroborate this, noting that AI investments, proxied by the book value of software assets, significantly influenced ROE among Nigerian deposit money banks. While these studies focus on traditional banking, their insights are instructive for fintech companies, which operate at the intersection of finance and technology and face similar pressures to innovate. The use of AI in fintech extends to applications such as chatbots for customer support, algorithmic trading, and automated risk assessment, all of which contribute to operational agility and financial performance.

The intellectual discourse surrounding AI's impact on financial performance is rich yet varied. Elegunde and Shotunde (2020) argue that AI's advanced capabilities—such as high-speed communication and superior decision-making—revolutionize business processes, a view shared by Singh and Kapoor (2018), who highlight its potential to redefine competitive dynamics. Conversely, Minzhen Xie (2019) cautions that the benefits of AI may be context-specific, depending on factors like infrastructure and regulatory frameworks, a critical consideration for Nigeria's emerging fintech ecosystem. Mattew Scherer (2016) adds a legal and ethical dimension, suggesting that AI's deployment raises questions about accountability and oversight, issues that fintech firms must navigate as they scale their operations. These diverse perspectives underscore the complexity of AI's role in financial performance, necessitating a localized study to unpack its effects in Nigeria's fintech sector.

In Nigeria, the adoption of AI by listed fintech companies is driven by both opportunity and necessity. The country's financial system has historically been constrained by inefficiencies, limited access to credit, and high operational costs—challenges that AI is uniquely positioned to address. For instance, AI-powered platforms can analyze alternative data to assess creditworthiness, enabling fintechs to serve unbanked populations more effectively than traditional banks. Chukwu and Nwachukwu (2022) note that robots and machines, programmed with complex algorithms, are increasingly performing tasks once reserved for humans, achieving objectives with greater precision and speed. This shift is evident in Nigeria, where fintechs like Flutterwave, Paystack, and Opay have integrated AI to streamline payments, enhance security, and optimize resource allocation. The promise of a "boom" in financial performance, as described by Chukwu and Nwachukwu, hinges on the effective application of these technologies, aligning financial outcomes with strategic goals.

The global context further illuminates Nigeria's fintech trajectory. Mohammad and Gang (2019) assert that AI's ability to mimic human intelligence makes it a game-changer for industries worldwide, a sentiment echoed by Adejola et al. (2024), who highlight its role in improving ROE and operational capabilities in banking. In Nigeria, fintech companies face unique opportunities and challenges, including a large informal economy, inconsistent power supply, and evolving regulatory frameworks. These factors shape how AI is deployed and its subsequent impact on

financial metrics such as return on assets (ROA) or ROE. Nwala et al. (2020) emphasize that in emerging markets, AI's value lies in its ability to reduce costs and enhance customer engagement, areas where Nigerian fintechs have made significant strides. For example, AI-driven fraud detection systems have bolstered trust in digital transactions, a critical factor in a market historically plagued by financial scams.

Despite its promise, the adoption of AI in Nigeria's fintech sector is still in its infancy, with limited empirical evidence to guide policy and practice. Chukwu and Nwachukwu (2022) argue that the world is gradually familiarizing itself with the activities of machines and robots, a process Nigeria is actively part of as its fintech industry matures. Oyewobi and Lawal (2023) stress the importance of continuous investment in AI to maintain competitiveness, a call that resonates with fintech firms seeking to differentiate themselves in a crowded market. This study builds on these insights, aiming to examine how AI influences the financial performance of listed fintech companies in Nigeria. By exploring the interplay between AI components—such as software, hardware, and automation—and financial outcomes, the research seeks to provide a comprehensive understanding of how these technologies can drive sustainable growth in an emerging market context.

In conclusion, the background to this study is rooted in the transformative potential of AI, as articulated by scholars like Chukwu, Nwachukwu, Adejola, Noguera, Lambe, and others. Nigeria's fintech sector stands at a crossroads, where the strategic deployment of AI could unlock significant financial gains, mirroring trends observed in banking by Omoruyi, Orobator, Chude, Oyewobi, and Lawal. Yet, the localized dynamics of Nigeria's economy, as noted by Elegunde, Shotunde, Singh, Kapoor, Minzhen Xie, and Scherer, demand a tailored investigation. This study, therefore, seeks to bridge the gap between global trends and local realities, offering insights into how AI can catalyze a financial "boom" for listed fintech companies in Nigeria.

1.2 Statement of the Problem

The emergence of Artificial Intelligence (AI) as a transformative technology has sparked widespread discourse in the 21st century, reshaping industries, including financial services. While AI's benefits—such as automation, cost reduction, and improved decision-making—are widely recognized, its specific impact on the financial performance of listed deposit money banks offering fintech services in Nigeria remains insufficiently explored. Chukwu and Nwachukwu (2022) argue that despite AI's acclaimed role in revolutionizing organizational processes, empirical evidence on its effect on financial performance in Nigeria is scarce, attributed to the country's early-stage AI adoption. This uncertainty is particularly acute for deposit money banks integrating fintech solutions, where rapid digital innovation necessitates a clearer understanding of how AI components—like software investments and automation—drive financial outcomes.

Existing research offers varied insights into AI's influence on financial performance, yet it largely overlooks Nigeria's unique banking context. Scholars like Elegunde and Shotunde (2020) found AI enhances non-financial measures (e.g., customer satisfaction) in Access Bank and

UBA, but their focus excludes comprehensive financial metrics like Earnings Per Share (EPS) or Price-to-Earnings Ratio (P/E). Similarly, Amer (2018) and Fadishehab et al. (2023) report positive AI impacts on productivity and Return on Assets (ROA) in Middle Eastern and Jordanian banks, respectively, yet these studies' regional scope and reliance on primary data limit applicability to Nigeria's fintech-driven banking sector. Adejola et al. (2024) observed that AI investments in Nigerian deposit money banks boost Return on Equity (ROE) through efficiency gains, but their findings do not extend to fintech-specific services or a broader set of performance indicators, leaving a gap in understanding AI's full financial impact.

The literature reveals additional shortcomings: a predominant focus on developed economies or traditional banking (e.g., Singh & Kapoor, 2018; Minzhen Xie, 2019), inadequate use of secondary financial data over extended periods, and sparse integration of fintech-specific AI proxies like Software Expenses Disclosure (SEd) or Software Book Value (SBV) (Ekpa et al., 2023; Mogaji & Nguyen, 2021). In Nigeria, listed deposit money banks face distinct challenges—regulatory complexities, infrastructural deficits, and a nascent digital ecosystem— that may alter AI's dynamics compared to other contexts, yet these factors remain underexamined. Ekpa et al. (2023) found chatbots positively affect ROA in Nigerian banks, but their study's scope (2012–2021) misses recent fintech advancements and excludes metrics like EPS.

This study addresses these gaps by investigating how AI influences the financial performance of listed deposit money banks offering fintech services in Nigeria over 2014–2023, using secondary data to analyze AI components (SED, SBV, AI-Related Keyword Disclosures) and their effects on EPS. The main objective is to examine the effect of artificial intelligence on the financial performance of financial technology companies in Nigeria.

2.1 Literature Review

2.2 Conceptual Review

2.2.1 The Concept of Artificial Intelligence

Artificial Intelligence (AI) represents a transformative domain of technologies designed to emulate human intelligence, enabling machines to perform tasks such as learning, problem-solving, and decision-making with remarkable efficiency. As defined by Sundar (2020), AI is a branch of computer science dedicated to creating programs that execute functions traditionally requiring human cognition, including perception, reasoning, and language comprehension. Similarly, IEEE-USA (2017) describes AI as a spectrum of systems, ranging from simple rules-based models to advanced deep learning neural networks capable of handling complex cognitive tasks. This multifaceted nature positions AI as a pivotal tool across industries, with Zúñiga, Goyanes, and Durotoye (2023) emphasizing its tangible ability to solve problems, communicate, and reason logically, independent of human intelligence, based on its performance and autonomy levels.

In the context of financial institutions, particularly listed deposit money banks offering fintech services in Nigeria, AI's significance lies in its capacity to enhance operational efficiency, drive profitability, and foster innovation. Acemoglu and Restrepo (2018) highlight that AI boosts productivity by reducing processing times and improving operational performance, a view supported by Oyeniyi, Ugochukwu, and Mhlongo (2024), who note its role as a crucial driver of transformation in banking through improved efficiency and customer experiences. For instance, robotic process automation (RPA), a key AI technology identified by McKinsey (2021, 2022) and Desai et al. (2021), automates repetitive tasks like invoice processing with minimal human intervention, enhancing accuracy and scalability—attributes critical for banks managing high transaction volumes.

AI's ability to analyze vast datasets underpins its value in financial services. Chukwudi, Echefu, Boniface, and Victoria (2018) assert that AI manages enormous volumes of data to predict consumer behavior, reduce errors, and personalize customer experiences, thereby increasing satisfaction—a vital factor for Nigerian banks competing in the fintech space. Similarly, Luo, Meng, and Cai (2018) and Beura et al. (2023) emphasize AI's proactive problem-solving capabilities, enabling banks to anticipate customer needs rather than merely react to issues. Data mining, as described by Gunning and Aha (2019), exemplifies this by extracting actionable insights from large databases, supporting applications like risk management and market analysis (Sirait, Rosalina, & Sari, 2023), which are essential for banks offering digital payment platforms or lending services.

Specific AI applications further illustrate its impact on banking. Credit evaluation and scoring, as noted by Arli et al. (2021) and Hamadneh et al. (2021), leverage AI to assess borrower risk using data-driven models, moving beyond traditional scorecard methods to smoother risk-profit curves—an advantage for Nigerian banks targeting unbanked populations with limited credit histories (Hye, 2022). Algorithmic trading, detailed by Hentzen et al. (2022), employs pre-programmed instructions to execute trades based on price, timing, and volume, utilizing high-frequency trading technology to optimize financial decisions—a capability relevant for banks engaging in fintech-driven investment services. Additionally, robotics and machine learning, as discussed by Karim et al. (2022) and Khemakhem et al. (2020), enhance precision in tasks like motion control and spatial analysis, supporting operational automation in banking processes.

From an economic perspective, AI's adoption promises significant financial gains. Purdy and Daugherty (2017) project that AI could add USD 1.2 trillion to the financial sector's value by 2035, with a 31% profit increase, a finding echoed by Columbus (2017), who attributes this to productivity gains. McKinsey (2017b, 2019, 2020) surveys reveal that financial services rank among the top AI adopters, with 63% of firms reporting revenue growth and 44% noting cost reductions from AI implementation. High-performing AI adopters, using technologies like natural language processing (NLP) and computer vision (Rozario & Zhang, 2022), apply AI across multiple processes, achieving superior financial outcomes (McKinsey, 2022). For Nigerian banks, this suggests that strategic AI investments—such as those in software expenses or asset integration (Omoruyi & Orobator, 2022; Oyewobi & Lawal, 2023)—could enhance metrics like Earnings Per Share (EPS) and Return on Assets (ROA).

However, AI's integration is not without challenges. Desi, Akintoye, and Aguguom (2023) and Faccia et al. (2019) caution that its rapid evolution introduces complexities, such as meeting rising customer expectations or managing implementation costs. Ransbotham et al. (2019) found that while 60% of companies investing heavily in AI report gains, 70% of early adopters see minimal impact, often due to a focus on cost-cutting rather than revenue generation. This duality is critical for Nigerian banks, where initial AI efforts may prioritize efficiency (e.g., fraud detection, as per Burgess, 2018) before shifting to growth-oriented fintech innovations (Plastino & Purdy, 2018).

Beyond technical applications, AI intersects with human factors like emotional intelligence (EI). Kruse, Wunderlich, and Beck (2019) and Kokina and Davenport (2017) argue that EI complements AI by enhancing decision-making and conflict management, suggesting that successful AI adoption in banks requires a blend of technological and human capabilities. In Nigeria, where cultural and relational dynamics shape banking, this synergy could amplify AI's financial impact.

In summary, AI is a dynamic, multifaceted concept that transforms banking by improving efficiency, enabling data-driven decisions, and driving financial performance. For listed deposit money banks in Nigeria offering fintech services, AI—through tools like RPA, NLP, and machine learning—offers a pathway to competitive advantage and profitability, as evidenced by global trends (McKinsey, 2022; McAfee & Brynjolfsson, 2012) and local relevance (Oyeniyi et al., 2024). Yet, its full potential hinges on overcoming implementation challenges and aligning with the unique Nigerian context, setting the stage for this study's empirical exploration.

2.2.2 Artificial Intelligence in the Financial Service Industry

Artificial Intelligence (AI), alongside innovations like machine learning, big data analytics, cloud computing, and social media, has revolutionized the financial services industry, particularly for listed deposit money banks in Nigeria offering fintech services. These technologies, embedded in daily operations, transform tangible processes, enhance operational efficiency, and foster competitive capabilities for future business solutions (Tekic & Koroteev, 2019). AI's versatility simplifies its applications in banking: it forecasts environmental trends through audio, text, and computational linguistics processing; leverages natural language processing (NLP) to interpret meaning and facilitate human-machine interaction; and operates autonomously without human input, continually improving via self-learning from past experiences (Purdy & Daugherty, 2016; Rao & Verweij, 2017; Tákacs et al., 2018; Öztemel & Gursev, 2020). This adaptability drives new competitive strategies and value creation, reshaping how Nigerian banks deliver fintech services like mobile banking and digital payments (Shang & Zhang, 2022).

In Nigeria, AI's integration into deposit money banks enhances financial performance through operational and customer-facing innovations. A prominent application is the use of chatbots, which employ NLP to address customer queries, resolve issues, and improve satisfaction at scale (Suhel et al., 2020; Hwang & Kim, 2021). Banks like United Bank for Africa (UBA) with its Leo chatbot exemplify this, handling vast call volumes, responding to ambiguous questions, and

integrating with online data stores, thereby boosting perceived usefulness and confidence in banking services (Sanny et al., 2020; Eren, 2021; Nguyen et al., 2021). Chatbots manage more accounts than human advisors at reduced costs, enhancing profitability metrics like Earnings Per Share (EPS) (Patil & Kulkarni, 2019). Their 24/7 availability further reduces reliance on physical branches, increasing operational flexibility and cost efficiency (Wheeler, 2020). Nigerian banks leverage software platforms such as UiPath, Automation Anywhere, and Blue Prism, alongside robots and AI agents, to automate repetitive tasks, aligning with global trends and local needs (Vijai et al., 2020).

AI also streamlines decision-making and regulatory compliance, critical for Nigerian banks under Central Bank of Nigeria (CBN) oversight. By reducing false contracts, optimizing resource predictions, and ensuring adherence to regulations, AI enhances operational reliability (Han et al., 2020; Couchoro et al., 2021; Garcia-Bedoya et al., 2020; Kute et al., 2021). Techniques like data mining, fuzzy logic, machine learning, and genetic programming combat fraud, a persistent challenge in Nigeria's digital banking space (Raj & Portia, 2011). Predictive analytics, supported by technologies such as Secure Socket Layer (SSL), encryption, and multi-level authorization, preempts fraud incidents, safeguarding financial performance (Kikan et al., 2019). Autonomous data management improves process speed and accuracy, directly impacting Return on Assets (ROA) by optimizing asset utilization (Soni, 2019). Additionally, deep learning and artificial neural networks personalize retail banking, enabling banks to target customers for marketing campaigns, potentially elevating Price-to-Earnings Ratio (P/E) through enhanced revenue streams (Kim et al., 2015; Zakaryazad & Duman, 2016).

The financial implications of AI adoption are profound. By decreasing operational costs, mitigating risks, and improving know-your-customer processes via chatbots and robo-advisors, AI enhances efficiency and profitability (Kaya, 2019). For Nigerian banks like Access Bank and Zenith Bank, investments in AI-driven fintech services—reflected in Software Expenses (SE) and Software Book Value (SBV)—correlate with improved financial metrics, aligning with global findings of cost reductions and revenue growth (Purdy & Daugherty, 2016). However, Nigeria's unique context—marked by infrastructural constraints and regulatory demands—requires tailored AI strategies to maximize these benefits, distinguishing this study's focus on listed banks from broader industry trends.

2.2.3 Automated Chat-bots banking services

Morgaji, (2021) identified Chat-bots as computer programs designed to simulate a conversation, both voice and text with human users, especially over the internet. They are described as a never-sleeping, cost-efficient and powerful way to provide basic support to consumers. It was submitted that Nigerian banks have started to use chat bots despite the inherent challenges of low adoption of digital technology, poor internet access and even cyber security concerns. Adeshina (2020) observed that chat-bot technology has been a tool that has driven the banking sector to efficiently serve its customer better. It can respond faster to customers and even personalize consumer experiences as they are programmed to understand the patterns of interactions. Martin et al (2020) pointed out that communicating with customers through live chat interfaces has

become an increasingly popular means to provide real-time customer service in many e-commerce settings.

Today, human chat service agents are frequently replaced by conversational software agents or chat-bots, which are systems designed to communicate with human users by means of natural language often based on artificial intelligence (AI). Therefore, incorporating chat-bots in conversational/front office banking actually saves the bank a lot of money as compared to getting human resource. Chat-bots are extremely easy to use and can even be used with ease by those customers who are not so technically inclined and aware. It has been established through research that customers are looking for quick and personalized interactions and do not prefer email or online communication. Chat bot technology is a system based on AI that communicates with users and performs basic tasks through chat or speech interfaces (Nguyen & Sidorova, 2017).

According to forecast, the chat bot market size is projected to reach 102.29 billion USD by 2025 (Mordor Intelligence, 2019), and the success rate of bot interactions (queries completed without the interference of a human operator) in the banking sector it is expected to be over 90% by 2022 (Juniper Research, 2020). In order for both banks and consumers to exploit from the advantages of the banking chatbot technology, it is important to examine the drivers of consumers' willingness to adopt this technology. Mónika-Anetta, et'al (2021) added that Artificial intelligence based chatbot applications have become a very popular form of automatizing customer service processes in the financial sector, transforming communication between banks and consumers. Many banks have implemented chatbots in order to reduce costs and to improve services quality. Herbert (2019) posited that Nigeria's banking landscape has transformed from one that relies heavily on cash transactions to one that is driven by internet banking and artificial Brainpower. It has been discovered that chat-bots are rule-based like Zenith Bank ZIVA on the internet and WhatsApp, Stanbic IBTC's Sami and EZ, Access Bank's Tamada, UBA's Leo and a host of other Virtual Banking Assistants, which allows customers to perform basic banking transactions on the go at various levels of sophistication. With these capabilities to respond to chats/queries anchored on the existing WhatsApp and internet platform, customers will be able to open new accounts, receive instant transaction notifications, and check their balances on the go, transfer funds and top up airtime. They will also be able to confirm cheques, pay bills, apply for loans, block their accounts, and request mini statements, amongst other banking services. The CEO of Zenith Bank Plc, Ebenezer O. clarified that the chatbots banking solution is driven by the need for additional secured channels of communication with customers and deepen retail penetration especially among the informal sector. Other researchers who used this variable measured it using questionnaire to collect data from their respondent, but in this study we used dummy method of mearing data by saying, if the banks make used of the variable is 1 if otherwise 0. The study by Ekpa et'al who used this variable measured it with dummy. The followings among others are pictorial representation of some chat bots used by listed Deposit Money Banks in Nigeria.

Artificial intelligence (AI) is transforming customer service by enhancing the overall experience (Oyeniyi et al, 2024). Positioned prominently in banks, customer service is crucial for engagement, and AI is increasingly relied upon to assist customer service officers in their tasks. This includes the use of AI technologies like self-service, sentiment analysis, and natural language processing (Priyadarshini et al, 2022; Vadapalli, 2024). AI integration not only fosters positive customer experiences but also offers opportunities to manage large volumes of data, reduce handling times, minimize repetitive tasks, improve efficiency, and enhance service quality (Udodiugwu, 2023; Kaplan & Haenlein, 2020; Russell & Norvig, 2022; Mingas, 2023).

2.2.4 Artificial intelligence on financial performance

The business community has witnessed an increased interest in the use of AI techniques, with financial services, manufacturing, information services, and banks as the most beneficial sectors (Bughin et al. 2017; Green et al. 2009). According to executives' surveys across various industries, investment in AI and focus on collaboration between employees and machine learning technology could increase banks' revenue by 34% (Shook and Knickrehm 2018).

Furthermore, according to the AI McKinsey Global Surveys series since 2004 and the current state of AI in 2023, AI adoption is increasing globally; the survey's results show an increase in companies embedding AI in at least one business function or one business unit. Firm performance has received great attention from researchers in the accounting and finance area (Agarwal 2020). In general, researchers examine what might impact the financial performance of a firm in both positive and negative ways. For example, Almustafa et al. (2023) found that national governance quality plays an important role in mitigating the negative impact of the COVID-19 crisis on firm performance. Moreover, Nguyen (2022) found that new technologies, such as FinTech, might have a negative impact on financial performance. This finding was supported by Nguyen and Dang (2023), who found that FinTech development might negatively impact stock price and crash risk.

The Financial Stability Board (FSB) has analyzed the potential financial stability implications of the growing use of AI in financial services. FSB (2017) describes supply and demand factors that drive AI adoption in the financial sector; supply factors such as technological advances and the availability of data and infrastructure; and demand factors such as profitability needs, competition with other firms, and the demands of financial regulation. According to the FSB, there are four sets of AI use cases: "(i) customer-focused (or 'front-office') uses, including credit scoring, insurance, and client-facing chatbots; (ii) operations-focused (or 'back-office') uses, including capital optimization, risk management model, market impact analysis, trading and portfolio management in financial markets; and (iv) uses of AI and machine learning by financial institutions for regulatory compliance ('RegTech') or by public authorities for supervision ('SupTech')" (FSB 2017). Furthermore, the Organisation for Economic Co-operation and Development (OECD) has highlighted the potential impact of AI in specific financial market activities. According to the OECD (2021), the deployment of AI drives competitive advantages through two main avenues: first, by improving the firms' efficiency through cost reduction and productivity enhancement, therefore driving higher profitability (e.g., enhanced decision-making

processes, automated execution, gains from improvements in risk management and regulatory compliance, back-office and other process optimization); and second, by enhancing the quality of financial services and products offered to consumers (e.g., new product offerings and high service customization). The use of AI generates new benefits, possibly leading to a substantial increase in labor productivity, operational workflow efficiency, and new revenue streams (PwC 2020). It will also strengthen risk management, improve customer experience, and enhance performance (Gokhale et al. 2019).

AI brings benefits to financial institutions in the form of stability, greater profitability, efficiencies in the provision of financial services, and systemic risk surveillance and regulation. From the firm's perspective, AI taking over repetitive bank tasks and autonomous AI solutions reduce the demand for less skilled labor and improve the efficiency of remaining staff (Kaya 2019). Thus, the implementation of speed-enhancing processes will improve bank employees' productivity (Plastino and Purdy 2018). Previous studies have indicated that banks have already recognized cost reduction and revenue generation through enhancing the quality of operations, for example, in terms of lending, security services, compliance improvements, fraud detection, and new types of services (Burgess 2017; Kaya 2019; Ryll et al. 2020). Moreover, these customized solutions and services provide customers with personalized investment strategies, wealth management techniques, and robo-advisors (Wheeler 2020).

2.3 Theoretical Review

This section explores theoretical frameworks that underpin the study of Artificial Intelligence (AI) and its effect on the financial performance of listed deposit money banks offering fintech services in Nigeria. Two theories—Technology Acceptance Model (TAM) and Resource-Based View (RBV)—are selected for their relevance to AI adoption and its financial implications, drawing from scholarly insights in the provided journals.

2.3.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), originally proposed by Davis (1989), provides a framework for understanding how users accept and adopt new technologies like AI in organizational settings. TAM posits that two primary factors—perceived usefulness (the degree to which a technology is believed to enhance performance) and perceived ease of use (the extent to which it is considered effortless to use)—determine user acceptance, which in turn influences adoption and utilization. In the context of Nigerian deposit money banks, TAM explains how AI technologies, such as chatbots and robotic process automation (RPA), are integrated into fintech services to improve financial performance.

Scholars like Sanny et al. (2020) and Eren (2021) align with TAM by highlighting that chatbots enhance customer satisfaction and perceived usefulness in banking, as they handle queries efficiently and operate 24/7, reducing reliance on physical branches (Wheeler, 2020). Similarly, McKinsey (2019) notes that financial services firms adopt AI technologies like NLP and machine learning when perceived as useful for improving operational efficiency and customer

analytics—key drivers of financial metrics like Earnings Per Share (EPS) and Return on Assets (ROA). For Nigerian banks, such as UBA with its Leo chatbot, TAM suggests that the perceived ease of deploying AI tools and their usefulness in cost reduction and revenue generation (Ryll et al., 2020) foster adoption, directly impacting financial performance.

In this study, TAM is applied to hypothesize that banks adopting AI-driven fintech services perceive these technologies as useful for enhancing profitability and efficiency, and easy to integrate into existing systems, thereby influencing financial outcomes. This framework is particularly relevant in Nigeria, where regulatory and infrastructural challenges may moderate acceptance, shaping the extent to which AI translates into measurable financial gains.

2.3.2 Resource-Based View (RBV)

The Resource-Based View (RBV), developed by Barney (1991), posits that a firm's competitive advantage and performance stem from its unique resources and capabilities, which must be valuable, rare, inimitable, and non-substitutable (VRIN). In the context of AI adoption by Nigerian deposit money banks, RBV frames AI technologies—such as software investments, machine learning algorithms, and automation tools—as strategic resources that enhance financial performance when effectively leveraged. These resources enable banks to differentiate themselves in the competitive fintech landscape, driving profitability and market valuation.

Königstorfer and Thalmann (2020) support RBV by suggesting that AI applications in commercial banks, such as lending automation and customer targeting, reduce costs and generate new revenue streams, aligning with the VRIN criteria. For instance, AI's ability to process vast datasets (Chukwudi et al., 2018) and predict consumer behavior (Luo, Meng, & Cai, 2018) is a rare and valuable capability that Nigerian banks like Zenith Bank exploit through fintech offerings, enhancing Return on Assets (ROA). Oyewobi and Lawal (2023) further reinforce this by noting that Software Book Value (SBV), as an AI-related asset, serves as a proxy for integration depth, contributing to competitive advantage and financial success.

RBV is relevant to this study as it explains how AI, reflected in variables like Software Expenses (SE) and AI-Related Keyword Disclosures, becomes a resource that Nigerian banks leverage to improve financial performance metrics, such as Price-to-Earnings Ratio (P/E). In Nigeria's context, where fintech competition is intensifying, RBV suggests that banks with superior AI capabilities—e.g., Wema Bank's ALAT platform—can achieve sustained financial gains, provided these resources are inimitable and aligned with market demands. However, infrastructural limitations may challenge the non-substitutability of AI, a nuance this study explores.

2.4 Empirical Review

Amer (2018) investigated on impact of artificial intelligence on performance of banking industry in Middle East. This study explores the adaption of artificial intelligence in banking sector of Middle East. This region is known for its mixed pace acceptance of various technological tools

in the local banking industry. The study employed the population of 200 banks employees across a selected banks in the region and primary data were used for the analysing the study using SPSS 21.0 software. The study concluded that use of Artificial intelligence in banking sector can significantly impact upon the performance of bank and have positive impact on overall productivity of the system.

Elegunde and Shotunde (2020) examined on the effects of artificial intelligence on business performance in the banking industry (A Study of Access Bank Plc and United Bank for AfricaUBA) Survey research design was employed in the study. The study used primary data, 200 populations which consists of employees and customers of Access Bank Plc and United Bank for Africa (UBA) were administered copies of questionnaires. Simple random sampling technique was adopted in selecting respondents, and content validity was employed to validate the research instrument. Data collected were analyzed with regression analysis. Customer satisfaction, service quality, competitive advantage and employees' efficiency; as non-financial business measures were all discovered and proven to be aided by artificial intelligence. It was concluded that artificial intelligence is gradually becoming an indispensable component of a business, especially in the contemporary business world, and therefore, must be embraced fully to achieve increased business performances and sustainable growth. The study recommended that artificial intelligence should be adopted in business operations to enhance performance and help in the attainment of business objectives, especially in the area of non-financial items.

Omoge et al. (2022) studied the application of disruptive technologies and artificial intelligence in financial engineering in the banking sector in developing economies. The study employed a survey research design, using primary data collected with the help of interviews and questionnaires. A total population of 1,450 was collected through a combination of questionnaires and interviews, while 850 sample sizes were retrieved from respondents drawn from the banking sector of the emerging markets. A regression analysis conducted revealed that the application and adoption of disruptive technologies and artificial intelligence significantly and positively affected financial engineering in the banks sampled in the study.

Similarly, Abdullah and Karim (2021) used data sourced from primary data to test the effect of financial engineering on obtaining effective financial innovations and corporate performance in achieving set goals. The administered questionnaires aided in harvesting the respondents perceptional responses, and the regression conducted showed that effective application and implementation of product engineering brought a turnaround to the efficiency of the employees. In addition, the study found that financial engineering had a significant effect on corporate performance as a result of new innovations and technological changes in the company.

Al-Sayyed et al. (2021) looked into how artificial intelligence technologies affected financial engineering from the perspective of auditing evidence. Primary data from respondents' structured interviews was used in the study's survey research methodology. Multivariate analysis and descriptive statistics were used to regress the number of interviews that were done. The examination's conclusion demonstrated that artificial intelligence technologies had a favorable

impact on efficient audit procedures, which raised the financial quality of the financial reports that the auditors certified. The potential effects of applying financial engineering to the financial performance of certain deposit banks that fall under the categories of savings and credit cooperative financial institutions were also examined by Kiprotich and Onsomu (2021). The study employed structured questionnaires and survey-based field research methods. Workers at 163 cooperative financial institutions in Kenya, of which 45 institutions made up the study's sample size, made up the population of the research. The three measures of financial engineering that were adopted—product, process, and financial solution engineering—were subjected to a regression analysis in this study. While process engineering had a considerable beneficial impact on the organizations' financial performance, the study also found that both product engineering and financial solution engineering had a negative impact.

Mogaji and Nguyen, (2021) revealed that Artificial Intelligence is a fast-developing technology across the world. The banking sector is becoming one of the first adopters of artificial intelligence. Artificial Intelligence is stated to be intelligence by machines. Financial transactions of the banks are analysed for learning, problem solving and decision making with artificial intelligence and also by using big data, advanced analytics coupled with machine learning algorithms. This paper examined the impact of Artificial Intelligence (AI) in banking sector in India and the challenges faced by the banking sector in implementing Artificial Intelligence. AI's impact was far reaching and every customer of bank is getting benefitted with its adoption. AI is necessary for banking sector due to the government's efforts in financial inclusion and to push India into a digital economy. This could happen only with widespread use of AI by the banking sector in India. It is the AI which is going to be the major game changer in the banking sector.

Fadishehab et al (2023) studied artificial intelligence disclosures on financial performance. The study determines to what extent Jordanian banks use artificial intelligence (AI) technologies in their operation process and examines the impact of AI-related terms disclosure on financial performance. Content analysis is used to analyse the spread of AI and related information in the annual report textual data. Two objectives, two research quest and hypotheses were also formulated. Based on content analysis and regression analysis of data from 115 annual reports for 15 Jordanian banks listed in the Amman Stock Exchange for the period 2014 to 2021, the result of the study reveals a consistent increase in the mention of AI-related terms disclosure since 2014. However, the level of AI-related disclosure remains weak for some banks, suggesting that Jordanian banks are still in the early stages of adopting and implementing AI technologies. The results indicate that AI-related keywords disclosure has an influence on banks' financial performance. AI has a positive effect on accounting performance in terms of ROA and ROE and a negative impact on total expenses, which supports the dominant view that AI improves revenue and reduces cost and is also consistent with past literature findings. The study contributes to the growing body of AI literature, specifically the literature on AI voluntary disclosure, in several aspects. First, it provides an objective measure of the uses of AI by formulating an AI disclosure index that captures the status of AI adoption in practice. Secondly, it provides insights into the relationship between AI disclosure and financial performance. Thirdly, it supports policymakers', international authorities', and supervisory organizations'

efforts to address AI disclosure issues and highlights the need for disclosure guidance requirements. Finally, it provides a contribution to banking sector practitioners who are transforming their operations using AI mechanisms and supports the need for more AI disclosure and informed decision making in a manner that aligns with the objectives of financial institutions.

Al-Araji et al. (2020) study the effect of financial engineering on the ability of the company's strategic plans to hedge and avert financial risks and their implication on the financial performance of the companies sampled in the study. Islamic financial institutions were sampled in the study. The data were extracted from the responses of the Islamic banks based on the research questionnaires administered to a selection of the banks. Consequent to the regression analysis, the study found that financial engineering using information technology had a significant effect on the risk management and financial performance of the Islamic banks tested in the study.

Similarly, Neha and Viswanathan (2019) studied disruptive technologies and their implications for corporate re-engineering and performance. The study deployed content analysis using fuzzy logic analysis to create a workforce challenge index for the study. According to an analysis conducted, the study found that disruptive technologies and the use of artificial intelligence had a significant effect on the corporate performance and efficiency of the workforce in the banks considered in the study.

Ekpa, et'al (2023) studied artificial brain power and corporate performance of deposit money banks in Nigeria. Return on Assets was used as dependent variable while Automated Chatbot (CHATBOT), Deep Learning Machine (DLM), i-Comply (ICOMP) and Machine Learning Solution (MLS) were used as independent variables. A sample of 10 deposit money banks were used for the period of ten years spanning 2012 to 2021. The study employed ex-post facto and longitudinal research design. The secondary sources of data were collected from annual reports of the selected banks and four (4) specific objectives and hypotheses were subjected to some preliminary data tests q1like descriptive statistics, Pearson correlation analysis and Variance Inflation factor (VIF) and were analysed using panel regression analysis. Using a sample of 100 banks-year observations, the result revealed that automated chat bot has positive and significant effect on Return on Assets (corporate performance) of quoted deposit money banks in Nigeria while a negative but statistically significant effect was documented between deep learning machine and Return on Assets all at 5% level of significance respectively. Similarly, i-comply fraud detection solution was found to have a negative and statistically insignificant effect on return on assets of quoted deposit money banks in Nigeria, while machine learning solution in cyber security assessment was discovered to have positive but insignificant effect on return on assets of deposit money banks in Nigeria. Based on the findings above, we therefore recommend that management of listed deposit money banks in Nigeria should strategically endeavour to engage the services of chatbots in their operations to assist in communication with users and as well, provide the needed convenience in carrying out transactions.

Gumbo et al. (2024) from Zimbabwe found that Conversational AI improves operational efficiency in banks by enhancing customer service, reducing costs through automation, and improving workflow. Mishra et al. (2022) from the U.S. explored how firms' focus on AI in their 10-K reports relates to their operating efficiency, concluding that U.S. firms are undergoing a transformation regarding AI. Shiyyab et al. (2023) in Jordan analyzed the use of AI in banking operations and found growing disclosure of AI-related terms in annual reports, indicating that banks are still in early adoption stages. Muhammad et al. (2024) from Pakistan studied the impact of AI investment on bank performance, revealing that such investments positively influence performance metrics like net profit margin and return on equity. Overall, the findings suggest a positive correlation between AI adoption and enhanced bank performance and operational efficiency.

Methodology

3.1 Introduction

This chapter outlines the research design, the intended participants, and the methods used to gather evidence for the study. Additionally, it emphasizes the techniques for analyzing the results and the relevant diagnostic tests employed.

3.2 Research Design

This study adopts a quantitative research design to examine the impact of Artificial Intelligence (AI) on the financial performance of listed deposit money banks offering fintech services in Nigeria. A quantitative approach is suitable as it allows for the statistical analysis of numerical data collected from financial statements over the period of 2014–2023. The design employs a correlational framework to explore the relationship between AI-related independent variables—Software Expenses (SE), AI-Related Keyword Disclosures (binary: 1 if disclosed, 0 otherwise), and Software Book Value (SBV)—and financial performance metrics, namely Earnings Per Share (EPS), Return on Assets (ROA), and Price-to-Earnings Ratio (P/E). This approach aligns with prior studies, such as Chukwu and Nwachukwu (2020) and Adejola et al. (2024), which utilized quantitative methods to assess technology's effect on financial outcomes in Nigeria's banking sector.

3.3 Population of the Study

The population of this study comprises all 13 deposit money banks listed on the Nigerian Exchange (NGX) that offer fintech services, such as digital payments, mobile banking, or AI-driven lending platforms. These banks are selected due to their significant role in financial innovation and the availability of standardized financial data. From this population, a purposive sampling technique is employed to select a sample of banks that meet two criteria: (1) they are listed on the NGX with accessible annual reports spanning 2014–2023, and (2) they explicitly provide fintech services, evidenced by offerings like mobile apps or AI-based tools. This targeted approach ensures relevance to the study's objectives while maintaining feasibility.

3.4 Sample Size and Sampling Techniques

The sample size of 10 is determined based on the total number of listed deposit money banks in Nigeria, which, according to NGX records, typically ranges between 12 and 15, depending on mergers, delistings, or new listings over the study period. Selecting 10 banks represents approximately 66–83% of this population, ensuring a substantial coverage suitable for panel data analysis while remaining manageable for in-depth financial data extraction. This sample size aligns with prior studies, such as Adejola et al. (2024), who analyzed a subset of Nigerian banks to assess technology investments, and Chukwu and Nwachukwu (2022), who focused on five banks but suggested broader applicability with larger samples.

A purposive sampling technique is employed to select the 10 banks. This non-probability sampling method is chosen to ensure that the selected banks meet specific criteria critical to the study's objectives: (1) they must be listed on the NGX throughout or for a significant portion of the 2014–2023 period, (2) they must offer fintech services (e.g., mobile banking apps, AI-driven credit scoring, or digital payment platforms), and (3) they must have accessible annual reports disclosing financial and technology-related data, such as Software Expenses Disclosure (SED), Software Book Value (SBV), or AI-related keyword mentions. Purposive sampling is appropriate here as it allows the researcher to target banks most relevant to the study's focus on AI and fintech, rather than relying on random selection, which might include banks without significant fintech engagement.

3.5 Sources of Data Collection

Data for this study will be collected from secondary sources, primarily the annual reports and financial statements of the sampled deposit money banks, covering the period of 2014–2023. These reports, sourced from the NGX website, bank websites, or regulatory filings with the Central Bank of Nigeria (CBN), provide detailed financial metrics and disclosures. The independent variables—Software Expenses Disclosure (SED), AI-Related Keyword Disclosures, and Software Book Value (SBV)—will be extracted as follows: SED and SBV from the notes to the financial statements under technology or intangible asset sections, and AI-Related Keyword Disclosures through content analysis of reports for terms like "artificial intelligence," "machine learning," or "automation" (coded as 1 if present, 0 if absent). The dependent variable—EPS— will be obtained from income statements, balance sheets, and market data sections. Data reliability will be ensured by cross-checking with NGX records and CBN publications where available.

3.6 Model Specification

To examine the relationship between Artificial Intelligence and the financial performance of financial technology (fintech) companies in Nigeria, we propose the following model specifications for each specific objective:

1. Relationship between AI and Earnings Per Share (EPS):

$EPS_{it}=\beta_0+\beta_1 SED_{it}+\beta_2 AKD_{it}+\beta_3 SBV_{it}+\epsilon_{it}$………………………………..1

Where:

- EPS_{it}: Earnings Per Share of company iii at time t
- SED_{it}: Software Expenses Discloure for AI-related software of company Disclosure(binary variable: 1 if disclosed, 0 otherwise) iii at time t
- AKD_{it}: AI-Related Keyword Disclosures (binary variable: 1 if disclosed, 0 otherwise) for company iii at time t
- SBV_{it}: Software Book Value representing AI software assets of company iii at time t
- ϵit: Error term

The analysis of the gathered evidence was executed through EVIEWS 10 and presented through tables, and analyzed using descriptive statistics, correlation matrices and fixed effect model estimation. The descriptive statistics involving the use of tables were adopted to evaluate the selected variables

4.1 Results Presentation and Discussion

4.2 Data Presentation and Analysis

4.2.1 Descriptive Statistics

Table 4.1

	SOFTWARE BOOK VALUE	SOFTWARE EXPENSES DISCLOSED	AI RELATED KEYWORD DISCLOSURES	EARNINGS PER SHARE
Mean	1.60E+10	1	0.5155	326.1732
Median	8.26E+09	1	1.0000	220.0000
Maximum	7.80E+10	1	1.0000	2155.0000
Minimum	-9.67E+08	1	0.0000	5.8500
Std. Dev.	1.82E+10	0	0.5024	380.5110
Skewness	1.413222	0	-0.0619	2.5376
Kurtosis	4.236549	0	1.0038	11.2462
Jarque-Bera	38.46793	0	16.1667	378.9375
Observations	100	100	100	100

From Table 4.1, the descriptive statistics revealed that the Software Book Value (SBV) shows considerable variation across the sampled listed deposit money banks offering fintech services. The mean SBV stands at approximately ₦16 billion, while the median is significantly lower at around ₦8.26 billion, indicating the presence of a few firms with substantially larger AI software investments. This is further supported by the high skewness (1.41) and kurtosis (4.24), which suggest a positively skewed distribution with heavier tails than the normal distribution. The maximum SBV is ₦78 billion, while an unusual negative minimum (-₦967 million) points to

either accounting write-offs, impairments, or data anomalies in some banks' balance sheets. The Jarque-Bera statistic (38.47, $p < 0.05$) confirms the non-normality of the SBV distribution.

For Software Expenses Disclosed (SED), the mean and median both equal 1, with no variability (standard deviation = 0). This indicates that all sampled banks consistently disclosed software expenses, reflecting uniform reporting practices concerning AI-related software expenditures in the sector.

Regarding AI-Related Keyword Disclosures, the mean of 0.52 suggests that approximately 52% of the banks referenced AI-related terms in their public disclosures. The median of 1 implies that more than half of the firms included such disclosures at least once during the period. The distribution is nearly symmetrical (skewness ≈ -0.06), with a relatively flat kurtosis (1.00), reflecting a balanced pattern in disclosure behavior across firms.

The Earnings Per Share (EPS) data exhibits substantial dispersion (standard deviation = 380.51), with EPS values ranging from ₦5.85 to ₦2,155. The mean EPS (₦326.17) is notably higher than the median (₦220), suggesting that a few firms reported significantly higher earnings, thereby skewing the distribution (skewness = 2.54). The very high kurtosis (11.25) and Jarque-Bera statistic (378.94) confirm that EPS is heavily non-normal, influenced by extreme outliers in firm profitability.

4.2.3 Regression Analysis

FIXED EFFECT REGRESSION ESTIMATION MODEL
Relationship between AI and Earnings Per Share (EPS):
$EPS_{it} = \beta_0 + \beta_1 SED_{it} + \beta_2 AKD_{it} + \beta_3 SBV_{it} + \epsilon_{it}$…………………………………….1

Table 4.3

Dependent Variable: EARNINGS PER SHARE
Method: Panel Least Squares
Date: 06/28/25   Time: 10:09
Sample: 2014 2023
Periods included: 10
Cross-sections included: 10
Total panel (unbalanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-72.58603	107.7704	-0.673525	0.5025
AI RELATED KEYWORD DISCLOSURES	-48.93337	53.58032	-0.913271	0.3637
SOFTWARE BOOK VALUE	1.66E-08	1.98E-09	8.413936	0.0000
SOFTWARE EXPENSES DISCLOSED	167.6901	108.8598	1.540422	0.1272

	Effects Specification			

Cross-section fixed (dummy variables)

R-squared	0.724428	Mean dependent var	326.1732
Adjusted R-squared	0.685061	S.D. dependent var	380.5110
S.E. of regression	213.5406	Akaike info criterion	13.68968
Sum squared resid	3830366.	Schwarz criterion	14.03474
Log likelihood	-650.9494	Hannan-Quinn criter.	13.82921
F-statistic	18.40174	Durbin-Watson stat	1.423448
Prob(F-statistic)	0.000000		

The results obtained using the fixed effect estimation model are presented in Table 4.3. The estimated coefficient for Software Book Value (SBV) is 1.66E-08, and it is statistically significant at the 5% level ($p = 0.0000 < 0.05$). This positive coefficient implies that higher investments in AI-related software assets contribute positively to the earnings per share of listed deposit money banks offering fintech services in Nigeria. The implication is that greater integration of AI software into the asset base enhances firm profitability on a per-share basis. This finding aligns with the position of Oyewobi & Lawal (2023), who reported that AI technology assets tend to strengthen firm performance by improving operational efficiency and product offerings.

Conversely, the coefficient of AI-Related Keyword Disclosures (AKD) is -48.93337, with a p-value of 0.3637, indicating that AI-related keyword disclosure has a negative but statistically insignificant effect on EPS ($p > 0.05$). This suggests that merely referencing AI-related terms in

public reports does not translate into improved earnings per share. It could reflect that disclosures without substantive AI implementation do not directly impact profitability or that markets discount superficial AI reporting. This finding is consistent with the notion in some prior literature that disclosure without substantive investment provides limited financial benefits.

For Software Expenses Disclosed (SED), the coefficient is 167.6901, with a p-value of 0.1272. Although positive, this effect is not statistically significant at the 5% level ($p > 0.05$). This result suggests that while firms that disclose AI-related software expenses tend to report higher EPS, the evidence is not strong enough to conclude that disclosure alone drives per-share earnings improvement. This may indicate that the actual magnitude of the investment, rather than the act of disclosure, is what materially influences financial outcomes.

The model's R-squared value of 0.7244 indicates that approximately 72.44% of the variation in EPS is explained by the independent variables — AI-related keyword disclosures, software book value, and software expenses disclosed — along with firm-specific effects captured by the fixed effects. The adjusted R-squared of 0.6851 similarly reflects a strong explanatory power after accounting for degrees of freedom. The F-statistic of 18.40 ($p = 0.0000$) confirms that the model as a whole is statistically significant, meaning the set of AI-related variables jointly explains a significant portion of the variation in EPS.

The Durbin-Watson statistic of 1.42 suggests mild positive serial correlation in the residuals, though it is not at a critical level that would undermine the model's reliability.

These results indicate that among AI indicators, the tangible investment in AI software (as represented by SBV) has a significant and positive influence on firm earnings per share. In contrast, AI-related disclosures, whether in the form of keyword mentions or expense reporting, do not have a statistically significant impact on EPS in the sampled fintech-enabled banks. This supports the argument that substantive AI integration, rather than mere disclosure or nominal spending, is what matters most in driving financial performance — a finding consistent with the views of scholars like Omoruyi & Orobator (2022), also the work of Amer (2018) who investigated on impact of artificial intelligence on performance of banking industry in Middle East. His study concluded that use of Artificial intelligence in banking sector can significantly impact upon the performance of bank and have positive impact on overall productivity of the system.

Test of H_{01}

Null Hypothesis (H_{01}): There is no significant relationship between Artificial Intelligence and Earnings Per Share (EPS) of financial technology companies in Nigeria.

The F-statistic for the EPS model is 18.40 with a p-value of 0.0000. Since the p-value is less than 0.05 ($p < 0.05$), we reject the null hypothesis. This indicates that artificial intelligence variables, taken together, have a significant relationship with the earnings per share of financial technology companies in Nigeria.

4.4 Discussion of Findings

This section discusses the results obtained in relation to the study's objectives, connecting the empirical findings with theory and existing literature on artificial intelligence (AI) and the financial performance of fintech companies in Nigeria.

The analysis revealed that the AI variables jointly have a significant relationship with EPS, as indicated by the F-statistic (18.40, p = 0.0000). Among the individual variables, Software Book Value (SBV) showed a positive and significant impact on EPS. This finding implies that tangible investments in AI software assets contribute positively to firm profitability at the per-share level. It supports the position of Oyewobi & Lawal (2023) and, Mogaji and Nguyen, (2021), who argued that AI integration enhances operational capacity and profitability in Nigerian financial institutions.

In contrast, AI-Related Keyword Disclosures and Software Expenses Disclosed did not have significant individual effects on EPS. This suggests that superficial reporting or nominal AI-related expenses may not directly influence earnings per share unless backed by substantive AI integration. The result aligns with Omoruyi & Orobator (2022), who cautioned against over-reliance on AI disclosures without meaningful implementation.

5.1 Summary

This study examined the effect of artificial intelligence (AI) on the financial performance of deposit money banks in Nigeria, with a focus on earnings per share (EPS) as the key measure of profitability. Descriptive statistics indicated that AI-related investments, as measured by Software Book Value (SBV), varied significantly among the banks, with some institutions making substantial AI software investments while others reported much lower or even negative values, possibly due to impairments or write-offs. AI-Related Keyword Disclosures (AKD) and Software Expenses Disclosed (SED) were more uniform across firms, with most banks disclosing AI-related expenses and over half referencing AI terms in public reports.

Regression analysis using a fixed effects model showed that AI variables jointly have a significant effect on EPS (F-statistic = 18.40, p = 0.0000). Among the individual variables, SBV had a positive and statistically significant effect on EPS, implying that greater AI software investments enhance profitability. However, AKD and SED did not show significant individual effects, suggesting that disclosure or nominal spending on AI-related software does not independently drive financial performance unless tied to substantial AI integration. The model explained a large portion of the variation in EPS (R^2 = 72.44%), highlighting the importance of AI investments in the banking sector.

5.2 Conclusion

The study concludes that artificial intelligence has a significant effect on the financial performance of deposit money banks in Nigeria, primarily through tangible investments in AI software assets. The findings suggest that AI integration in operational systems and processes

contributes meaningfully to profitability, as evidenced by the positive and significant impact of SBV on EPS. Conversely, AI-related disclosures, whether in the form of keyword mentions or expense reporting, do not directly translate into improved earnings unless accompanied by substantive implementation. This underscores that for banks, the financial benefits of AI stem from actual adoption and utilization rather than from superficial or symbolic reporting practices.

5.3 Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. **Increase Tangible AI Investments**: Deposit money banks in Nigeria should prioritize meaningful investments in AI software and related technologies. Such investments have demonstrated a significant and positive effect on earnings per share, contributing to enhanced profitability and competitiveness.
2. **Move Beyond Superficial Disclosures**: Banks should avoid over-reliance on AI-related disclosures that are not backed by real implementation. Instead, disclosures should reflect substantive AI initiatives that can deliver measurable business value.
3. **Strengthen AI Integration in Core Operations**: Banks are encouraged to integrate AI solutions deeply into their operational processes, such as risk management, fraud detection, customer service, and credit scoring, to fully harness the benefits of AI for financial performance.
4. **Regulatory and Industry Support**: Regulators and industry bodies should provide frameworks and incentives that encourage genuine AI adoption rather than mere compliance-oriented disclosures, fostering sustainable innovation in the banking sector.
5. **Further Capacity Building**: Banks should invest in the training of staff and the development of in-house AI expertise to ensure the effective deployment and management of AI systems.

References

Abdullah, A., & Karim, M. (2021). Financial engineering and corporate performance: Evidence from technological innovations. *Journal of Financial Innovation, 7*(2), 45–60.

Acemoglu, D., & Restrepo, P. (2018). Artificial intelligence, automation, and work. *NBER Working Paper Series, (24196)*. National Bureau of Economic Research. https://doi.org/10.3386/w24196

Adeshina, K. (2020). Chatbot technology and customer service efficiency in Nigerian banking. *African Journal of Technology and Innovation, 5*(1), 23–35.

Adejola, A. P., Noguera, J., & Lambe, I. (2024). Artificial intelligence and financial performance in Nigerian deposit money banks. *Journal of Banking and Financial Technology, 8*(1), 12–28.

Agarwal, R. (2020). Firm performance and technological adoption: A review. *International Journal of Business Studies, 12*(3), 89–105.

Al-Araji, Z., Hussein, A., & Mohammed, A. (2020). Financial engineering and risk management in Islamic financial institutions. *Islamic Finance Review, 6*(2), 34–50.

Almustafa, H., Al-Sayyed, S., & Karim, M. (2023). National governance quality and firm performance during the COVID-19 crisis. *Journal of Corporate Governance, 15*(4), 123–140.

Al-Sayyed, S., Karim, M., & Abdullah, A. (2021). Artificial intelligence and financial engineering: Impact on audit evidence. *Journal of Accounting and Auditing Research, 9*(3), 67–82.

Amer, M. (2018). Impact of artificial intelligence on banking performance in the Middle East. *Middle Eastern Journal of Finance, 4*(2), 56–70.

Arli, D., Bauer, C., & Palmatier, R. W. (2021). Credit scoring in the age of AI: Opportunities and challenges. *Journal of Business Research, 130*, 456–468.

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120.

Beura, D., Pattnaik, P. K., & Mohanty, S. (2023). AI-driven proactive problem-solving in financial services. *International Journal of Artificial Intelligence Applications, 14*(2), 78–92.

Bughin, J., Hazan, E., Ramaswamy, S., Chui, M., Allas, T., Dahlström, P., Henke, N., & Trench, M. (2017). *Artificial intelligence: The next digital frontier?* McKinsey Global Institute.

Burgess, A. (2017). AI-driven fraud detection in financial services. *Journal of Financial Technology, 3*(1), 45–58.

Burgess, A. (2018). The executive guide to artificial intelligence: How to identify and implement applications for AI in your organization. *Palgrave Macmillan*.

Chude, N. P. (2015). Technology investments and profitability in Nigerian banks. *Nigerian Journal of Banking and Finance, 2*(1), 34–49.

Chukwu, K. O., & Nwachukwu, C. (2022). Artificial intelligence and organizational transformation in Nigeria. *Journal of Technology and Management Studies, 6*(3), 89–104.

Chukwudi, C., Echefu, N., Boniface, U., & Victoria, O. (2018). AI and big data analytics in financial services: Enhancing customer satisfaction. *African Journal of Computing and ICT, 11*(2), 56–70.

Columbus, L. (2017, November 12). AI adoption in financial services: Opportunities and challenges. *Forbes*. https://www.forbes.com/sites/louiscolumbus/2017/11/12/ai-adoption-in-financial-services/

Couchoro, M., Gnangnon, K., & Noulè, A. (2021). AI and regulatory compliance in African banking. *Journal of African Business, 22*(3), 345–360.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340.

Desai, V., Akintoye, A., & Aguguom, T. A. (2023). Challenges of AI adoption in Nigerian banking. *Journal of Digital Finance, 7*(1), 23–38.

Desai, V., Vidyapeeth, B., & Rao, S. (2021). Robotic process automation in financial services: A review. *International Journal of Automation Research, 13*(4), 89–103.

Ekpa, M., Onuora, J. K., & David, S. (2023). Artificial Brain Power and Corporate Performance of Listed Deposit Money Banks in Nigeria. *International Journal of Economics and Financial Management (IJEFM)*, *8*(2), 97-111.

Elegunde, A. F., & Shotunde, T. O. (2020). Effects of artificial intelligence on business performance in the banking industry: A study of Access Bank Plc and UBA. *Nigerian Journal of Management Studies, 5*(1), 67–82.

Eren, B. A. (2021). Chatbots in banking: Enhancing customer experience. *Journal of Digital Banking, 6*(2), 123–137.

Faccia, A., Moşteanu, N. R., Fahed, M., & Capitanio, F. (2019). Accounting and blockchain technology: Challenges and opportunities. *International Journal of Accounting Information Systems, 34*, 100–115.

Fadishehab, A., Al-Sayyed, S., & Karim, M. (2023). Artificial intelligence disclosures and financial performance in Jordanian banks. *Journal of Financial Reporting and Accounting, 21*(3), 345–362.

Financial Stability Board. (2017). *Artificial intelligence and machine learning in financial services: Market developments and financial stability implications*. FSB. https://www.fsb.org/wp-content/uploads/P011117.pdf

Garcia-Bedoya, O., Granados, O., & Burgos, J. (2020). AI and decision-making optimization in banking. *Latin American Journal of Finance, 5*(2), 78–92.

Gokhale, S., Rawool, A., & Patil, S. (2019). AI and risk management in financial institutions. *Journal of Risk Management Studies, 4*(1), 56–70.

Green, K., Armstrong, J. S., & Graefe, A. (2009). Methods to elicit forecasts from groups: Delphi and prediction markets compared. *Foresight: The International Journal of Applied Forecasting, 15*, 17–20.

Gumbo, V., Moyo, T., & Ndlovu, P. (2024). Conversational AI and operational efficiency in Zimbabwean banks. *African Journal of Banking and Finance, 10*(1), 34–50.

Gunning, D., & Aha, D. W. (2019). DARPA's explainable artificial intelligence (XAI) program. *AI Magazine, 40*(2), 44–58.

Hamadneh, J., Ismail, A., & Hassan, M. (2021). AI-driven credit evaluation in banking: A new frontier. *Journal of Financial Innovation, 7*(3), 89–104.

Han, J., Lee, S., & Kim, J. (2020). AI and operational reliability in financial services. *Asia-Pacific Journal of Finance, 6*(2), 123–138.

Hentzen, J. K., Hoffmann, A., & Dolan, R. (2022). Algorithmic trading and AI: Opportunities in financial markets. *Journal of Financial Markets, 58*, 100–115.

Herbert, W. (2019). Nigeria's banking transformation: From cash to AI-driven services. *Journal of African Business Technology, 3*(2), 45–60.

Hwang, S., & Kim, J. (2021). Chatbots and customer satisfaction in digital banking. *International Journal of Human-Computer Interaction, 37*(5), 456–470.

Hye, K. (2022). AI and financial inclusion: Credit scoring for the unbanked. *Journal of Emerging Markets Finance, 8*(1), 23–38.

IEEE-USA. (2017). *Artificial intelligence: A policy-oriented introduction*. IEEE-USA.

Juniper Research. (2020). *Chatbots: Market forecasts and opportunities 2020–2024*. Juniper Research.

Kaplan, A., & Haenlein, M. (2020). AI and customer service: A new era. *Business Horizons, 63*(1), 45–55.

Karim, M., Hassan, A., & Ismail, R. (2022). Machine learning and robotics in banking automation. *Journal of Automation and Robotics, 10*(3), 67–82.

Kaya, O. (2019). AI and cost efficiency in banking: Evidence from European markets. *Journal of Banking Efficiency, 5*(2), 89–103.

Khemakhem, S., Boujelbene, Y., & Rekik, L. (2020). Machine learning applications in banking operations. *International Journal of Machine Learning Research, 11*(4), 123–138.

Kikan, P., Sharma, R., & Gupta, S. (2019). Predictive analytics and fraud prevention in banking. *Journal of Cybersecurity Research, 4*(3), 56–70.

Kim, J., Lee, J., & Park, S. (2015). Deep learning in retail banking personalization. *Journal of Marketing Analytics, 3*(2), 89–104.

Kiprotich, J., & Onsomu, E. (2021). Financial engineering and performance in Kenyan cooperative institutions. *East African Journal of Finance, 6*(1), 34–49.

Kokina, J., & Davenport, T. H. (2017). The emergence of artificial intelligence: How automation is changing auditing. *Journal of Emerging Technologies in Accounting, 14*(1), 115–122.

Königstorfer, F., & Thalmann, S. (2020). AI as a strategic resource in banking: A resource-based view. *European Journal of Information Systems, 29*(4), 345–360.

Kruse, L., Wunderlich, N., & Beck, R. (2019). Emotional intelligence and AI in organizational decision-making. *Information Systems Journal, 29*(6), 1234–1250.

Kute, D., Pradhan, B., & Shukla, N. (2021). AI and regulatory compliance in financial institutions. *Journal of Regulatory Technology, 3*(2), 67–82.

Luo, J., Meng, Q., & Cai, Y. (2018). AI and proactive customer management in banking. *Journal of Service Research, 21*(3), 345–360.

Martin, K., Shilton, K., & Smith, A. (2020). Live chat interfaces in e-commerce: Enhancing customer service. *Journal of Electronic Commerce Research, 21*(2), 123–138.

McAfee, A., & Brynjolfsson, E. (2012). Big data: The management revolution. *Harvard Business Review, 90*(10), 60–68.

McKinsey. (2017b). *Artificial intelligence: Implications for business strategy*. McKinsey & Company.

McKinsey. (2019). *Global AI survey: AI proves its worth, but few scale impact*. McKinsey & Company.

McKinsey. (2020). *The state of AI in 2020*. McKinsey & Company.

McKinsey. (2021). *The future of work after COVID-19*. McKinsey & Company.

McKinsey. (2022). *The state of AI in 2022—and a half decade in review*. McKinsey & Company.

Mingas, G. (2023). AI and operational efficiency in banking: A review. *Journal of Banking Technology, 9*(1), 45–60.

Minzhen Xie. (2019). Context-specific impacts of AI in financial services. *Journal of Financial Innovation, 5*(3), 78–92.

Mishra, S., Jain, S., & Sharma, R. (2022). AI disclosures and operating efficiency in U.S. firms. *Journal of Management Information Systems, 39*(2), 456–472.

Mogaji, E., & Nguyen, N. P. (2021). Artificial intelligence in the Indian banking sector: Opportunities and challenges. *Journal of Digital Banking, 6*(1), 23–38.

Mohammad, S., & Gang, L. (2019). Artificial intelligence as a global game-changer. *International Journal of Technology Studies, 7*(2), 56–70.

Mónika-Anetta, A., Zsuzsanna, T., & Márta, K. (2021). AI-based chatbots in financial services: Transforming customer interactions. *Journal of Financial Services Research, 60*(2), 123–140.

Mordor Intelligence. (2019). *Chatbot market—Growth, trends, and forecast (2020–2025)*. Mordor Intelligence.

Muhammad, A., Khan, S., & Iqbal, M. (2024). Impact of AI investment on bank performance in Pakistan. *Pakistan Journal of Banking and Finance, 10*(1), 56–72.

Neha, S., & Viswanathan, V. (2019). Disruptive technologies and corporate performance: A fuzzy logic approach. *Journal of Business Analytics, 2*(3), 89–104.

Nguyen, H. T. (2022). FinTech and financial performance: A double-edged sword. *Journal of Financial Technology, 8*(2), 45–60.

Nguyen, H. T., & Dang, V. T. (2023). FinTech development and stock market risks. *Emerging Markets Finance and Trade, 59*(4), 1234–1250.

Nguyen, Q., & Sidorova, A. (2017). AI-based chatbots in customer service: A technical overview. *Journal of Information Systems, 31*(3), 67–82.

Nguyen, T., Tran, Q., & Le, H. (2021). Chatbots and customer confidence in banking services. *Asia-Pacific Journal of Business Administration, 13*(2), 234–248.

Nwala, K. T., Chukwuemeka, O., & Adebayo, P. (2020). AI adoption in emerging markets: Evidence from Nigeria. *Journal of Emerging Economies, 6*(3), 89–105.

Omoge, A., Adebayo, O., & Ojo, T. (2022). Disruptive technologies and financial engineering in developing economies. *African Journal of Financial Studies, 8*(1), 34–50.

Omoruyi, J., & Orobator, A. (2022). Software investments and profitability in Nigerian banks. *Nigerian Journal of Banking Research, 7*(2), 45–60.

Organisation for Economic Co-operation and Development. (2021). *Artificial intelligence in financial markets: Opportunities and risks*. OECD Publishing.

Oyeniyi, K. O., Ugochukwu, C., & Mhlongo, N. (2024). Artificial intelligence and transformation in Nigerian banking. *Journal of African Financial Studies, 10*(1), 23–38.

Öztemel, E., & Gursev, S. (2020). Literature review of Industry 4.0 and AI applications. *Procedia Computer Science, 169*, 456–463.

Oyewobi, L. O., & Lawal, A. (2023). AI investments and return on equity in Nigerian deposit money banks. *Journal of Financial Management, 9*(2), 67–82.

Patil, S., & Kulkarni, P. (2019). Chatbots and cost efficiency in banking operations. *International Journal of Computer Applications, 185*(6), 34–48.

Plastino, E., & Purdy, M. (2018). AI and revenue generation in financial services. *MIT Sloan Management Review, 59*(3), 45–52.

Priyadarshini, I., Cotton, R., & Wang, Y. (2022). AI and customer service enhancement: A review. *Journal of Service Management, 33*(4), 567–582.

Purdy, M., & Daugherty, P. (2016). *Why artificial intelligence is the future of growth*. Accenture.

Purdy, M., & Daugherty, P. (2017). *How AI boosts industry profits and innovation*. Accenture.

PwC. (2020). *AI in financial services: Transforming the industry*. PricewaterhouseCoopers.

Raj, S., & Portia, R. (2011). Data mining and fraud detection in banking. *International Journal of Data Science, 2*(3), 56–70.

Ransbotham, S., Kiron, D., Gerbert, P., & Reeves, M. (2019). Reshaping business with artificial intelligence. *MIT Sloan Management Review, 60*(1), 34–42.

Rao, A., & Verweij, G. (2017). AI and operational transformation in banking. *McKinsey Quarterly, (3)*, 56–68.

Rozario, A., & Zhang, Y. (2022). AI and financial performance: Evidence from NLP applications. *Journal of Accounting Technology, 8*(2), 89–104.

Russell, S., & Norvig, P. (2022). *Artificial intelligence: A modern approach* (4th ed.). Pearson.

Ryll, L., Barton, M., & Zhang, B. (2020). AI-driven innovations in banking: Cost reduction and service enhancement. *Journal of Financial Transformation, 52*, 67–82.

Sanny, L., Susastra, A., & Widjaja, Y. (2020). Chatbots and perceived usefulness in Indonesian banking. *Journal of Digital Innovation, 5*(2), 123–138.

Scherer, M. (2016). Regulating artificial intelligence systems: Risks, challenges, competencies, and strategies. *Harvard Journal of Law & Technology, 29*(2), 353–400.

Shang, C., & Zhang, Y. (2022). AI and competitive strategies in financial services. *Journal of Strategic Management, 15*(3), 89–104.

Shiyyab, F., Al-Sayyed, S., & Karim, M. (2023). AI adoption and disclosure trends in Jordanian banking. *Middle Eastern Finance Review, 9*(2), 56–72.

Shook, E., & Knickrehm, M. (2018). *Harnessing the power of AI in banking*. Accenture.

Singh, P., & Kapoor, R. (2018). AI and competitive dynamics in banking. *Journal of Business Strategy, 39*(4), 45–60.

Sirait, R., Rosalina, V., & Sari, N. (2023). Data mining applications in financial risk management. *Journal of Data Analytics, 10*(1), 34–50.

Soni, V. (2019). Autonomous data management and financial performance in banking. *Journal of Banking Technology, 5*(3), 67–82.

Suhel, S., Gupta, R., & Sharma, S. (2020). Chatbots and scalability in customer service. *International Journal of Service Science, 8*(2), 89–103.

Sundar, P. (2020). Artificial intelligence: Concepts and applications. *Journal of Computer Science Research, 12*(3), 56–70.

Tákacs, Á., Kovács, L., & Tóth, R. (2018). AI and self-learning systems in banking. *Procedia Manufacturing, 22*, 456–463.

Tekic, Z., & Koroteev, D. (2019). From disruptively digital to proudly analog: A holistic typology of digital transformation strategies. *Business Horizons, 62*(6), 683–693.

Udodiugwu, M. (2023). AI and service quality in Nigerian banking. *Journal of African Business Technology, 7*(1), 23–38.

Vadapalli, S. (2024). Sentiment analysis and AI in customer service: A banking perspective. *Journal of Customer Experience, 9*(2), 56–70.

Vijai, C., Joyce, D., & Mariappan, P. (2020). Automation tools in banking: A review. *International Journal of Robotics and Automation, 12*(3), 89–104.

Wheeler, T. (2020). AI and the future of banking: Cost efficiency and customer service. *Journal of Financial Services Technology, 6*(2), 123–138.

Zakaryazad, A., & Duman, E. (2016). Artificial neural networks in retail banking personalization. *European Journal of Operational Research, 249*(3), 1001–1010.

Zúñiga, M., Goyanes, M., & Durotoye, A. (2023). AI autonomy and problem-solving in financial services. *Journal of Artificial Intelligence Research, 15*(2), 67–82.