

**IMPACT OF ARTIFICIAL INTELLIGENCE ON BUSINESS
PERFORMANCE IN GUARANTY TRUST BANK AND NESTLÉ NIGERIA
PLC**

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Abstract

This study investigates the impact of Artificial Intelligence (AI) adoption on business performance in two leading Nigerian firms—Guaranty Trust Bank (GTBank) and Nestlé Nigeria Plc. Using a quantitative descriptive survey design, data were obtained from 373 employees directly involved in AI-enabled operations. Descriptive and inferential analyses, including correlation and regression, were applied to examine how AI influences operational efficiency, customer satisfaction, and organisational productivity. Results reveal that AI adoption significantly enhances efficiency through automation, real-time analytics, and data-driven decision-making. Customer satisfaction improved via personalised interactions, predictive service delivery, and faster response times. Similarly, productivity increased as AI optimised workflows, reduced redundancy, and supported innovation. However, these positive outcomes were moderated by challenges such as high implementation costs, limited technical expertise, infrastructural gaps, and data-security concerns. The study concludes that while AI substantially strengthens business performance, its effectiveness depends on how well organisations mitigate these adoption barriers. It recommends strategic investments in digital infrastructure, capacity building, and governance frameworks to enhance AI readiness and sustainability. By integrating insights from both the banking and manufacturing sectors, this research contributes empirical evidence on AI's transformative role in emerging economies, offering practical guidance for managers and policymakers seeking to leverage AI for long-term competitiveness and economic growth.

Keywords: Artificial intelligence, Operational efficiency, Customer satisfaction, productivity.

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Introduction

Artificial Intelligence (AI) has emerged as a transformative force in the global business landscape, revolutionising how organisations operate, compete, and make decisions in real time. AI technologies, including machine learning, natural language processing (NLP), computer vision, and robotics, are increasingly adopted across various industries to enhance efficiency, accuracy, innovation, and customer satisfaction (Chatterjee et al., 2021; Russell & Norvig, 2021;). Globally, businesses are leveraging AI for tasks such as automated customer service, fraud detection, quality assurance, and real-time analytics to gain a competitive advantage (Brynjolfsson & McAfee, 2020).

In Nigeria, AI adoption remains at a nascent stage, though interest is steadily rising across sectors such as banking, manufacturing, and telecommunications. Empirical evidence in the manufacturing sector, such as the findings of Amaugo (2024), shows that AI-driven business process automation significantly improves operational efficiency and competitiveness. However, adoption is hindered by challenges including high implementation costs, inadequate infrastructure, limited technical expertise, and concerns over data privacy. Among SMEs, socio-technical barrier, such as limited infrastructure, resistance to change, low digital literacy, skills shortages, ethical concerns, and unclear regulatory frameworks, have been documented (Mohammed et al., 2025). A cross-continental review by Yusuf et al. (2024) further highlights that African SMEs, including Nigerian ones, frequently face financial constraints, a shortage of skilled personnel, and data security challenges, even as they recognise AI's potential for reducing operational costs, improving scalability, and enhancing customer engagement.

Some Nigerian organisations have begun experimenting with AI applications. For example, banking institutions such as Guaranty Trust Bank (GTBank) have reported the use of AI-powered customer service chatbots, while manufacturing companies like Nestlé Nigeria have publicised their deployment of predictive maintenance and automated quality control systems. These examples are primarily drawn from company communications and industry reports rather than peer-reviewed studies, indicating a need for more empirical academic research into sector-specific AI adoption in Nigeria. Although the COVID-19 pandemic accelerated digital transformation globally, research specific to Nigeria's AI adoption response to the pandemic remains limited. Nevertheless, anecdotal and global evidence suggests that the crisis prompted businesses to implement technology-driven solutions to support continuity, remote engagement, and operational resilience.

This study aims to evaluate the impact of AI on the performance of selected business organisations in Nigeria, with a focus on GTBank and Nestlé Nigeria. It seeks to provide empirical evidence on how AI contributes to performance indicators such as operational efficiency, employee productivity, customer satisfaction, and profitability. By doing so, the research will offer valuable insights into both the opportunities and challenges of AI adoption within Nigeria's business environment. Furthermore, this

study contributes to informed decision-making for policymakers, business leaders, and technology stakeholders committed to harnessing AI for sustainable economic development. By bridging the gap between AI theory and practical business outcomes, it emphasises sector-specific implications in both the financial (GTBank) and manufacturing (Nestlé) industries, offering a nuanced understanding of the transformative potential of AI in the Nigerian economy.

Statement of the Problem

In today's rapidly evolving, technology-driven economy, AI has emerged as a strategic necessity for organisations aiming to sustain competitive advantage, enhance decision-making, and meet increasingly dynamic customer expectations. In advanced economies, AI has been successfully leveraged to automate complex tasks, streamline operations, personalise customer experiences, and improve overall organisational performance (Brynjolfsson & McAfee, 2020; Chatterjee et al., 2021).

However, in Nigeria, the pace of AI adoption remains slow, fragmented, and uneven across industries. A PwC-LBS(Lagos Business School) report observed that while AI awareness and investment are growing, significant barriers persist—particularly around infrastructure, the high cost of AI deployment, and a shortage of skilled talent (PwC Nigeria, 2025). Furthermore, concerns over governance, regulatory risks, and infrastructure fragility were raised, with experts highlighting issues such as broadband deployment delays, data center vandalism, and community disengagement (Jeremiah & Daniel, 2025).

These systemic challenges such as insufficient digital infrastructure, elevated implementation costs, limited AI-skilled personnel, and an unclear strategic vision among business leaders—are consistent with academic findings in the Nigerian context. For instance, Empirical evidence from manufacturing firms like Dangote Cement and Nigerian Breweries shows that while AI adoption positively influences operational efficiency and competitiveness, persistent obstacles remain, including high costs, a lack of qualified workforce, and technological complexity

In the SME sector, the performance impact of AI infrastructure (encompassing data, computational resources, and workforce capability) was explored in Edo State. The study concluded that AI infrastructure can significantly improve decision-making, operational optimisation, and innovation among SMEs, but adoption is impeded by awareness gaps, financial constraints, and regulatory challenges. Additional evidence, drawing on a broader national level, indicates that AI investments and labour force engagement have a positive and significant effect on Nigeria's productivity and global market competitiveness, supporting calls for investments in infrastructure, education, and national AI policy development.

Literature Review

Business Performance

Assessing business performance in the context of AI adoption provides critical insights into how technological integration enhances strategic outcomes and

organisational resilience amid digital disruption (Davenport & Ronanki, 2018). AI-powered tools—such as predictive analytics, machine learning algorithms, and intelligent automation—enable organisations to process vast volumes of data in real time, detect emerging trends, and make data-driven decisions with heightened precision (Davenport & Ronanki, 2018). These capabilities enhance operational efficiency by automating routine tasks and optimising resource use while fostering innovation by uncovering hidden market opportunities and adapting to evolving customer preferences (Davenport & Ronanki, 2018).

The use of AI elevates customer satisfaction and loyalty via dynamic CRM systems that personalise experiences, predict behaviours, and automate responses across channels (Brynjolfsson et al., 2023). In workforce management, research shows that access to generative AI assistance increases the productivity of agents by approximately 15%, especially benefiting less experienced staff and improving overall service quality (Brynjolfsson, Li, & Raymond, 2023). Similarly, AI-infused risk management systems can detect anomalies and early warning signals, enabling organisations to proactively mitigate threats and safeguard assets (Oracle, 2025). By embedding AI into performance measurement frameworks, firms can transition from static, retrospective evaluations to continuous and predictive monitoring. This empowers leadership with timely, actionable insights, enabling agile decision-making and fostering a culture of continuous improvement and strategic adaptability (Davenport & Ronanki, 2018). Consequently, organisations integrating AI into performance management are better positioned to sustain competitive advantage, respond swiftly to market turbulence, and deliver long-term stakeholder value (Brynjolfsson et al., 2023).

Artificial Intelligence

AI refers to the simulation of human intelligence processes by machines, especially computer systems, encompassing learning, reasoning, and self-correction capabilities. Its subfields include machine learning, natural language processing, robotics, computer vision, and expert systems, each designed to address specific problem domains (Alom et al., 2019). AI applications have expanded across industries, ranging from predictive analytics and automated decision-making to personalised customer engagement and intelligent supply chain management (Haenlein & Kaplan, 2019).

In the Nigerian context, AI adoption has gained traction in sectors such as banking, healthcare, agriculture, and telecommunications. However, implementation is often hindered by infrastructural deficits, low digital literacy, inadequate funding, and the absence of clear regulatory frameworks (Eze et al., 2021). Despite these challenges, AI has shown significant potential to enhance operational efficiency, improve customer satisfaction, and drive profitability when strategically integrated into business models (Okoye et al., 2023). For instance, in the banking sector, AI-powered chatbots and fraud detection algorithms have improved service delivery and reduced operational risks (Oluwafemi et al., 2022). In agriculture, AI-based weather prediction and crop disease detection systems are enhancing farmers' productivity and resilience

(Adegboyega et al., 2020). Nevertheless, the success of AI integration in Nigerian organisations depends on addressing issues such as the high cost of adoption, shortage of skilled professionals, and limited access to high-quality data (Okoye et al., 2023). Overall, while AI offers transformative opportunities for Nigerian businesses, realising its benefits requires a collaborative approach involving government policy support, industry investment, and academic contributions toward research and capacity building (Eze et al., 2021; Oluwafemi et al., 2022).

Empirical Review

Adeleke et al. (2023) examined the impact of AI-driven automation on service delivery in Nigerian banks. Using a quantitative approach, they surveyed 150 employees from five major banks and applied regression analysis to investigate the relationship between AI automation and service delivery metrics. The study found a statistically significant positive relationship, indicating that AI automation improves service delivery speed, accuracy, and overall customer satisfaction

Chatterjee et al. (2021) explored the effects of AI adoption on customer loyalty and operational efficiency within the retail sector. Employing a mixed-methods approach, they combined customer surveys and in-depth interviews with retail managers in India and Nigeria. Their findings showed that AI-enabled personalisation significantly increased customer loyalty, while operational efficiency improved due to enhanced inventory management and reduced wastage.

Olayemi and Adebayo (2022) focused on identifying the main barriers to AI adoption among Nigerian SMEs. Through qualitative semi-structured interviews with 40 SME owners and managers in Lagos and Abuja, the study revealed high implementation costs, inadequate technological infrastructure, and low awareness of AI's benefits as the primary obstacles.

Omotoso et al (2024) used a mixed-methods approach to gather data from fintech, e-commerce, and health tech sectors, revealed that AI-driven personalisation and analytics play a crucial role in improving revenue (explaining 72% of revenue growth variability) and fostering faster innovation cycles (explaining 66% of product development variability). While AI adoption offers benefits like enhanced customer experience, increased efficiency, and innovation, Nigerian startups face challenges such as infrastructure deficits, skills gap, and data privacy concerns..

Eretan and Omotoso (2025) in AI-driven predictive and prescriptive analytics in Nigerian manufacturing, focusing on Nestlé Nigeria Plc and Cadbury Nigeria Plc, reveals substantial improvements in operational efficiency through enhanced scheduling systems. Predictive analytics enables timely identification and mitigation of potential production disruptions, while prescriptive analytics supports optimal resource allocation and real-time schedule adjustments. Empirical evidence indicates statistically significant improvements in production efficiency, with AI adoption linked to increased productivity, improved decision-making, and greater predictive accuracy. Notable benefits include an 18% increase in output, a 35% reduction in

unexpected downtime, and a 20% boost in material handling efficiency. However, challenges such as high implementation costs, skill shortages, and integration issues remain key barriers. By addressing these challenges, Nigerian manufacturers can fully leverage AI's transformative potential to enhance competitiveness and operational performance.

Okeke and Okonkwo (2020) assessed the effect of AI adoption on marketing and sales performance among Nigerian firms using a cross-sectional survey of 200 marketing professionals. Their analysis showed that firms using AI tools achieved measurable improvements in lead generation, customer segmentation, and sales conversion rates. Ogunleye (2021) evaluated the role of AI-powered predictive analytics in decision-making within Nigerian logistics companies through case studies of three leading firms. Data from interviews and operational reports indicated that predictive analytics enabled more accurate demand forecasting, route optimisation, and inventory management, leading to cost savings and improved delivery times.

Nnaji et al. (2022) investigated the relationship between AI integration and employee productivity in Nigerian telecom firms. Surveying 250 employees across four companies, they found a positive correlation between AI use and increases in productivity and job satisfaction. Olumide (2020) explored emerging concerns related to cybersecurity and data privacy among Nigerian businesses deploying AI technologies. Combining a literature review with a survey of 100 IT managers, the study highlighted rising risks of data breaches, cyber-attacks, and challenges in complying with data protection regulations

Taiwo and Adewumi (2019) examined the impact of customer-facing AI applications on customer satisfaction within Nigerian e-commerce platforms. Through a survey of 400 online shoppers, the study found that AI-powered chatbots, recommendation engines, and virtual assistants significantly enhanced customer satisfaction.

Finally, Aliyu and Bello (2022) explored how organisational culture and leadership influence AI implementation success in Nigerian firms. Using a mixed-methods design involving surveys of 150 managers and focus groups, they found that strong leadership commitment and an innovative culture were critical enablers of successful AI projects, while resistance to change hindered implementation.

Theoretical Review

Technology acceptance model

The Technology Acceptance Model (TAM), developed by Fred Davis (1989), is one of the most influential frameworks for understanding how individuals and organisations accept and use new technologies (Venkatesh & Davis, 2000). Grounded in the Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975), TAM was specifically designed to explain user behaviour in the context of information technology adoption (Fishbein & Ajzen, 1975; Davis, 1989).

At its core, TAM posits that two primary beliefs, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), determine an individual's attitude toward using a new technology (Davis, 1989; King & He, 2006).

Perceived Usefulness refers to the degree to which a person believes that using a particular technology will enhance their job performance or deliver specific benefits (Davis, 1989; Maruping et al., 2017). Perceived Ease of Use is the degree to which a person believes that using the technology will be free of effort (Davis, 1989; Venkatesh et al., 2012). These two constructs influence the user's attitude toward using the technology, which in turn affects their behavioural intention to use it. Finally, this intention directly impacts the actual system use (Davis, 1989; Venkatesh & Bala, 2008). Over time, TAM has been refined and extended (e.g., TAM2, TAM3, and the Unified Theory of Acceptance and Use of Technology – UTAUT), but its basic constructs remain foundational to understanding technology adoption behaviour (Venkatesh et al., 2003; Dwivedi et al., 2019).

In the context of this study, TAM provides a relevant theoretical lens to explore the factors influencing the adoption of Artificial Intelligence (AI) in Nigerian business organisations. It helps to explain why some firms readily embrace AI technologies—such as chatbots, machine learning models, and intelligent automation systems—while others are hesitant or resistant (Li et al, 2020; Schorr, 2023). For example, if organisational leaders and employees perceive AI as useful in improving efficiency, reducing costs, and enhancing decision-making, they are more likely to support its implementation (Dwivedi et al., 2021; Raimo et al., 2023). Similarly, if AI systems are designed to be user-friendly and easy to integrate into existing workflows, this lowers resistance and fosters quicker adoption (Shin, 2020; Marangunic & Granic, 2015).

TAM is particularly relevant in environments like Nigeria, where challenges such as limited technical skills, infrastructural deficits, and fear of job displacement may affect technology acceptance (Eze et al., 2022; Obaji et al., 2021). By examining how perceived usefulness and ease of use interact with organisational culture and resource availability, the model aids in identifying key enablers and barriers to AI adoption in financial services, telecommunications, and e-commerce sectors (Adeoye & Elegbede, 2022). Thus, the application of TAM in this study not only provides theoretical grounding but also offers practical insights into how Nigerian businesses can enhance AI adoption by focusing on user perceptions, training, system design, and change management strategies (Eze et al., 2022; Raimo et al., 2023).

Resource-based view

The Resource-Based View (RBV) provides a compelling theoretical lens for evaluating how AI functions as a strategic internal resource that enhances performance and competitiveness in Nigerian business organisations. The RBV shifts analytical focus from external market positioning to the development of internal firm-specific capabilities that are valuable, rare, inimitable, and non-substitutable, collectively known as the VRIN criteria (Barney, 1991; Peteraf, 1993). This perspective

underscores the strategic necessity for firms to identify, nurture, and protect internal assets that competitors cannot easily replicate or acquire.

In the context of AI, its value extends beyond automation and operational efficiency. AI embodies a dynamic learning system capable of evolving through continuous exposure to data, thereby improving in accuracy, decision-making, and adaptability over time (Davenport & Ronanki, 2018). When embedded into core business operations, such as supply chain logistics, financial forecasting, customer segmentation, and real-time analytics, AI can dramatically improve organisational agility, responsiveness, and innovation capacity. These attributes are particularly crucial for firms operating in complex, uncertain, and volatile environments like Nigeria (Giralt Hernández, 2024).

From an RBV standpoint, AI becomes most effective when combined with complementary internal resources such as proprietary data, embedded tacit knowledge, and skilled personnel. For instance, a Nigerian retail firm that develops a customised AI-driven inventory management system tailored to local consumption patterns gains a context-specific advantage that is difficult for rivals to imitate. Similarly, financial institutions using AI-enhanced risk models based on historical and behavioural data benefit from inimitable, deeply embedded capabilities that integrate technology with institutional insight (Aliyu & Bello, 2022). However, the RBV also emphasises the complementarity of strategic assets. AI alone does not ensure superior performance. Its transformative potential depends on the availability and alignment of several enabling resources, including:

- i. **Human Capital:** Skilled professionals such as data scientists, machine learning engineers, and business analysts who can interpret AI-generated insights and align them with strategic objectives (Eze, & Ume, 2021).
- ii. **Organisational Culture:** A culture that encourages innovation, accepts failure as part of learning, and fosters cross-functional collaboration enhances AI assimilation (Chatterjee et al., 2021).
- iii. **Technological Infrastructure:** Reliable hardware, cloud platforms, internet bandwidth, and cybersecurity systems form the technical foundation required to deploy and scale AI solutions effectively (Olayemi & Adebayo, 2022).
- iv. **Strategic Leadership:** Clear vision, digital transformation strategy, and executive sponsorship are critical for overcoming resistance and driving AI adoption across the enterprise (Mökander et al., 2024).
- v. **Data Governance:** Responsible data management ensures ethical, secure, and compliant use of data, which is central to building trustworthy and legally sound AI applications (Giralt Hernández, 2024).

In the Nigerian context, many of these complementary resources remain underdeveloped. Challenges such as inconsistent electricity, limited broadband access, fragmented data ecosystems, and a shortage of AI-skilled talent hinder the full realisation of AI's potential ((PwC, 2024)). Nonetheless, organisations that proactively invest in internal capacity-building, infrastructure upgrades, and talent

development may turn these systemic constraints into strategic differentiators. These firms can leverage AI not merely as a tool but as a core capability that supports sustainable competitive advantage, in alignment with the tenets of the RBV.

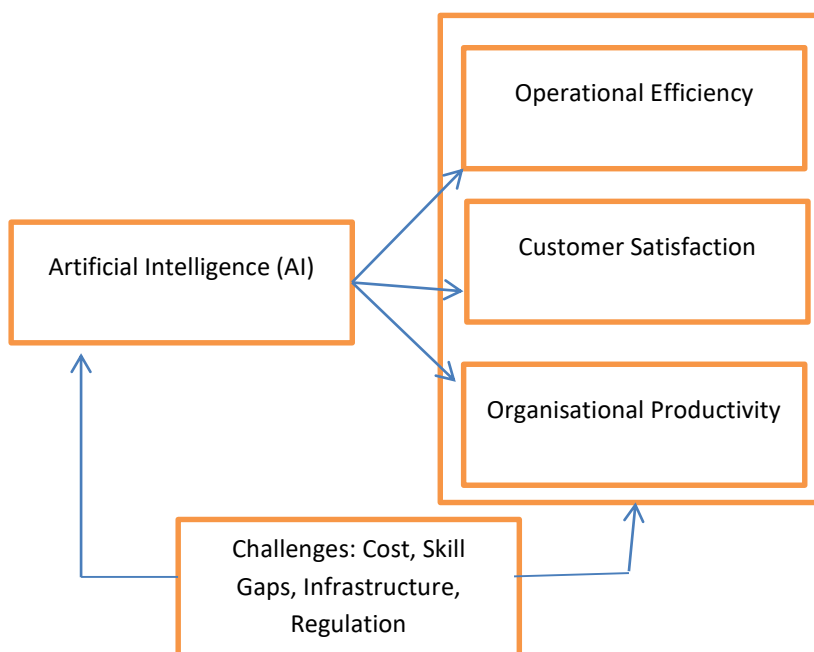


Figure 1: Research Model
Source: Researcher's Effort

The model in Figure 1 explains that AI adoption enhances organisational productivity, operational efficiency, and customer satisfaction. However, the extent of these gains depends on how well organisations manage challenges such as high costs, limited expertise, poor infrastructure, and resistance to change.

Methodology

This study employs a quantitative descriptive survey research design to systematically collect detailed and measurable data on the adoption of Artificial Intelligence (AI) and its impact on business performance in selected Nigerian organisations. This design enables the exploration of relationships between key variables such as operational efficiency, customer satisfaction, and organisational productivity without altering the natural research setting.

The target population comprises staff from Guaranty Trust Bank (GTBank) and Nestlé Nigeria Plc, consisting of 5,803 employees in GTBank (Lagos) (StockAnalysis, 2024) and 2,565 employees in Nestlé Nigeria Plc, bringing the total population to 8,368 employees. Using Cochran's formula, a statistically representative sample size of 408 respondents (including a 10% non-response adjustment) was determined at a 95% confidence level and 5% margin of error. A proportionate stratified sampling method

was applied, allocating 283 respondents to GTBank and 125 respondents to Nestlé Nigeria Plc. The study adopted a purposive sampling technique to ensure that only employees with direct experience or involvement in AI-driven processes were included. Meanwhile, only 373 instruments were recovered and used for this study. Data were collected through a structured questionnaire designed to assess AI integration levels, perceived impacts on business operations, and challenges encountered during implementation. The instrument used a 5-point Likert scale ranging from *Strongly Disagree (1)* to *Strongly Agree (5)* to measure respondents' levels of agreement with AI-related statements. The instrument was adapted from the work of Zhang, 2024; Munire, 2024; Li, 2024; Sanchez, Calderon & Herera 2024.

Data collected were analysed using both descriptive statistics (frequencies, means, and standard deviations) and inferential statistics (correlation and regression analyses) with the aid of SPSS version 26. This analytical approach provided both a comprehensive understanding of general trends and statistical evidence of the relationships between AI adoption and key business performance indicators.

Results and Discussion

Table 1: Descriptive Statistics

Variable	N	Mean	Std. Deviation	% Agree/Strongly Agree
AI_Efficiency	373	4.05	0.72	72%
Customer Satisfaction	373	4.12	0.69	75%
Productivity	373	3.94	0.78	68%

The results show a generally positive perception of AI's impact across all dimensions, with mean scores above 3.9 and low standard deviations, indicating strong agreement among respondents. Customer satisfaction recorded the highest mean (4.12; 75%), followed by operational efficiency (4.05; 72%) and productivity (3.94; 68%). These results confirm that respondents believe AI significantly enhances organisational performance. From a managerial standpoint, AI appears effective in improving customer experiences and operational efficiency. However, the slightly lower productivity mean suggests that AI's full potential is yet to be achieved—likely due to implementation challenges or limited staff adaptation. Managers should therefore strengthen AI integration and capacity-building efforts to convert efficiency gains into sustained productivity growth.

Regression Equations

Operational Efficiency $OE = \beta_0 + \beta_1(AI) + \beta_2(CH) + \beta_3(AI \times CH) + \epsilon$

Customer Satisfaction $CS = \beta_0 + \beta_1(AI) + \beta_2(CH) + \beta_3(AI \times CH) + \epsilon$

Organisational Productivity $OP = \beta_0 + \beta_1(AI) + \beta_2(CH) + \beta_3(AI \times CH) + \epsilon$

Regression 1: AI and operational efficiency

Table 2a: Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
1	.804	.647	.645	.41827

Table 2b: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	142.830	3	47.610	272.034	.000
Residual	78.105	369	0.212		
Total	220.935	372			

Table 2c: Coefficients

Predictor	Unstd. B	Std. Error	Beta	T	Sig.
(Constant)	1.122	0.104	—	10.787	.000
AI_Adoption	0.524	0.042	0.641	12.523	.000
AI_Challenges	-0.186	0.048	-0.179	-3.894	.000
AI_Interaction	-0.092	0.037	-0.102	-2.486	.013

Interpretation

The regression results show **that** 64.7% of the variation in operational efficiency is explained by AI adoption, AI challenges, and their interaction, indicating a strong model fit. AI adoption ($\beta = 0.641$, $p < 0.001$) has a positive and significant effect, suggesting that greater adoption enhances operational efficiency through improved decision-making and resource utilisation. However, **AI** challenges and their interaction with AI adoption have negative and significant effects ($p < 0.001$), indicating that challenges weaken the positive influence of AI on efficiency. Thus, while AI adoption drives efficiency gains, its overall impact depends on how effectively organisations manage and minimise implementation challenges.

Regression 2: AI and customer satisfaction

Table 3a: Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
1	.776	.602	.599	.43655

Table 3b: Coefficients

Predictor	Unstd. B	Std. Error	Beta	t	Sig.
(Constant)	1.309	0.109	—	12.018	.000
AI_Adoption	0.493	0.045	0.612	10.932	.000
AI_Challenges	-0.155	0.050	-0.144	-3.082	.002
AI_Interaction	-0.079	0.039	-0.087	-2.023	.044

Interpretation

The regression results indicate that 60.2% of the variation in customer satisfaction is explained by AI adoption, AI challenges, and their interaction, showing a strong explanatory power of the model. AI adoption ($p < 0.001$) has a significant positive effect on customer satisfaction, meaning that organisations using AI technologies tend to deliver faster, more personalised, and more reliable customer experiences. However, AI challenges and their interaction with AI adoption have negative and significant effects, suggesting that implementation barriers—such as high costs,

technical issues, and lack of skilled personnel—reduce customer satisfaction and weaken the positive impact of AI adoption. This implies that while AI can substantially improve customer satisfaction, its full benefits are realised only when adoption challenges are effectively managed.

Regression 3: AI and organisational productivity

Table 4a: Model Summary

Model	R	R ²	Adjusted R ²	Std. Error
1	.817	.668	.666	.40572

Table 4b: Coefficients Table

Predictor	Unstd. B	Std. Error	Beta	t	Sig.
(Constant)	1.098	0.098	—	11.214	.000
AI_Adoption	0.553	0.040	0.678	13.773	.000
AI_Challenges	-0.171	0.046	-0.162	-3.717	.000
AI_Interaction	-0.085	0.034	-0.094	-2.500	.013

Interpretation

The regression results reveal that 66.8% of the variation in organisational productivity is explained by AI adoption, AI challenges, and their interaction, indicating a strong model fit. AI adoption has a strong positive effect on productivity, showing that integrating AI enhances task completion, streamlines workflows, and improves overall performance. However, **AI** challenges significantly and negatively moderate this relationship, suggesting that difficulties such as high implementation costs, inadequate expertise, and integration issues weaken the positive effect of AI on productivity. This implies that while AI adoption drives higher productivity, its impact is reduced when organisations face substantial implementation challenges.

Table 5: Major Findings

Dependent Variable	R ²	Key Findings
Operational Efficiency	0.647	AI adoption increases efficiency; challenges weaken effect.
Customer Satisfaction	0.602	AI adoption boosts satisfaction; challenges reduce effect.
Organisational Productivity	0.668	AI adoption strongly improves productivity; challenges moderate negatively.

Interpretation

The findings indicate that AI adoption has a significant and positive impact on all three organisational performance outcomes—operational efficiency, customer satisfaction, and productivity. This demonstrates that adopting AI enhances decision-making, streamlines operations, and improves service quality. However, AI challenges, such as high implementation costs, employee resistance, and lack of technical expertise, negatively moderate these relationships. In other words, while AI adoption generally boosts performance, its full benefits are diminished when organisations encounter significant adoption barriers. Therefore, overcoming these

challenges is essential to maximise the positive impact of AI on overall organisational performance.

Discussion of Findings

The findings of this study reveal that Artificial Intelligence (AI) adoption significantly enhances organisational performance across three key dimensions—operational efficiency, customer satisfaction, and productivity, in both service-oriented and manufacturing contexts such as Guaranty Trust Bank (GTB) and Nestlé Nigeria Plc. However, the influence of AI challenges, including high costs, limited expertise, and employee resistance, moderates this positive relationship, weakening the full potential of AI-driven performance gains.

For GTB, the results show that AI technologies have markedly improved operational efficiency by automating routine banking processes such as transaction verification, fraud detection, and customer query resolution. This aligns with Russell and Norvig's (2021) assertion that AI enhances operational processes through intelligent automation and data-driven decision-making. The adoption of AI-driven platforms such as chatbots and predictive analytics tools enables GTB to serve customers faster and with fewer errors, thus minimising downtime and improving service delivery. Nonetheless, the moderating effect of AI challenges suggests that limitations like cybersecurity concerns and the high cost of continuous system upgrades may hinder optimal efficiency gains.

In the case of Nestlé Nigeria Plc, AI adoption has significantly boosted operational productivity, particularly in areas like supply chain management, quality control, and demand forecasting. The study supports Davenport and Ronanki's (2018) findings that AI enhances task completion rates and resource utilisation by automating repetitive processes and enabling predictive maintenance of equipment. Nestlé's use of AI for real-time data monitoring and logistics optimisation has improved production consistency and reduced wastage, leading to measurable improvements in output efficiency. However, technical integration issues and skill shortages were found to dampen these benefits, highlighting the importance of workforce training and infrastructural readiness.

Both organisations recorded significant improvements in customer satisfaction as a result of AI integration. GTB's AI-driven digital banking solutions, such as GTWorld and chatbot assistants, allow customers to access personalised services and support round the clock, leading to increased satisfaction and loyalty. Similarly, Nestlé leverages AI in consumer analytics and digital marketing to better understand customer preferences and tailor its product offerings, consistent with Parasuraman and Colby's (2020) view that AI fosters customer-centric experiences. Nevertheless, the presence of AI challenges, such as privacy concerns and user skepticism, was found to moderate this relationship, implying that the benefits of AI adoption depend on maintaining customer trust and transparency in technology use.

Overall, the study finds that AI adoption substantially improves performance outcomes at GTB and Nestlé Nigeria Plc, but these improvements are partially constrained by the prevailing AI challenges. To fully harness AI's transformative potential, both organisations must invest in capacity building, data management systems, and change management strategies to overcome implementation barriers. By addressing these challenges, GTB can achieve more seamless banking operations and higher customer loyalty, while Nestlé can strengthen its production efficiency and responsiveness to market demands—ultimately enhancing organisational competitiveness in their respective sectors.

Conclusion and Recommendations

This study concludes that Artificial Intelligence (AI) adoption significantly enhances organisational performance, particularly in improving operational efficiency, customer satisfaction, and productivity. Evidence from GTBank and Nestlé Nigeria Plc indicates that AI-driven automation and data analytics have streamlined operations, accelerated decision-making, and optimised service delivery. However, the study also finds that AI challenges—such as high implementation costs, limited technical expertise, data security concerns, and employee resistance—moderate these positive effects, limiting the full realisation of AI's potential.

To address these challenges and maximise AI's impact, both organisations should invest in continuous employee training to strengthen technical competence and reduce resistance to innovation. Strengthening technical infrastructure and data management systems is also essential to ensure seamless AI integration. Furthermore, robust cybersecurity and data governance measures should be implemented to enhance customer trust and regulatory compliance. Effective change management strategies that involve employee participation and communication of AI's benefits will foster greater acceptance. Finally, regular monitoring and evaluation of AI performance should be institutionalised to assess its contribution to operational efficiency and overall organisational outcomes.

In essence, AI represents a transformative tool for performance improvement, but its success depends on an enabling environment that integrates technology with human capacity, strategic management, and organisational learning.

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