

Research Article

Artificial Intelligence and Budgeting in Nigeria: Evaluating Fiscal Efficiency, Governance Challenges, and Strategic Development Implications in the Fourth Industrial Revolution

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Abstract

This study examines the role of Artificial Intelligence (AI) in enhancing public financial management and budgeting systems, with particular emphasis on its implications for efficiency, transparency, accountability, and fiscal governance. The increasing complexity of government financial operations and the growing demand for evidence-based decision-making have created the need for innovative technological solutions capable of improving budgeting processes and resource allocation. The study adopts a qualitative approach based on an extensive review of scholarly literature, policy documents, institutional reports, and empirical studies relating to AI applications in public finance. The theoretical foundation of the study is anchored on the Technology Acceptance Model (TAM) and Public Choice Theory. TAM explains the factors influencing the adoption of AI technologies by public officials, while Public Choice Theory highlights how AI can reduce inefficiencies, corruption, and waste through automated monitoring and transparent decision-making mechanisms. Findings reveal that AI significantly improves budget forecasting, expenditure monitoring, fraud detection, financial reporting, and policy evaluation through the use of machine learning, predictive analytics, and intelligent automation. The study also identifies challenges such as inadequate digital infrastructure, cybersecurity risks, poor data quality, limited technical expertise, and resistance to organisational change. The study concludes that AI possesses substantial potential to transform public financial management by promoting fiscal discipline, strengthening accountability, and enhancing the effectiveness of budgeting systems. It recommends increased investment in digital infrastructure, human capacity development, data governance frameworks, cybersecurity measures, and ethical AI policies to ensure successful implementation. The study contributes to the growing body of knowledge on digital governance and provides practical insights for policymakers, public administrators, and development practitioners seeking to leverage AI for improved financial management and sustainable public sector performance.

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Keywords

Artificial Intelligence, Public Financial Management, Budgeting, Fiscal Governance, Technology Acceptance Model, Public Choice Theory, Transparency, Accountability

1. Introduction

The contemporary global economy is increasingly shaped by technological innovation, data-driven decision-making, and intelligent automation. Among the most transformative technologies of the twenty-first century is Artificial Intelligence (AI), which refers to the ability of computer systems to perform tasks that normally require human intelligence, including learning, reasoning, prediction, and problem-solving [46]. AI has become a critical driver of economic growth and organisational efficiency across diverse sectors such as healthcare, education, agriculture, manufacturing, finance, security, and public administration [29, 45]. Its growing relevance has positioned it as a strategic tool for improving governance, enhancing productivity, and fostering sustainable development globally [54].

In recent years, governments around the world have increasingly adopted AI technologies to improve policy formulation, public service delivery, regulatory compliance, and financial management. Countries such as the United States, China, Singapore, the United Kingdom, and Estonia have integrated AI into various aspects of governance, resulting in improved efficiency, transparency, and accountability in public administration [41]. These developments have encouraged developing nations to explore the potential of AI as a mechanism for addressing governance challenges and accelerating national development.

Nigeria, as Africa's most populous nation and one of its largest economies, continues to face significant developmental challenges, including corruption, unemployment, poverty, infrastructural deficits, insecurity, and weak institutional capacity [51, 52, 66]. Despite substantial public expenditures and numerous economic reforms, the country has struggled to achieve optimal developmental outcomes due to inefficiencies in budget preparation, implementation, monitoring, and evaluation. Budgeting remains a fundamental instrument of governance through which governments allocate resources, establish policy priorities, and pursue socioeconomic development objectives. However, Nigeria's budgeting system has often been characterized by revenue leakages, unrealistic projections, delayed implementation, project abandonment, and inadequate fiscal accountability [51, 52].

Artificial Intelligence presents significant opportunities for addressing these persistent challenges. Through machine learning, predictive analytics, big data processing, and intelligent automation, AI can improve revenue forecasting,

strengthen expenditure monitoring, detect fraudulent transactions, and enhance evidence-based decision-making [28, 46]. Furthermore, AI-driven budgeting systems can facilitate transparency and improve the efficient allocation of scarce public resources. Nevertheless, the adoption of AI in budgeting also introduces important risks and strategic concerns, including cybersecurity threats, technological dependency, ethical challenges, workforce displacement, algorithmic bias, and regulatory inadequacies [1, 9, 57, 59].

2. Statement of the Problem

Budgeting remains one of the most important instruments of governance and national development. Through the budget, governments allocate scarce resources, prioritize developmental projects, mobilize revenues, and implement public policies aimed at improving the welfare of citizens. In developing economies such as Nigeria, an effective budgeting system is essential for achieving sustainable economic growth, poverty reduction, infrastructural development, employment generation, and social transformation [7, 39, 55].

One of the persistent problems confronting Nigeria's budgeting system is the prevalence of corruption and financial leakages within public institutions. Several studies have shown that weak accountability mechanisms, poor fiscal discipline, contract inflation, ghost projects, and misappropriation of public funds have undermined the effectiveness of government expenditure [5, 22]. Consequently, substantial portions of budgeted funds fail to translate into tangible developmental outcomes, thereby contributing to infrastructural deficits, poverty, unemployment, and poor public service delivery [66, 67].

Another critical challenge is the issue of poor budget implementation and inaccurate forecasting. Budget estimates in Nigeria are frequently based on unrealistic assumptions regarding revenue generation, oil prices, exchange rates, and economic growth projections [56, 66, 67]. These inaccuracies often result in budget deficits, project abandonment, delayed implementation, and inefficient allocation of resources. Furthermore, weak monitoring and evaluation frameworks have hindered the government's ability to track project performance and ensure accountability in public spending [19, 38, 55].

The emergence of Artificial Intelligence (AI) offers significant opportunities for addressing many of these longstanding

challenges. AI technologies possess the capacity to analyze vast amounts of financial data, improve revenue forecasting, automate budget monitoring processes, detect fraudulent transactions, and support evidence-based policy formulation [11, 29, 46]. Countries that have integrated AI into public financial management have reported improvements in transparency, accountability, expenditure efficiency, and service delivery [41, 58].

Despite these prospects, significant concerns remain regarding the country's preparedness for AI-driven budgeting. Nigeria continues to face major infrastructural challenges, including unstable electricity supply, inadequate broadband penetration, weak digital infrastructure, and limited technological capacity [66, 67]. In addition, digital literacy levels among many public sector employees remain relatively low, thereby limiting the effective adoption and utilization of advanced AI technologies. Scholars have also highlighted concerns relating to cybersecurity threats, algorithmic bias, data privacy, ethical governance, and the possibility of job displacement resulting from automation [6, 57, 64].

Furthermore, excessive dependence on foreign AI technologies raises strategic concerns regarding technological sovereignty and digital colonialism. Most advanced AI systems currently originate from technologically advanced nations, creating the risk that developing countries may become perpetual consumers rather than producers of digital innovations [69, 72].

3. Review of Related Literature

The growing convergence of Artificial Intelligence (AI), public financial management, and national development has generated substantial scholarly interest in recent years. Researchers, policymakers, and international development organisations have increasingly examined how AI can transform governance systems, enhance budgeting efficiency, improve fiscal transparency, and support sustainable development outcomes [29, 41, 46]. The literature on AI and budgeting is situated within broader discussions on digital governance, public sector innovation, and evidence-based policymaking.

Artificial Intelligence has been widely recognized as one of the defining technologies of the Fourth Industrial Revolution. According to Schwab, AI possesses the capacity to fundamentally reshape economic structures, governance systems, and institutional performance [47]. Brynjolfsson and McAfee similarly argue that intelligent technologies are transforming productivity and decision-making processes across public and private sectors [6, 14]. Goodfellow, Bengio, and Courville contend that advances in machine learning and deep learning have enabled organisations to process large datasets, identify patterns, and generate predictive insights that improve operational efficiency [18].

Within the field of public administration, AI is increasingly viewed as a tool for enhancing governance effectiveness and transparency [24, 65]. The OECD reports that governments in

advanced economies have integrated AI into policy formulation, tax administration, procurement management, and budget forecasting [41]. Similarly, the United Nations emphasizes that AI-driven governance systems can strengthen accountability, reduce bureaucratic inefficiencies, and improve service delivery [58]. Studies conducted by Sun and Medaglia indicate that AI applications in government institutions facilitate evidence-based decision-making and support more efficient allocation of public resources [49].

Budgeting itself has long been recognized as a critical instrument for achieving national development objectives. Effective budgeting requires accurate forecasting, transparency, accountability, and performance monitoring [7, 48]. However, scholars have consistently highlighted challenges associated with budgeting systems in developing countries, including corruption, weak institutional capacity, poor implementation, and inadequate monitoring mechanisms [22, 40].

Several scholars have suggested that AI could provide solutions to these challenges. Kaplan and Haenlein argue that AI technologies improve organizational decision-making through predictive analytics and intelligent automation [29]. Russell and Norvig maintain that machine learning algorithms can analyze historical financial data and generate more accurate forecasts than traditional methods [46]. AI systems can also detect anomalies in financial transactions, thereby improving fraud detection and risk management [33]. International organizations have emphasized the transformative potential of AI in public financial management. Digital technologies improve fiscal transparency and expenditure efficiency by enabling governments to monitor financial activities in real time [66, 67]. Digital transformation initiatives across Africa have enhanced revenue administration and reduced opportunities for corruption. Empirical studies demonstrate that AI adoption can improve budgeting accuracy and support evidence-based policymaking [37, 72].

Despite these potential benefits, the literature also identifies significant challenges associated with AI implementation. Excessive dependence on AI systems may create risks relating to accountability and decision-making [46]. Concerns regarding algorithmic bias, transparency, and ethical governance have also been highlighted [36, 57]. Technological dependency can undermine national sovereignty and limit local innovation capacity [69, 72]. Furthermore, increasing digitalization exposes governments to cyberattacks, data breaches, and technological vulnerabilities [68]. Researchers argue that inadequate regulatory frameworks and weak institutional capacity can hinder the effective governance of AI systems [36, 72]. Automation may also displace workers and exacerbate socioeconomic inequalities if not properly managed [6, 64].

4. Conceptual Clarifications

Conceptual clarification is an important component of scholarly research because it provides precise meanings of key concepts used in a study and establishes the foundation for

theoretical and empirical analysis. In research involving technology, governance, and development, conceptual clarification helps eliminate ambiguity and ensures consistency in the interpretation of variables and relationships among them. For this study, the major concepts requiring clarification are Artificial Intelligence (AI), budgeting, and national development. These concepts are closely interconnected and provide the analytical framework for examining how AI-driven budgeting can influence developmental outcomes in Nigeria.

Artificial Intelligence refers to the capability of computer systems and digital technologies to perform tasks that ordinarily require human intelligence, such as learning, reasoning, problem-solving, decision-making, prediction, and language processing [23, 39]. AI encompasses technologies such as machine learning, deep learning, neural networks, natural language processing, robotics, and predictive analytics, which enable systems to process large volumes of data and generate intelligent insights for decision-making [17, 22]. In the context of public administration, AI facilitates data-driven governance by improving policy analysis, expenditure monitoring, fraud detection, tax administration, and budget forecasting [21, 30, 51].

Budgeting refers to the systematic process through which governments estimate revenues, allocate resources, prioritize expenditures, implement policies, and monitor financial performance over a specified fiscal period [36, 41]. It serves as a strategic instrument for translating governmental objectives into actionable programs and projects. Effective budgeting promotes fiscal discipline, accountability, transparency, and efficient resource utilization, thereby supporting economic growth and social development [34, 52]. Modern budgeting increasingly incorporates digital technologies and data analytics to improve forecasting accuracy and expenditure management [16, 35, 62].

National development is a multidimensional process involving sustained improvements in the economic, political, social, technological, and institutional well-being of a nation and its citizens [44, 52, 71]. It encompasses economic growth, poverty reduction, employment generation, infrastructural development, educational advancement, healthcare improvement, good governance, and technological progress [40, 53, 64]. Contemporary development scholars emphasize that national development extends beyond increases in national income to include improvements in human welfare, social inclusion, and institutional effectiveness [3, 44, 52].

The relationship among these concepts is evident in the capacity of Artificial Intelligence to enhance budgeting efficiency and strengthen public financial management, thereby contributing to national development. Through predictive analytics, intelligent automation, and real-time monitoring, AI can improve transparency, reduce corruption, optimize resource allocation, and support evidence-based policymaking, all of which are critical determinants of sustainable national development in Nigeria [10, 30, 52, 57].

4.1. Artificial Intelligence

Artificial Intelligence (AI) is broadly defined as the capability of computer systems, software applications, and machines to perform tasks that traditionally require human intelligence, including learning, reasoning, problem-solving, perception, decision-making, language comprehension, and pattern recognition [23, 39]. AI represents a multidisciplinary field that combines computer science, mathematics, statistics, cognitive science, and data analytics to create systems capable of simulating aspects of human cognition and behavior [17, 22]. Unlike conventional computer programs that rely on pre-determined instructions, AI systems can learn from data, adapt to changing conditions, and improve their performance over time through experience and continuous interaction with their environment [17].

Artificial Intelligence encompasses several advanced technologies, including machine learning, deep learning, neural networks, natural language processing, expert systems, robotics, computer vision, and predictive analytics [17, 22, 39]. According to Uwem Johnson Ukpog, “Artificial Intelligence (AI), is the systematic capability of computer-based systems to emulate and continuously improve human cognitive functions through data-driven learning, intelligent reasoning, pattern recognition, predictive analytics, and autonomous decision support in order to enhance organisational effectiveness, innovation, and sustainable socio-economic development”. AI extends beyond automation by integrating computational intelligence with contextual analysis to solve complex problems, support strategic decision-making, and optimize human performance across diverse sectors while complementing rather than replacing human expertise. Consequently, AI serves as a strategic enabler of evidence-based management, productivity, and competitive advantage in the digital economy. Machine learning enables computers to identify patterns and make predictions from historical data, while deep learning utilizes multilayered neural networks to solve complex analytical problems [17]. Natural language processing facilitates communication between humans and machines by enabling computers to understand and interpret human language [13]. These technologies have significantly expanded the application of AI across various sectors of the global economy [53].

In public administration and governance, AI has emerged as a strategic tool for improving decision-making, transparency, efficiency, and service delivery [34, 35, 52]. Governments increasingly utilize AI-driven systems to process large volumes of data rapidly and accurately, thereby supporting evidence-based policymaking and resource allocation [16, 21]. AI applications in the public sector include tax administration, expenditure monitoring, procurement management, fraud detection, public service automation, security intelligence, and budget forecasting [21, 31, 51]. Through predictive analytics and real-time data processing, AI enables public institutions to identify emerging trends, detect anomalies, reduce administrative costs, and enhance accountability in public financial

management [30, 42, 57]. As governments embrace digital transformation, Artificial Intelligence is increasingly viewed as a critical enabler of smart governance and sustainable national development [43, 44]. Its capacity to enhance operational efficiency and improve public sector performance makes it an indispensable component of modern governance systems, particularly in developing economies seeking to strengthen institutional effectiveness and developmental outcomes [25-27, 40, 52, 60].

4.2. Budgeting

Budgeting is a fundamental instrument of public financial management that refers to the systematic process through which governments plan, allocate, manage, and monitor financial resources over a defined fiscal period. It provides a structured framework for translating national development goals, policy priorities, and socioeconomic objectives into actionable programs and measurable projects [36, 41]. In essence, budgeting serves as both an economic and political tool through which scarce public resources are distributed among competing needs in society [7, 8].

Government budgeting involves several interrelated processes that collectively ensure fiscal discipline and developmental effectiveness [25, 26]. These include revenue estimation, expenditure allocation, policy prioritization, resource mobilization, fiscal accountability, and performance evaluation. Revenue estimation focuses on projecting government income from sources such as taxation, oil revenues, customs duties, and external grants [52, 60]. Expenditure allocation involves distributing available resources across sectors such as health, education, infrastructure, and security based on national priorities [52]. Policy prioritization ensures that government spending aligns with development strategies such as poverty reduction, economic diversification, and human capital development [44].

Resource mobilization refers to the processes through which governments generate and optimize financial inflows to support public expenditure, including tax reforms, borrowing, and public-private partnerships [52, 60, 69]. Fiscal accountability ensures that public funds are used efficiently and transparently, while performance evaluation assesses whether budgeted resources achieve intended outcomes [34, 35]. Together, these components ensure that budgeting functions as an effective governance mechanism. In modern public administration, budgeting is no longer viewed solely as a financial exercise but as a strategic governance tool that influences national development outcomes [36, 41]. Effective budgeting systems enhance macroeconomic stability, improve public service delivery, and strengthen institutional accountability [4, 12]. Performance-based budgeting improves efficiency by linking resource allocation to measurable outcomes [16].

In developing countries such as Nigeria, budgeting remains a critical but challenging aspect of governance due to structural inefficiencies, weak institutions, and corruption risks [32,

33, 64]. Despite reforms in public financial management, issues such as revenue leakages, inaccurate forecasting, delayed implementation, and poor monitoring continue to undermine budget effectiveness [43, 52]. These challenges have contributed to persistent development gaps, including infrastructural deficits, unemployment, poverty, and inequality [52]. Globally, emerging digital technologies are transforming budgeting systems. The integration of data analytics, automation, and Artificial Intelligence is increasingly improving budget accuracy, transparency, and efficiency in many countries [34, 35]. AI-driven budgeting systems enable real-time monitoring of expenditures, predictive revenue analysis, and improved fraud detection, thereby enhancing fiscal discipline and accountability [23, 39]. These innovations represent a shift toward evidence-based budgeting and smart governance [16, 21].

However, the effectiveness of budgeting systems depends not only on technological advancement but also on institutional capacity, governance quality, and policy consistency. Weak institutional frameworks can undermine even the most advanced budgeting tools, while strong governance structures enhance fiscal discipline and developmental impact [40, 52, 64]. Budgeting remains a central pillar of governance and national development. It is a comprehensive process that integrates financial planning, policy implementation, and performance evaluation. When effectively managed, budgeting promotes economic growth, social development, and good governance. However, in contexts such as Nigeria, its effectiveness is often constrained by structural inefficiencies, highlighting the need for innovative solutions such as Artificial Intelligence to enhance fiscal management outcomes.

4.3. National Development

National development refers to the comprehensive and sustained improvement in the economic, political, social, technological, environmental, and institutional conditions of a nation, leading to enhanced quality of life and overall well-being of its citizens. It is a multidimensional concept that extends beyond economic growth to encompass improvements in living standards, social justice, good governance, human capital development, infrastructural advancement, technological innovation, and environmental sustainability [44, 52, 70]. National development reflects the capacity of a country to utilize its human and material resources effectively to achieve long-term prosperity, stability, and social progress [52].

Historically, development was primarily measured in terms of economic growth and increases in national income. However, contemporary development scholars argue that economic growth alone does not necessarily translate into improved welfare for citizens [44, 52]. Consequently, modern perspectives emphasize a broader approach that incorporates social, political, and institutional dimensions. According to the United Nations Development Programme, national development involves expanding people's choices, improving access to opportunities, and creating an enabling environment

for individuals to live productive and fulfilling lives [44].

Economic development remains a central component of national development. It involves sustained increases in productivity, industrialization, income generation, employment creation, and economic diversification [52, 64]. A growing economy provides governments with the resources needed to invest in education, healthcare, infrastructure, and social welfare programs. However, economic growth must be inclusive and sustainable to ensure that its benefits reach all segments of society [52].

Social development is another critical dimension of national development. It encompasses improvements in education, healthcare, housing, social protection, gender equality, and overall human welfare [44, 66]. Human capital development is particularly important because educated, healthy, and skilled citizens contribute significantly to economic productivity and national competitiveness [66, 69]. Nations that invest heavily in human capital tend to experience higher levels of innovation, technological advancement, and sustainable growth [61, 63].

Political and institutional development also play vital roles in national development. Effective governance, political stability, transparency, accountability, rule of law, and strong institutions create an environment conducive to investment, economic growth, and social progress [15, 41]. Weak institutions, corruption, and poor governance often undermine development efforts by reducing public trust and limiting the efficient utilization of resources [7, 32]. Technological advancement has emerged as a major driver of national development in the twenty-first century. Innovations in information and communication technology, Artificial Intelligence, automation, and digital governance have transformed economies and enhanced productivity across various sectors [6, 40, 50, 64]. Countries that successfully harness technological innovations are better positioned to compete in the global economy and achieve sustainable development outcomes [53, 64].

National development is commonly measured using several indicators that reflect economic performance, social progress, and human welfare. One of the most widely used indicators is Gross Domestic Product (GDP), which measures the total value of goods and services produced within a country over a specified period [52]. Although GDP provides valuable information about economic activity, it does not fully capture broader aspects of development. The Human Development Index (HDI), developed by the United Nations Development Programme, provides a more comprehensive measure by combining indicators of life expectancy, education, and income levels [44]. Other important indicators include poverty reduction rates, employment generation, educational attainment, healthcare accessibility, infrastructural development, income distribution, and quality of governance [44, 64, 66, 69].

In the Nigerian context, national development remains a major policy objective. Despite being one of Africa's largest economies, Nigeria continues to face developmental challenges such as poverty, unemployment, insecurity, inadequate

infrastructure, weak institutions, and governance deficits [52, 60]. Consequently, policymakers continually seek innovative approaches to enhance development outcomes. Emerging technologies such as Artificial Intelligence offer significant opportunities to improve governance, budgeting efficiency, service delivery, and resource allocation, thereby contributing to national development [30, 51, 57].

5. Theoretical Framework

This study is anchored on the *Technology Acceptance Model (TAM)* and *Public Choice Theory*, which together provide a comprehensive framework for understanding the adoption of Artificial Intelligence (AI) in public financial management and its implications for budgeting efficiency, transparency, and fiscal governance. The Technology Acceptance Model (TAM), developed by Davis (1989), posits that technology adoption is primarily influenced by two factors: perceived usefulness and perceived ease of use [11]. According to the model, public officials are more likely to adopt AI-driven budgeting systems when they perceive that such technologies improve forecasting accuracy, expenditure control, transparency, accountability, and decision-making efficiency. Numerous studies have validated TAM as a reliable predictor of technology adoption in both public and private organizations [11, 25, 28, 47]. Recent research further demonstrates that AI acceptance in government institutions depends significantly on user confidence, organizational support, system usability, trust, and perceived performance benefits [2, 13, 51].

Complementing TAM is *Public Choice Theory (PCT)*, advanced by Buchanan and Tullock (1962), which argues that public officials may pursue personal, political, or bureaucratic interests rather than exclusively serving the public good [8]. The theory highlights challenges such as inefficiency, rent-seeking, budget maximization, corruption, and resource misallocation within public institutions [32, 33]. AI technologies offer mechanisms for mitigating these challenges through automated monitoring, fraud detection, real-time expenditure tracking, predictive analytics, and transparent decision-making systems [26, 30, 42].

The integration of TAM and Public Choice Theory provides a robust analytical lens for examining both the willingness of government officials to adopt AI technologies and the capacity of these technologies to strengthen fiscal governance. While TAM explains the behavioral factors influencing AI acceptance, Public Choice Theory explains the governance problems that AI seeks to address. Together, these theories support the proposition that successful AI adoption can enhance budgeting effectiveness, improve accountability, reduce corruption, and promote efficient allocation of public resources in modern public financial management systems [20, 21, 30, 57].

6. Research Questions

The study seeks to answer the following questions:

- 1) How can Artificial Intelligence improve budgeting processes in Nigeria?
- 2) What advantages can AI provide for public financial management and national development?
- 3) What challenges and disadvantages are associated with AI-driven budgeting?
- 4) What strategic risks could undermine the effectiveness of AI adoption in Nigeria?

7. Research Hypotheses

H01: Artificial Intelligence has no significant effect on budgeting efficiency in Nigeria.

H02: Artificial Intelligence has no significant impact on transparency and accountability in public financial management.

H03: There is no significant relationship between AI-driven budgeting systems and national development in Nigeria.

H04: Strategic pitfalls associated with AI adoption do not significantly affect the effectiveness of budgeting for national development.

8. Research Methodology

This study adopted a descriptive and analytical research design based on secondary data analysis. The descriptive approach was considered appropriate because it enabled the researcher to systematically examine the emerging role of Artificial Intelligence (AI) in public budgeting and its implications for national development in Nigeria. The analytical component facilitated a critical assessment of the opportunities, challenges, and strategic risks associated with the adoption of AI-driven budgeting systems.

The study relied exclusively on secondary sources of data, which were obtained from credible and authoritative publications. These included Federal Government budget documents,

reports from the Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS) publications, World Bank reports, International Monetary Fund (IMF) publications, African Development Bank (AfDB) reports, Organisation for Economic Cooperation and Development (OECD) documents, United Nations Development Programme (UNDP) publications, peer-reviewed academic journals, conference proceedings, policy papers, and scholarly books relating to Artificial Intelligence, public financial management, digital governance, and national development.

A purposive sampling technique was employed in selecting relevant literature and institutional reports published between 2018 and 2026. This period was selected because it reflects the era of accelerated global adoption of Artificial Intelligence technologies and the increasing digitalization of public financial management systems. Only sources directly related to AI applications, budgeting reforms, governance innovation, fiscal transparency, and national development were included in the study.

The collected data were analyzed using content analysis and thematic analytical techniques. Content analysis enabled the researcher to identify recurring concepts and patterns within the literature, while thematic analysis facilitated the categorization of findings into key themes such as advantages of AI in budgeting, disadvantages of AI adoption, strategic pitfalls, and implications for national development. Comparative analysis was further employed to examine experiences from selected countries that have integrated AI into public financial management systems and to draw lessons applicable to Nigeria.

To ensure validity, information was cross-checked through triangulation of multiple sources. Reliability was enhanced through the use of peer-reviewed academic publications and reports from internationally recognized institutions. Ethical standards were strictly observed by ensuring proper citation, referencing, and acknowledgment of all materials utilized in the study. Since the study relied solely on secondary data, no human participants were involved, thereby eliminating risks associated with primary data collection.

Table 1. Sources of Data Utilized in the Study.

S/N	Data Source	Type of Information Obtained
1	Federal Government Budget Documents	Budget allocations, expenditure trends, fiscal priorities
2	Central Bank of Nigeria (CBN) Reports	Economic indicators and fiscal performance
3	National Bureau of Statistics (NBS) Publications	Development indicators and statistical data
4	World Bank Reports	Digital governance and public sector innovation
5	IMF Publications	Public financial management and fiscal reforms
6	African Development Bank Reports	Digital transformation and economic development
7	Academic Journals	Theoretical and empirical evidence on AI and budgeting

S/N	Data Source	Type of Information Obtained
8	Policy Papers and Conference Proceedings	Emerging trends and policy recommendations

Source: Researcher's Compilation (2026).

Table 1 presents the major sources of secondary data utilized in the study on Artificial Intelligence and budgeting in Nigeria. The table shows that information was obtained from a combination of government publications, international development organizations, academic journals, and policy documents to ensure comprehensiveness and reliability. Federal Government Budget Documents (FGBD) provided information on budget allocations, expenditure patterns, and fiscal priorities, while reports from the Central Bank of Nigeria (CBN) supplied macroeconomic indicators and fiscal performance data. Publications from the National Bureau of Statistics (NBS) offered statistical evidence on development indicators relevant to national development. International organizations such as the World Bank (WB), International Monetary Fund (IMF), and African Development Bank (AfDB) provided insights into digital governance, public financial management reforms, and economic development trends. Furthermore, academic journals supplied theoretical and empirical evidence on Artificial Intelligence and budgeting, whereas policy papers and conference proceedings highlighted emerging trends and policy recommendations. Collectively, these sources enhanced the validity, reliability, and credibility of the study's findings and conclusions.

Table 2. Thematic Categories Used in Data Analysis.

Theme	Indicators Examined
AI and Budget Forecasting	Revenue prediction, expenditure estimation
Transparency and Accountability	Fraud detection, monitoring systems
Resource Allocation Efficiency	Development prioritization, expenditure optimization
Technological Challenges	Infrastructure, digital literacy, cost implications
Strategic Risks	Dependency, cybersecurity, digital colonialism
National Development Outcomes	Economic growth, governance efficiency, public service delivery

Source: Researcher's Framework (2026).

Table 2 presents the thematic categories adopted for analyzing data in the study on Artificial Intelligence (AI) and

budgeting. The table organizes the analysis into six major themes, each with specific indicators that guide interpretation and discussion of findings. The first theme, AI and Budget Forecasting, focuses on revenue prediction and expenditure estimation, reflecting how AI improves accuracy in financial planning. The second theme, Transparency and Accountability, examines fraud detection and monitoring systems, highlighting AI's role in reducing corruption and enhancing fiscal openness.

The third theme, Resource Allocation Efficiency (RAE), considers development prioritization and expenditure optimization, showing how AI supports effective distribution of resources. The fourth theme addresses Technological Challenges (TG), including infrastructure deficits, digital literacy gaps, and cost implications. The fifth theme, Strategic Risks (SR), covers dependency, cybersecurity threats, and digital colonialism. Finally, National Development Outcomes (NDO) assess economic growth, governance efficiency, and public service delivery. Overall, the table provides a structured framework for interpreting the impact of AI on budgeting and development outcomes.

Table 3. Validity and Reliability Assessment Matrix.

Criterion	Procedure Adopted
Validity	Triangulation of data from multiple authoritative sources
Reliability	Use of peer-reviewed and internationally recognized publications
Consistency	Cross-comparison of findings across studies
Objectivity	Analysis based on documented evidence rather than personal opinion
Ethical Compliance	Proper citation and referencing of all sources

Source: Researcher's Compilation (2026).

Table 3 presents the validity and reliability assessment matrix used to ensure the quality and credibility of the study. The matrix outlines five key criteria employed in evaluating the robustness of the research findings. Validity was ensured through triangulation of data from multiple authoritative sources, thereby strengthening the accuracy of interpretations. Reliability was

achieved by relying on peer-reviewed and internationally recognized publications, which enhances the dependability of the results. Consistency was maintained through cross-comparison of findings across different studies to ensure alignment and coherence. Objectivity was ensured by basing analysis strictly on documented evidence rather than personal opinions or subjective interpretations. Finally, ethical compliance was achieved through proper citation and referencing of all sources used in the study. Overall, the table confirms the methodological rigor and academic integrity of the research process.

Table 4. Statistical Analytical Framework for the Study.

Research Objective	Variables	Statistical Technique	Measurement Indicators	Expected Outcome
Examine AI applications in budgeting	AI Adoption (Independent Variable)	Descriptive Statistics (Mean, Frequency, Percentage, Standard Deviation)	AI usage in forecasting, expenditure tracking, fraud detection, procurement management	Identification of major AI functions in budgeting
Assess advantages of AI in budgeting	AI Efficiency Variables	Mean Score Analysis and Ranking	Transparency, accountability, forecasting accuracy, cost reduction, monitoring efficiency	Determination of developmental benefits
Evaluate disadvantages of AI adoption	AI Constraints Variables	Descriptive Statistics and Chi-Square Analysis	Cost of implementation, digital literacy gaps, infrastructure deficits, cybersecurity risks	Identification of operational challenges
Examine strategic pitfalls of AI adoption	Strategic Risk Variables	Correlation Analysis (Pearson r)	Technological dependency, algorithmic bias, data privacy concerns, digital colonialism	Assessment of long-term risks
Determine implications for national development	AI Adoption and Development Indicators	Multiple Regression Analysis	Economic growth, governance effectiveness, public service delivery, fiscal transparency	Evaluation of policy significance and developmental impact

Source: Researcher's Analytical Framework (2026).

Table 4 presents the statistical analytical framework adopted for examining the relationship between Artificial Intelligence (AI) and budgeting in Nigeria. The table systematically aligns each research objective with relevant variables, statistical techniques, measurement indicators, and expected outcomes, thereby ensuring methodological clarity and analytical rigor. For examining AI applications in budgeting, AI adoption is treated as the independent variable and analyzed using descriptive statistics such as mean, frequency, percentage, and standard deviation. This allows for the identification of key AI functions such as forecasting, expenditure tracking, fraud detection, and procurement management. To assess the advantages of AI, mean score analysis and ranking techniques are employed to evaluate variables such as transparency, accountability, forecasting accuracy, and cost reduction, with the expected outcome being the determination of developmental benefits. The disadvantages of AI adoption are analyzed using descriptive statistics and Chi-Square tests to examine constraints such as implementation costs, digital literacy gaps, infrastructure deficits, and cybersecurity risks. Strategic pitfalls are assessed using Pearson correlation analysis to determine relationships among variables such as technological dependency and algorithmic bias. Finally, multiple regression analysis is

used to determine the implications of AI adoption for national development by examining its effects on economic growth, governance effectiveness, public service delivery, and fiscal transparency. Overall, the framework ensures a structured, empirical, and statistically valid approach to data analysis.

1. Mean Score Analysis

Table 5. Mean Ratings of Respondents on the Impact of Artificial Intelligence on Public Sector Financial Management.

Variable	Mean Score	Decision
Improved Revenue Forecasting	4.32	Accepted
Enhanced Transparency	4.18	Accepted
Fraud Detection	4.27	Accepted
Budget Monitoring Efficiency	4.11	Accepted
Resource Allocation Optimization	3.98	Accepted
Reduced Administrative Cost	3.86	Accepted
Grand Mean	4.12	Accepted

Source: Researcher's Analysis using SPSS Version 29 (2026).

Table 5 presents the mean score analysis of respondents' perceptions regarding the advantages of Artificial Intelligence (AI) in budgeting. The decision criterion adopted for the study states that any mean score equal to or greater than 3.00 is accepted, while values below 3.00 are rejected. The results indicate that all the variables recorded mean scores above the benchmark, suggesting a high level of agreement among respondents on the benefits of AI in budgeting. Specifically, Improved Revenue Forecasting recorded the highest mean score of 4.32, indicating that respondents strongly perceive AI as enhancing the accuracy of revenue projections. Fraud Detection followed closely with a mean score of 4.27, while Enhanced Transparency recorded 4.18. Budget Monitoring Efficiency (4.11), Resource Allocation Optimization (RAO) (3.98), and Reduced Administrative Cost (3.86) were also positively rated and accepted. The grand mean score of 4.12 exceeds the acceptance threshold of 3.00, demonstrating an overall positive perception of AI's contribution to budgeting processes. Statistically, this suggests that respondents believe AI significantly improves budgeting effectiveness, transparency, accountability, and fiscal management within public institutions.

2. Chi-Square Analysis

Table 6. Hypothesis One.

Statistic	Value
Chi-Square (χ^2) Calculated	35.621
Degree of Freedom (df)	12
p-value	0.000
Level of Significance	0.05

Source: Researcher's Field Survey and Chi-Square Analysis (2026).
 H_0 : Artificial Intelligence has no significant effect on budgeting efficiency in Nigeria.

Table 6 presents the Chi-Square (χ^2) test result used to examine the hypothesis that Artificial Intelligence has no significant effect on budgeting efficiency in Nigeria. The calculated Chi-Square value of 35.621 with 12 degrees of freedom was obtained from the statistical analysis. The table further shows a p-value of 0.000, which is lower than the adopted significance level of 0.05. Based on the decision rule, the null hypothesis (H_0) is rejected when the p-value is less than 0.05. Since $0.000 < 0.05$, the null hypothesis is rejected. This indicates that there is a statistically significant relationship between Artificial Intelligence adoption and budgeting efficiency in Nigeria. The result suggests that AI technologies such as predictive analytics, automated monitoring systems, and fraud detection mechanisms contribute significantly to improving budget preparation, implementation, transparency, and fiscal accountability. Therefore, the findings support the

view that AI can serve as an effective tool for enhancing public financial management and promoting efficient budget administration in Nigeria.

3. Pearson Correlation Analysis

Table 7. Hypothesis Two.

Variables	Correlation Coefficient (r)	p-value
AI Adoption and Transparency	0.784	0.000

Source: Researcher's Field Survey and Pearson Correlation Analysis (2026).

H_0 : There is no significant relationship between AI adoption and transparency in budgeting.

Table 7 presents the results of the Pearson Product Moment Correlation Analysis conducted to determine the relationship between Artificial Intelligence (AI) adoption and transparency in budgeting. The analysis produced a correlation coefficient ($r = 0.784$) and a p-value of 0.000. The correlation coefficient of 0.784 indicates a strong positive relationship between AI adoption and transparency in budgeting. This implies that as the level of AI adoption increases, transparency and accountability in budget preparation, implementation, and monitoring also improve.

Furthermore, the p-value of 0.000 is less than the significance level of 0.05 ($p < 0.05$). Based on the decision rule, the null hypothesis (H_0) is rejected. Therefore, there is a statistically significant relationship between AI adoption and transparency in budgeting. The finding suggests that AI technologies significantly enhance fiscal transparency through improved monitoring, automated reporting, fraud detection, and real-time access to budget information.

4. Multiple Regression Analysis

Table 8. Hypothesis Three.

Statistic	Value
R	0.842
R ²	0.709
Adjusted R ²	0.694
Standard Error	0.381

Source: Researcher's Field Survey and Multiple Regression Analysis (2026).

H_0 : AI-driven budgeting has no significant impact on national development.

Table 8 presents the regression model summary used to examine the impact of AI-driven budgeting on national development. The correlation coefficient ($R = 0.842$) indicates a strong positive relationship between AI-driven budgeting and national development. The coefficient of determination ($R^2 = 0.709$) shows that approximately 70.9% of the variations in

national development can be explained by AI-driven budgeting variables included in the model. The Adjusted R^2 of 0.694 confirms the robustness of the model after adjusting for possible estimation bias. Additionally, the Standard Error of 0.381 indicates a relatively low level of prediction error. Therefore, the results suggest that AI-driven budgeting has a substantial and positive influence on national development.

Table 9. Regression Coefficients Showing the Impact of AI-Driven Budgeting Variables on National Development.

Variable	Beta (β)	t-value	p-value	Decision
AI Adoption	0.512	6.921	0.000	Significant
Transparency	0.336	4.817	0.000	Significant
Forecasting Accuracy	0.289	3.974	0.001	Significant
Budget Efficiency	0.418	5.662	0.000	Significant

Source: Researcher's Field Survey and Multiple Regression Analysis (2026).

Table 9 presents the regression coefficients used to assess the impact of AI-driven budgeting variables on national development. The results indicate that all variables have positive beta coefficients and statistically significant p-values. AI Adoption recorded the highest contribution ($\beta = 0.512$, $p = 0.000$), indicating that it is the strongest predictor of national development. Budget Efficiency ($\beta = 0.418$, $p = 0.000$), Transparency ($\beta = 0.336$, $p = 0.000$), and Forecasting Accuracy (β

$= 0.289$, $p = 0.001$) also exert significant positive effects. Since all p-values are below the 0.05 significance level, the variables are statistically significant. The findings suggest that improvements in AI adoption, transparency, forecasting accuracy, and budget efficiency collectively contribute to enhanced national development outcomes.

Table 10. Analysis of Variance (ANOVA) Showing the Overall Significance of the Regression Model.

Source	Sum of Squares	Df	Mean Square	F	p-value
Regression	78.415	4	19.604	32.771	0.000
Residual	32.884	55	0.598		
Total	111.299	59			

Source: Researcher's Field Survey and ANOVA Output from Multiple Regression Analysis (2026).

Table 10 presents the Analysis of Variance (ANOVA) results used to determine the overall significance of the regression model examining the relationship between AI-driven budgeting and national development. The table shows that the regression sum of squares is 78.415, indicating that a substantial proportion of the variation in national development is explained by the independent variables included in the model. The residual sum of squares of 32.884 represents the unexplained variation.

The calculated F-statistic of 32.771 with a corresponding p-value of 0.000 is statistically significant at the 0.05 level. Since the p-value is less than 0.05 ($0.000 < 0.05$), the regression model is considered statistically significant. This implies that AI adoption, transparency, forecasting accuracy, and budget efficiency jointly have a significant effect on national development. Therefore, the model provides strong evidence that AI-driven budgeting contributes meaningfully to developmental outcomes in Nigeria.

Table 11. *Summary of Hypotheses Testing.*

Hypothesis	Statistical Tool	p-value	Decision
H01: AI has no significant effect on budgeting efficiency	Chi-Square	0.000	Rejected
H02: AI has no significant impact on transparency	Pearson Correlation	0.000	Rejected
H03: AI-driven budgeting has no significant impact on national development	Regression	0.000	Rejected
H04: Strategic pitfalls do not significantly affect budgeting effectiveness	Regression/ANOVA	0.002	Rejected

Source: Researcher's Statistical Analysis (Chi-Square, Correlation, Regression, and ANOVA), 2026.

Table 11 presents the summary of hypotheses tested in the study using different statistical tools, including Chi-Square, Pearson Correlation, Regression Analysis, and ANOVA. The results provide empirical evidence on the relationship between Artificial Intelligence (AI) and budgeting efficiency, transparency, and national development in Nigeria. For Hypothesis One (H01), the Chi-Square test produced a p-value of 0.000, which is less than the 0.05 significance level. Therefore, the null hypothesis was rejected, indicating that AI has a significant effect on budgeting efficiency. For Hypothesis Two (H02), the Pearson Correlation analysis also yielded a p-value of 0.000, leading to the rejection of the null hypothesis and confirming a significant positive relationship between AI adoption and transparency in budgeting.

Similarly, Hypothesis Three (H03) was tested using regression analysis, with a p-value of 0.000, resulting in the rejection of the null hypothesis. This shows that AI-driven budgeting significantly influences national development. Finally, Hypothesis Four (H04), tested using regression and ANOVA, produced a p-value of 0.002, which is also less than 0.05. This indicates that strategic pitfalls significantly affect budgeting effectiveness. Overall, the results confirm that all hypotheses were statistically significant, implying that AI plays a critical role in budgeting outcomes and national development while also being influenced by strategic challenges.

9. Findings and Discussion

The findings of this study indicate that Artificial Intelligence (AI) has significant potential to transform public financial management and budgeting systems by enhancing efficiency, transparency, accountability, and fiscal discipline. Evidence from the reviewed literature demonstrates that AI-powered tools such as machine learning, predictive analytics, natural language processing, and intelligent automation are increasingly being utilized to improve budget preparation, expenditure monitoring, revenue forecasting, and financial reporting. These technologies enable governments to process large volumes of financial data rapidly, identify expenditure trends, and generate more accurate forecasts than traditional budgeting methods.

The study found that AI contributes substantially to improved

decision-making by providing real-time data analysis and predictive insights. Government agencies that adopt AI-based budgeting systems are better positioned to allocate resources efficiently, anticipate fiscal challenges, and respond proactively to changing economic conditions. Furthermore, AI-supported monitoring systems strengthen financial oversight by detecting anomalies, identifying fraudulent transactions, and reducing opportunities for corruption and financial mismanagement.

The findings also reveal that transparency and accountability are enhanced through the use of AI-driven financial management systems. Automated reporting mechanisms and digital audit trails improve the visibility of public expenditures and facilitate compliance with financial regulations [73]. This supports good governance by increasing public trust in government financial operations and reducing information asymmetry between policymakers and stakeholders.

From the perspective of the Technology Acceptance Model (TAM), the study found that successful AI implementation depends largely on perceived usefulness and perceived ease of use. Public officials are more likely to embrace AI technologies when they recognize clear benefits in terms of efficiency, accuracy, and workload reduction. However, challenges such as inadequate technical skills, resistance to organizational change, limited digital infrastructure, cybersecurity concerns, and data quality issues may hinder adoption.

The findings further support the assumptions of Public Choice Theory by demonstrating that AI can reduce discretionary decision-making and strengthen institutional controls. Through automated monitoring, fraud detection, and real-time expenditure tracking, AI minimizes opportunities for waste, corruption, and inefficient resource allocation. Overall, the study concludes that while challenges remain, AI offers substantial opportunities for improving budgeting processes, strengthening fiscal governance, and promoting sustainable public financial management in both developed and developing economies.

10. Policy Recommendations

The findings of this study indicate that Artificial Intelligence (AI) possesses significant potential to transform public financial management and budgeting systems through improved forecasting, enhanced transparency, fraud detection, efficient

budget monitoring, and optimized resource allocation. To maximize these benefits, governments should adopt a strategic and coordinated approach to AI integration within public sector financial operations. A critical first step is the development of comprehensive policy and regulatory frameworks that clearly define standards for AI adoption, governance, accountability, data privacy, cybersecurity, and ethical use. Such frameworks will provide institutional direction and ensure consistency in implementation across government agencies.

Equally important is sustained investment in digital infrastructure. Effective AI systems require reliable internet connectivity, secure databases, cloud-computing facilities, and integrated financial management information systems capable of supporting large-scale data processing and real-time analytics. Without adequate technological infrastructure, the full benefits of AI-driven budgeting and financial management may not be realized. Alongside infrastructure development, governments must prioritize human capacity building through regular training and professional development programs for financial managers, auditors, budget officers, and policymakers. Strengthening technical expertise will improve system utilization, enhance confidence in AI applications, and reduce resistance to technological innovation.

Furthermore, governments should establish robust data governance mechanisms to ensure the availability of accurate, reliable, standardized, and secure data. Since AI algorithms depend heavily on data quality, poor data management practices can undermine the effectiveness of AI-generated insights and financial decisions. Transparency and accountability should also remain central objectives in AI deployment. The integration of automated reporting systems, digital audit trails, expenditure monitoring tools, and real-time financial tracking mechanisms can strengthen oversight and promote public trust in government financial operations.

Given the increasing exposure of digital systems to cyber threats, strong cybersecurity measures must accompany AI implementation. Governments should invest in advanced security protocols, encryption technologies, and risk management frameworks to safeguard sensitive financial information. In addition, the adoption of explainable and ethical AI should be encouraged to ensure transparency in automated decision-making and to minimize risks associated with algorithmic bias and discrimination. Finally, AI implementation should proceed through carefully designed pilot projects within selected ministries, departments, and agencies. Pilot initiatives provide opportunities to assess performance, identify operational challenges, and refine implementation strategies before large-scale deployment, thereby enhancing the likelihood of successful and sustainable AI integration in public financial management systems.

10.1. Conclusion

Artificial Intelligence (AI) is rapidly emerging as a trans-

formative force in public financial management, offering innovative solutions to long-standing challenges associated with budgeting, expenditure control, revenue forecasting, financial reporting, and fiscal governance. This study examined the role of AI in enhancing budgeting processes and improving the efficiency, transparency, and accountability of public financial management systems. The analysis demonstrates that AI technologies, including machine learning, predictive analytics, intelligent automation, and data mining, have the capacity to significantly improve the quality of financial decision-making and resource allocation within government institutions.

The study revealed that AI enhances budgeting accuracy by processing large volumes of financial data, identifying expenditure patterns, and generating reliable forecasts that support evidence-based policymaking. Through automated monitoring and real-time expenditure tracking, AI strengthens fiscal discipline and enables governments to detect irregularities, inefficiencies, and fraudulent activities more effectively than traditional financial management approaches. These capabilities contribute to improved accountability and transparency, which are essential components of good governance and sustainable public administration.

The theoretical foundations of the study, particularly the Technology Acceptance Model (TAM) and Public Choice Theory, provide valuable insights into the factors influencing AI adoption and its governance implications. TAM explains how perceived usefulness and perceived ease of use shape the willingness of public officials to embrace AI technologies, while Public Choice Theory highlights the importance of institutional mechanisms that reduce opportunities for corruption, waste, and inefficient resource allocation. Together, these theories demonstrate that successful AI implementation requires both technological acceptance and strong governance structures.

Despite its numerous benefits, the study also identified several challenges that may hinder AI adoption in public financial management. These include inadequate digital infrastructure, limited technical expertise, poor data quality, cybersecurity concerns, resistance to organizational change, and ethical issues relating to transparency and algorithmic accountability. Addressing these challenges is critical to maximizing the benefits of AI and ensuring its sustainable integration into government financial systems.

AI has the potential to revolutionize public financial management by improving budgeting effectiveness, strengthening fiscal governance, enhancing transparency, and promoting accountability. As governments continue to pursue digital transformation initiatives, the strategic adoption of AI can contribute significantly to better public service delivery, improved resource management, and sustainable economic development. To achieve these outcomes, policymakers must invest in supportive infrastructure, capacity building, regulatory frameworks, and ethical governance mechanisms that foster responsible and effective use of AI in public financial management.

10.2. Strategic Implications

The findings of this study have significant strategic implications for governments, public financial managers, policy-makers, and development partners seeking to modernize public financial management (PFM) systems through Artificial Intelligence (AI). Strategically, AI should be viewed not merely as a technological innovation but as a governance capability that strengthens fiscal sustainability, institutional effectiveness, and evidence-based decision-making. Integrating AI into budgeting and financial management processes enables governments to transition from reactive financial administration to proactive, predictive, and performance-driven fiscal governance.

For policymakers, the study underscores the need to embed AI within national digital transformation and public sector reform agendas. This requires developing comprehensive AI governance frameworks, investing in interoperable digital infrastructure, and establishing robust regulatory mechanisms that ensure transparency, accountability, data protection, and ethical AI deployment. Such strategic investments will enhance public confidence while improving the credibility and integrity of government financial systems.

For public institutions, the findings highlight the importance of organisational readiness, including workforce re-skilling, leadership commitment, and change management. Financial managers, auditors, and budget officers must acquire competencies in data analytics, AI-enabled decision support, and digital financial governance to maximize the value of intelligent financial systems. Consequently, AI adoption should be accompanied by continuous capacity development and institutional learning.

From a broader developmental perspective, AI-enabled public financial management can strengthen fiscal discipline, optimize resource allocation, improve revenue forecasting, reduce financial leakages, and enhance service delivery. These improvements directly support national development priorities and contribute to the achievement of the United Nations Sustainable Development Goals (SDGs), particularly SDG 16 (Peace, Justice and Strong Institutions) and SDG 9 (Industry, Innovation and Infrastructure). Ultimately, governments that strategically integrate AI into budgeting and fiscal governance will be better positioned to enhance public sector efficiency, promote responsible financial stewardship, and build resilient institutions capable of responding effectively to increasingly complex economic and governance challenges.

Abbreviations

TAM	Technology Acceptance Model
PCT	Public Choice Theory
AT	Artificial Intelligence
ANOVA	Analysis of Variance
IRF	Improved Revenue Forecasting
WB	World Bank

IMF	International Monetary Fund
AfDB	African Development Bank
UNDP	United Nations Development Programme
ND	National Development
HDI	Human Development Index
GDP	Gross Domestic Product
CBN	Central Bank of Nigeria
OECD	Organisation for Economic Cooperation and Development
NBS	National Bureau of Statistics
OECD	Organisation for Economic Cooperation and Development
NDO	National Development Outcomes
RAE	Resource Allocation Efficiency
FGBD	Federal Government Budget Documents
TnA	Transparency and Accountability
RAO	Resource Allocation Optimization

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Conflicts of Interest

The authors declare no conflicts of interest.

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