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ARTIFICIAL INTELLIGENCEADOPTION IN FINANCIAL MANAGEMENT OF TERTIARY INSTITUTIONS IN NIGERIA

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ABSTRACT

This study examined artificial intelligence adoption in financial management of tertiary institutions in Nigeria. The adoption of Artificial Intelligence (AI) is transforming financial management across various sectors, including higher education. In the context of carrying out this research, the following subheads were taken into consideration among many others: concept of artificial intelligence and concept of financial management. The roles of artificial intelligence in financial management of tertiary institutions as mentioned in the study included automation of financial processes, predictive analytics/financial forecasting and fraud detection/risk management. Automating financial operations and enhancing budget planning/forecasting, among many others, were mentioned as the strategic ways of using artificial intelligence in financial management of tertiary institutions. The challenges of using artificial intelligence for financial management of tertiary institutions as mentioned in the study included high implementation costs, data privacy/security risks and lack of technical expertise. Furthermore, the study provided ways to mitigate the challenges of using artificial intelligence for financial management of tertiary institutions to include securing adequate funding for AI implementation and enhancing data security/privacy measures, to mention but a few. The study concluded that the adoption of Artificial Intelligence (AI) is revolutionizing financial management in tertiary institutions by enhancing efficiency, reducing errors, and improving decision-making. One of the recommendations made was that the Nigerian tertiary institutions should prioritise investment in AI infrastructure, including high-performance computing systems and secure cloud-based platforms.

KEYWORDS: Artificial Intelligence, Financial Management, Tertiary Institutions, Nigeria

INTRODUCTION

The adoption of Artificial Intelligence (AI) is transforming financial management across various sectors, including higher education. In tertiary institutions, financial management is a complex process that involves budgeting, revenue collection, payroll administration, and resource allocation. The integration of AI offers innovative solutions to enhance efficiency, reduce human errors, and improve decision-making. As Nigerian universities and colleges face increasing financial pressures due to fluctuating government funding, rising operational costs, and growing student populations, AI-driven financial systems provide an opportunity to optimize resource management and sustainability (Ananyi& Nwosu, 2023). AI technologies such as machine learning, robotic process automation, and predictive analytics have the potential to revolutionise financial operations in Nigerian tertiary institutions. These technologies enable automated processing of financial transactions, real-time fraud detection, and predictive forecasting for better financial planning. For instance, AI-powered budgeting tools can analyse historical data and market trends to predict future revenue streams and expenses, allowing institutions to make informed financial decisions (Adelakun, 2023). Despite these advantages, AI adoption in Nigeria's tertiary institutions remains limited due to infrastructural deficits, lack of skilled personnel, and resistance to change.

One of the key benefits of AI in financial management is its ability to enhance transparency and accountability. Corruption and financial mismanagement have long been challenges in Nigeria's higher education sector, affecting fund allocation and service delivery (Ogunbunmi & Adefabi, 2024). AI-driven financial systems can mitigate these issues by providing real-time transaction monitoring, ensuring compliance with regulatory standards, and reducing opportunities for financial malpractice. By leveraging AI's capabilities, tertiary institutions can strengthen financial governance and improve overall institutional credibility.

However, the adoption of AI in financial management is not without challenges. Limited digital infrastructure, high implementation costs, and inadequate government support hinder the widespread adoption of AI in Nigerian universities and colleges (Obiya, 2024). Additionally, concerns about data privacy, cyber security risks, and ethical implications of AI-driven decision-making present obstacles to seamless implementation. Overcoming these barriers requires targeted investments, policy reforms, and capacity-building initiatives to foster AI integration in financial management systems.

To successfully adopt AI in financial management, tertiary institutions in Nigeria must develop strategic frameworks that prioritise AI literacy, staff training, and collaboration with technology experts. Partnerships with financial technology companies and government agencies can facilitate access to AI-driven solutions and enhance their practical applications. Furthermore, institutions must establish regulatory frameworks to ensure responsible AI adoption while addressing ethical considerations and security concerns (Abhulimen and Ejike, 2024).

CONCEPT OF ARTIFICIAL INTELLIGENCE

As mentioned by Kingsley & James (2025), AI enables machines to perform tasks that require human intelligence, such as speech recognition, decision-making, and data analysis Major components of the Artificial Intelligence bucket are machine learning, big data, natural language processing, decision logic, data visualization, and data analytics. Artificial Intelligence (AI) refers to the development of computer systems that can perform tasks that typically require human intelligence. According to Bassey and Owushi (2023), artificial intelligence can be understood as the collection of technologies that enable machines to sense, comprehend, act, and perform several functions matching those of humans. Major components of the artificial intelligence bucket are machine learning, big data, natural language processing, decision logic, data visualization, and data analytics. Artificial intelligence (AI) is the study of how the human brain makes decisions, learns new things, and thinks through difficulties (Adolf and Nkanta, 2025).

Furthermore, Lion and Ekefre (2024) defined artificial intelligence (AI) as computer programs that are able to carry out sophisticated operations that were previously limited to human performance, such as problem-solving, thinking, and decision-making. Furthermore, Akpan & Essien (2025), define Artificial intelligence as a branch of computer science that study how the human brain makes decisions, learns new things, and thinks through difficulties. Artificial intelligence (AI) is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. Artificial intelligence (AI), in its broadest sense, is intelligence exhibited by machines, particularly computer systems, as opposed to the natural intelligence of living beings. As a field of research in computer science focusing on the automation of intelligent behaviourTO through machine learning, it develops and studies methods and software that enable machines to perceive their environment and take actions that maximize their chances of achieving defined goals, with the aim of performing tasks typically associated with human intelligence (Ikechukwu and Echerenachukwu, 2024). Artificial intelligence (AI) is one of the prominent innovations in the 21st century in science engineering management and all other disciplines. This support the option of ..... who stated that as a cultural activity, technology predates both science and engineering, each of which formalises some aspects of

technological endeavour. In this sense, it remains connected with artistic endeavours (Udo-Okon & Ekong, 2022).

Moreover, Ufot (2024) described artificial intelligence (AI) as computer programs that are able to carry out sophisticated operations that were previously limited to human performance, such as problem-solving, thinking, and decision-making. Udo-Okon and Akpan (2024) mentioned that artificial intelligence is a branch of computer science that studies how computers learn, comprehend data, recognise characters in images, analyse pictures, and simulate how the eyes work. Artificial intelligence (AI) is the study of how the human brain makes decisions, learns new things, and thinks through difficulties. The goal of artificial intelligence is to enhance computer abilities related to human understanding, including language intelligence, learning, reasoning, and problem-solving (Akpan and Clark, 2024).

CONCEPT OF FINANCIAL MANAGEMENT

Financial management is all about monitoring, controlling, protecting, and reporting on an institution's financial resources. According to Egumah-Nyemsduke (2025), financial management is the strategic planning and management of an institution's finances to achieve its goals and objectives. It involves planning, organising, directing, and controlling financial activities within the institution. Financial management refers to the strategic planning, organising, directing, and controlling of financial resources to achieve its objectives efficiently and sustainably. It involves budgeting, financial reporting, investment decision-making, risk management, and ensuring regulatory compliance. Moreover, financial management includes capital structure decisions, cost control, and revenue generation strategies.

Furthermore, Bacatan (2023) defined financial management as the planning, organising, directing and controlling of the financial activities, such as the utilisation of funds in an institution and procurement. It means applying general management principles to financial resources of the institution. According to Oosthuizen (2003), cited in Tlale (2011), financial management is the distribution and use of money for the purpose of providing educational services and producing learner achievement. Financial management in contemporary education management aims to:

- Estimate the needs of local educational training;
- Obtain finances in accordance with the estimated needs;
- Administers the finances thus obtained in a legally correct manner.

ROLES OF ARTIFICIAL INTELLIGENCE IN FINANCIAL MANAGEMENT OF TERTIARY INSTITUTIONS

Artificial Intelligence (AI) is playing a transformative role in the financial management of tertiary institutions by enhancing efficiency, accuracy, and decision-making. Below are some key roles AI performs in financial management as mentioned by Sanghvi, Sanghvi, Sanghvi , .and Sharma (2024):

Automation of Financial Processes: AI automates repetitive and time-consuming tasks such as budgeting, payroll processing, and invoice management. This reduces manual errors, improves efficiency, and allows financial staff to focus on strategic planning rather than administrative tasks.

Predictive Analytics and Financial Forecasting: AI analyses historical financial data and market trends to predict future financial needs. This helps institutions anticipate budgetary requirements, manage tuition revenue fluctuations, and allocate resources effectively, ensuring financial stability.

Fraud Detection and Risk Management: AI-powered systems monitor financial transactions in real time, identifying anomalies that could indicate fraud or financial mismanagement. By detecting and preventing fraudulent activities, AI helps maintain financial integrity and ensures compliance with financial regulations.

Optimised Resource Allocation: AI assists in analysing data to determine the most effective distribution of resources. It helps institutions optimise operational costs, allocate funds efficiently to different departments, and reduce unnecessary expenditures.

STRATEGIC WAYS OF USING ARTIFICIAL INTELLIGENCE IN FINANCIAL MANAGEMENT OF TERTIARY INSTITUTIONS

Artificial Intelligence (AI) is revolutionizing financial management in tertiary institutions by enhancing efficiency, accuracy, and decision-making. By strategically integrating AI, universities and colleges can optimize financial operations, ensure transparency, and improve resource allocation. Below are key strategic ways AI can be utilized in financial management as mentioned by King (2018):

- **Automating Financial Operations:** AI-driven automation streamlines routine financial tasks such as payroll processing, invoice management, and budgeting. Implementing AI-powered accounting systems reduces human errors, improves efficiency, and allows financial officers to focus on more complex strategic planning.
- **Enhancing Budget Planning and Forecasting:** AI can analyze historical financial data and market trends to predict future revenue and expenses. Tertiary institutions can use AI-driven predictive analytics to make data-informed budgetary decisions, ensuring effective financial planning and resource allocation.
- **Optimizing Student Financial Aid and Tuition Management:** AI helps in analyzing student financial data to determine the best financial aid packages. It can also automate tuition fee processing, track payment schedules, and identify students at risk of financial difficulties, enabling proactive intervention.
- **Fraud Detection and Risk Mitigation:** AI-powered systems can detect anomalies in financial transactions by analyzing patterns and flagging suspicious activities. By integrating machine learning-based fraud detection systems, institutions can enhance security, prevent financial mismanagement, and ensure compliance with financial regulations.

- **Improving Investment and Fund Management:** Tertiary institutions often manage large endowment funds and investments. AI-powered financial tools assist in analyzing investment portfolios, assessing risks, and providing insights into optimal investment strategies to maximize returns.
- **Enhancing Financial Reporting and Compliance:** AI can automate the generation of financial reports, ensuring accuracy and timely submission. It also helps in tracking regulatory compliance by monitoring financial policies and automatically adjusting reports to meet legal and institutional requirements.
- **Personalized Financial Assistance for Students:** AI-driven chatbots and virtual assistants can provide students with real-time financial guidance, helping them navigate tuition payments, scholarship opportunities, and loan applications. This improves financial literacy and enhances student satisfaction.
- **Cost Reduction and Resource Optimization:** AI can identify cost-saving opportunities by analyzing financial inefficiencies. Institutions can leverage AI to reduce administrative costs, optimize resource allocation, and eliminate redundant expenses, ensuring long-term financial

sustainability.

CHALLENGES OF USING ARTIFICIAL INTELLIGENCE FOR FINANCIAL MANAGEMENT OF TERTIARY INSTITUTIONS

The integration of artificial intelligence (AI) in financial management offers numerous benefits to tertiary institutions, including improved efficiency, automation, and predictive analytics. However, several challenges hinder the effective implementation and utilisation of AI in financial management, some of which, as mentioned by Swain and Mallick (2023), include the following:

High Implementation Costs: Deploying AI-powered financial management systems requires significant financial investment in advanced software, hardware, and training. Many tertiary institutions, especially those with limited budgets, struggle to afford the initial costs of AI integration.

Data Privacy and Security Risks: AI systems rely on vast amounts of financial and personal data, making them attractive targets for cyberattacks. Institutions face the challenge of ensuring data protection, preventing unauthorised access, and complying with strict data privacy regulations.

Lack of Technical Expertise: AI technology requires skilled professionals who can develop, implement, and manage AI-driven financial systems. Many institutions face a shortage of qualified personnel, leading to difficulties in maintaining and optimising AI applications.

Resistance to Change: The transition from traditional financial management methods to AI-driven systems often faces resistance from employees and stakeholders. Staff may be reluctant to adopt AI due to fears of job displacement, lack of training, or uncertainty about AI's reliability.

Integration with Existing Systems: Many tertiary institutions use legacy financial management systems that may not be compatible with modern AI solutions. Integrating AI with these outdated systems can be complex, costly, and time-consuming.

Ethical and Bias Concerns: AI algorithms can sometimes exhibit biases based on historical data, leading to unfair financial decisions. Bias in AI-driven financial aid distribution, budgeting, or fraud detection can result in unintended discrimination against certain groups of students or staff.

Regulatory and Compliance Challenges: Financial management in tertiary institutions is subject to strict regulations and compliance requirements. AI applications must adhere to financial laws and institutional policies, and failure to do so can lead to legal and financial penalties.

Reliability and System Errors: AI-driven financial systems depend on accurate data input and algorithmic precision. Errors in data processing, incorrect predictions, or software malfunctions can result in financial miscalculations, budget discrepancies, or misplaced fund allocations.

HOW TO MITIGATE THE CHALLENGES OF USING ARTIFICIAL INTELLIGENCE FOR FINANCIAL MANAGEMENT OF TERTIARY INSTITUTIONS

The integration of artificial intelligence (AI) in financial management offers numerous benefits to tertiary institutions, but it also presents several challenges. To maximise AI's potential while minimizing risks, institutions must implement strategic measures to address these issues. Below are key ways to mitigate these challenges:

Securing Adequate Funding for AI Implementation: To overcome high implementation costs, tertiary institutions should seek funding through government grants, private sector partnerships, and research collaborations (Toriola-Coker, Omokungbe, and Ayodele-Oja, 2022). Investing in scalable AI solutions that can be integrated gradually can also help manage costs effectively.

Enhancing Data Security and Privacy Measures: Institutions should adopt strong cyber security protocols, including encryption, multi-factor authentication, and AI-driven fraud detection systems (Fynd Academy, nd). Compliance with data protection regulations, such as GDPR, should be ensured to safeguard sensitive financial data.

Investing in Technical Training and Capacity Building: Universities should train financial staff and IT personnel in AI technologies to improve system management and troubleshooting. Collaborations with AI experts and technology firms can provide valuable knowledge-sharing opportunities.

Encouraging Change Management and AI Adoption: Resistance to AI implementation can be addressed through awareness programmes, staff training, and transparent communication about AI's role in enhancing efficiency rather than replacing human jobs. Demonstrating AI's benefits can foster acceptance among stakeholders.

Ensuring Compatibility with Existing Financial Systems: Institutions should adopt AI solutions that can integrate seamlessly with legacy financial systems. Gradual implementation and testing of AI tools before full-scale deployment can help minimise disruptions and compatibility issues.

Addressing Ethical and Bias Concerns: AI systems should be regularly audited to detect and correct biases in financial decision-making (Bailey, n.d.). Using diverse and representative datasets during AI model training can help ensure fair financial policies for all students and staff.

Compliance with Financial Regulations and Policies: AI solutions must be designed to comply with legal and regulatory standards. Regular monitoring and updates should be conducted to ensure that financial operations remain aligned with evolving regulatory frameworks.

Ensuring AI System Reliability and Accuracy: Institutions should implement quality control measures, such as continuous system testing and error detection algorithms, to maintain the accuracy of AI-driven financial processes. Human oversight should be maintained to verify AI-generated financial decisions.

CONCLUSION

The adoption of Artificial Intelligence (AI) is revolutionising financial management in tertiary institutions by enhancing efficiency, reducing errors, and improving decision-making. As Nigerian universities face financial pressures, AI-driven solutions offer opportunities for optimised resource management and sustainability. AI technologies such as machine learning and predictive analytics can streamline financial operations, enhance transparency, and curb financial mismanagement. However, challenges such as infrastructural deficits, high costs, and data security concerns hinder full implementation. To maximise AI's benefits, institutions must invest in training, strategic partnerships, and regulatory frameworks to ensure responsible adoption, ultimately improving financial stability and institutional credibility.

RECOMMENDATIONS

1. Nigerian tertiary institutions should prioritise investment in AI infrastructure, including high-performance computing systems and secure cloud-based platforms. Additionally, institutions must develop AI literacy programmes to train financial staff and IT personnel, ensuring they can effectively implement and manage AI-driven financial systems.
2. The government should create policies that support AI integration in education finance, including funding incentives and regulatory frameworks. Partnerships with financial technology firms and AI experts can provide technical expertise, funding support, and innovative solutions tailored to the needs of tertiary institutions.
3. To address concerns about data security and financial transparency, institutions should integrate AI-powered cybersecurity systems to detect fraud, prevent data breaches, and ensure compliance with financial regulations. Regular audits and monitoring of AI algorithms will also help maintain ethical and accountable financial practices.

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