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FACTORS MILITATING AGAINST EFFECTIVE ADOPTION OF ARTIFICIAL INTELLIGENCE AMONG LECTURERS IN HIGHER INSTITUTIONS IN RIVERS STATE, NIGERIA

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ABSTRACT

This research examined the financial and infrastructural barriers that impede the successful adoption of Artificial Intelligence (AI) by lecturers in higher education institutions located in Anambra State, Nigeria. Although AI is internationally acknowledged as a revolutionary tool in higher education, its utilization in Nigerian universities is still restricted. The research employed a descriptive survey methodology, involving 144 lecturers chosen through both random and purposive sampling methods from two different universities. Information was gathered using a structured questionnaire called "Factors Militating against Effective Adoption of Artificial Intelligence" and the data were analyzed through mean scores. The results indicated that financial limitations, including the steep costs associated with AI software, hardware, licensing fees, and training for staff, significantly hinder AI implementation. Additionally, technological challenges such as insufficient expertise, algorithmic prejudice, difficulties in integration, and weak regulatory frameworks also present significant barriers. The study concludes that without targeted investments, capacity enhancement, and supportive policies, the rate of AI adoption in Nigerian higher education will continue to be slow. It suggests increased financial support, institutional training initiatives, clear policies on AI, and enhanced digital infrastructure to promote the successful integration of AI in universities.

Keywords: Artificial Intelligence, challenges, Adoption, Infrastructural constraints, Financial Constraints, Factors, Higher Institution

Introduction

The advancement of educational technologies has dramatically transformed the teaching and learning environment by providing greater access to learning resources and allowing for flexible learning. Students can remotely access educational materials and utilize virtual instructors who offer personalized assistance, monitor their progress, and provide immediate feedback on their work (Enwereji et al., 2023). Specifically, artificial intelligence consists of computer systems or machines that mimic human intelligence to execute tasks such as learning, reasoning, making decisions, and solving problems (Russell & Norvig, 2021). In the educational sector, AI is applied in forms such as intelligent tutoring systems, automated grading, adaptive learning platforms, virtual assistants, and predictive analytics that enhance teaching and management processes (Luckin et al., 2016). Its integration is essential in any

teaching and learning context, particularly in higher education institutions, which are expected to spearhead the use of AI to enhance quality and foster competitiveness among students.

AI adoption means the intentional integration and consistent usage of AI tools by lecturers and institutions to improve pedagogy, learning outcomes, research, and operational efficiency. Effective adoption is seen when it is supported by adequate infrastructure, training, motivation, and favorable policies (Venkatesh et al., 2003). Interestingly, while AI has been utilized in education for some time, its uptake in Nigeria has been notably slower compared to that in developed countries (Mafara & Abudullahi, 2024). Studies on AI adoption in universities reveal that while lecturers are open to using the technology, they have concerns regarding its effective integration into the Nigerian educational system (Akinyemi & Ezekiel, 2022).

Worldwide, universities are beginning to leverage AI to tackle challenges related to access, equity, quality, and relevance. Nigeria, with its expansive and rapidly growing student population, cannot afford to lag behind. Nonetheless, the effective implementation of AI tools remains quite limited. The benefits of AI include facilitating collaboration both within and outside educational settings, supplying real-time data and diverse algorithms (Mafara, 2024). ChatGPT contributes to personalized education, automating tasks, and enhancing assessments (Vinay, 2023). AI-driven systems offer tailored instruction to students to improve their grasp of various subjects, while chatbots deliver instant assistance and responses to inquiries.

Globally, developed nations are showcasing the transformative potential of AI in education. In the United States, AI-enhanced platforms such as Carnegie Learning and Coursera Labs personalize learning experiences and streamline feedback processes (U.S. Department of Education, 2010; Jiarui et al, 2024). In the United Kingdom, universities utilize AI chatbots, like Jisc's Learning Analytics Service, to provide student support and insights for retention. China incorporates AI into education through facial recognition and speech analysis for classroom management and assessments, while Finland applies AI for curriculum design and data-informed planning in institutions (Zawacki-Richter et al., 2019). These advancements have enhanced engagement, accessibility, and educational results in higher learning. Conversely, numerous African countries, including Nigeria, encounter significant obstacles to the incorporation of AI.

Despite the increasing recognition of AI's potential, widespread implementation is obstructed by foundational and systemic challenges. Various researchers have highlighted these issues. Nwaimo et al. (2024) underscore the problems of unreliable electricity, inadequate internet connectivity, and outdated ICT infrastructure within Nigerian universities. Okeke (2020) notes the lack of digital skills and negative attitudes among faculty members towards new technologies. Edinoh et al. (2025) stress the lack of institutional policies and the low emphasis on AI in national educational strategies. Furthermore, Jobin et al. (2019) bring attention to global ethical concerns related to AI in education, including issues of data privacy, surveillance, and algorithmic bias,

which are particularly acute in regions with weak regulatory frameworks.

Review of Related Literature

Numerous studies have extensively investigated the integration of Artificial Intelligence in education, especially regarding its potential advantages, challenges, and methods for implementation. Research from more developed nations illustrates how AI can transform pedagogy, learning analytics, and institutional effectiveness. For example, Luckin et al. (2016) argue that AI-driven tools can enhance student engagement and success by providing personalized learning opportunities, adaptive feedback, and intelligent tutoring. Holmes et al. (2019) also note that AI promotes inclusive education by aiding learners with disabilities and facilitating timely interventions.

In developed areas like the United States and China, AI has been effectively woven into extensive educational systems. Platforms such as Carnegie Learning utilize AI for cognitive tutoring in mathematics, while classrooms in China implement facial recognition and speech analytics for monitoring and feedback purposes (Zawacki-Richter et al., 2019). These instances illustrate how AI can benefit both students and teachers when adequate infrastructure, training, and policies are established.

However, the literature related to the African context offers a divergent perspective. Nwaimo (2024) identifies significant infrastructural challenges, such as inconsistent electricity and poor internet access, as ongoing barriers to digital innovation in Nigerian higher education institutions. Olorkor and Gideon (2024) note that many lecturers in Nigeria lack sufficient exposure to emerging technologies and often maintain negative views about their utility, which hinders their readiness to embrace AI tools.

One of the primary challenges is the lack of AI infrastructure, which obstructs the effective deployment, scaling, and maintenance of AI systems. These challenges include limited access to high-performance computing resources, insufficient data management and storage systems, poor internet connectivity, lack of technical support, inconsistent power supply, absence of cloud infrastructure, high costs of infrastructure, and cybersecurity risks. Most Nigerian universities face challenges regarding reliable internet access, consistent electricity, and updated computer facilities, all of which are essential prerequisites for AI integration (Imizuokena & Ikechukwu, 2025; Nwaimo et al., 2024). Even basic e-learning platforms struggle to operate effectively in these conditions. Similarly, many Nigerian lecturers lack the necessary digital literacy to engage with AI technologies. Without formal education or experience, AI can seem inaccessible and daunting to them. The absence of organized professional development initiatives exacerbates this divide (Sayari, 2025). If lecturers are not familiar with AI, they are unlikely to utilize it, much less support its integration into teaching practices. However, due to the chronic underfunding of public universities in Nigeria, AI is often perceived as an unaffordable luxury rather than a necessity (Olorkor & Gideon, 2024).

Without specific funding allocated for digital transformation, universities are unable to initiate or maintain AI-related projects. Implementing AI incurs

substantial costs associated with software licensing, hardware purchases, maintenance, upgrades, and personnel training. These expenses are frequently regarded as low priority, in a setting where many public universities struggle with ongoing underfunding, further hindering technological advancement (Edinoh et al, 2025). Additionally, Sayari (2025) contends that the absence of coherent institutional frameworks and supportive policies has resulted in a leadership deficit, complicating efforts to plan and sustain AI initiatives. The international research by Jobin et al. (2019) also highlights ethical concerns, including surveillance, data misuse, and algorithmic bias, which are particularly alarming in nations with ineffective data governance systems.

Numerous researchers advocate for a contextually informed approach to AI adoption in Africa, urging decision-makers and educators to take into account socio-cultural, economic, and institutional factors (Edinoh et al, 2025; Mafara, 2024). They emphasize that without customized solutions, attempts to transfer global AI models into Nigerian higher education institutions may lead to shallow integration rather than significant transformation.

Theoretical Perspective

The Technology Acceptance Model (TAM) introduced by Davis (1989) has been extensively utilized in educational studies to elucidate the acceptance of digital technologies by educators and students. It provides a perspective to understand lecturers' hesitance toward adopting AI. According to TAM, two principal factors perceived usefulness and perceived ease of use influence an individual's readiness to accept new technologies. In the context of Nigerian higher education, TAM is pertinent as it underscores the significance of users' perceptions in shaping whether AI tools are embraced and utilized effectively by educators. For example, if lecturers view AI tools as advantageous for simplifying lesson planning, assessment, and student interaction, they are more inclined to adopt them. However, in Nigeria, if perceived usefulness and perceived ease of use are compromised by infrastructural, technical, and institutional limitations, the level of adoption will be low.

Research Problem

Despite the worldwide acknowledgment of AI as a transformative asset in higher education, its utilization by lecturers in Nigerian universities remains constrained. The disparity between the potential advantages of AI and its actual application in Nigerian higher education institutions highlights a systemic issue relating to infrastructure, training, funding, and institutional policies. If this gap is not addressed, it could exacerbate educational inequalities and impede the nation's advancement toward global digital proficiency. The objective of this study is to investigate the factors obstructing the effective adoption of Artificial Intelligence by lecturers in higher education institutions in Rivers State.

Research Questions

This study is guided by the following questions:

1. What infrastructural obstacles impede AI adoption among lecturers in higher education institutions in Rivers State?
2. What financial obstacles hinder AI adoption among lecturers in higher

education institutions in Rivers State?

Methods

The research employed a descriptive survey design and was conducted across two universities located in Rivers State. The study's population consisted of 650 lecturers from these institutions. A simple random sampling technique was implemented to choose three faculties and two departments from each faculty, resulting in a total of 12 departments from both universities. Additionally, the purposive sampling technique was utilized to select 14 lecturers from each department, all of whom had at least 10 years of teaching experience. Consequently, a total sample size of 144 respondents was established for the study. The data collection instrument was entitled "Factors Militating against Effective Adoption of Artificial Intelligence in Higher Institutions." This instrument was a questionnaire organized on a 4-point Likert scale ranging from strongly agree to strongly disagree. Validation of the instrument was performed by three educational experts. A reliability coefficient of 0.75 was obtained using the Pearson Product Moment Correlation Coefficient. Data collected were analyzed using mean scores. A mean score of less than "2.50" was interpreted as "disagree" (D), while items with a mean score equal to or exceeding "2.50" were interpreted as "agree" (A).

Presentation and Data Analysis

Table1: Respondents mean ratings on the financial challenges of AI adoption in higher institutions.

s/n	Financial Challenges	Mean	SD	Remarks
1	AI hardware and infrastructure are costly	2.93	0.83	Agreed
2	AI software are expensive	3.60	0.93	Agreed
3	AI licensing fees are costly	3.47	0.87	Agreed
4	Hiring AI professionals is expensive	2.86	0.86	Agreed
5	High cost of staff training and development	2.55	0.72	Agreed
6	It is costly to acquire data	2.84	0.83	Agreed
7	AI system upgrade is expensive	2.37	0.96	Disagreed
		2.94		Agreed

Table 1 evaluated the perceptions of lecturers regarding various financial limitations that hinder the effective integration of AI. All items, except one (Item 7: "AI system upgrade is expensive"), had mean scores exceeding 2.50, indicating a level of agreement. The item with the highest mean score was item 2, "AI software is expensive" (Mean = 3.60), followed by "AI licensing fees are costly" (3.47). Other recognized challenges included: the high costs of AI hardware and infrastructure (Mean = 2.93), the expense of hiring AI professionals (2.86), costly data acquisition (2.84), and the high cost of staff training (2.55). On the other hand, the item

regarding AI system upgrades had a mean score below 2.50 (2.37), indicating that system maintenance or upgrades are not viewed as a significant obstacle. The overall grand mean was 2.94, suggesting that financial constraints are generally considered a notable barrier to AI adoption in the institutions surveyed. Additionally, the standard deviation of items, which ranged between 0.72 and 0.97, reflects a consistency in the respondents' views.

Table2: Respondents mean ratings on the Infrastructural challenges of AI adoption in higher institutions.

s/n	Items	M	SD	Remarks
8	Data privacy is a challenge	2.65	0.81	Agreed
9	Unavailability of quality training data	2.56	0.95	Agreed
10	Algorithmic bias and discrimination is a constraints	3.10	0.78	Agreed
11	Computation cost is high	2.52	0.82	Agreed
12	It is difficult integrating AI with existing systems	2.65	1.04	Agreed
13	Insufficient expertise in AI	3.32	1.16	Agreed
14	Limited regulatory frameworks	3.23	0.78	Agreed
	Grand Mean	2.86		Agreed

The findings from Table 2 show that all items received ratings above the required threshold, demonstrating a general consensus that infrastructural challenges are equally significant. The most pressing issues identified were the lack of AI expertise (Mean = 3.32) and inadequate regulatory frameworks (Mean = 3.23). Other concerns included algorithmic bias (Mean = 3.10), data privacy (Mean = 2.65), and integration challenges (Mean = 2.65). The overall mean of 2.86 indicates that these technological challenges are not only present but also impactful.

Discussion of Findings

The outcomes of this research suggest that both financial and infrastructural issues substantially obstruct the effective implementation of Artificial Intelligence (AI) among lecturers in higher education institutions in Nigeria, particularly in Rivers State. Results from Table 1 demonstrate that participants largely concurred that financial obstacles significantly limit AI integration. The most critical barriers identified include the steep costs associated with AI software (Mean = 3.60) and licensing fees (Mean = 3.47). This implies that even when institutions recognize the importance of AI tools, the financial strain of obtaining high-quality software solutions discourages usage. Additionally, the expenses related to recruiting AI experts (Mean = 2.86) and training personnel (Mean = 2.55) pose substantial challenges, indicating that universities may not have the financial resources to develop internal AI capabilities.

Notably, upgrading AI systems was the only item with a disagreement (Mean = 2.37), which suggests that respondents may either lack experience with system upgrades or perceive it as less urgent than the initial investment costs. In general, the grand mean of 2.94 supports the notion that financial limitations are broadly recognized as a significant hindrance to AI adoption.

These findings are consistent with Olorkor and Gideon (2025), who noted that persistent underfunding in Nigerian public universities renders digital innovation more of a luxury than a necessity. They also align with the views of Imizuokena and Ikechukwu (2025), who advocated for increased financial support for digital infrastructure and capacity building among staff.

As indicated in Table 2, every infrastructural item was scored above the threshold, signifying a collective acknowledgment that infrastructural limitations are equally concerning. The absence of AI competency (Mean = 3.32) and constricted regulatory frameworks (Mean = 3.23) surfaced as the most urgent issues. This highlights a widespread lack of skills among lecturers and insufficient institutional policies regarding AI implementation.

Additional problems like algorithmic bias (Mean = 3.10), data privacy (Mean = 2.65), and challenges in integration (Mean = 2.65) mirror rising apprehensions about the ethical and operational hazards associated with AI use in education, particularly in environments lacking robust governance and infrastructure. This observation aligns with Jobin et al. (2019), who cautioned that weak data protection laws in developing nations exacerbate AI-related risks.

The overall mean score of 2.86 indicates that these infrastructural barriers are not merely theoretical but can have substantial effects. They echo previous literature advocating for investments in digital literacy, data infrastructure, and policy formulation to create a secure and effective AI landscape in African higher education institutions (Sayari, 2025).

Taken together, these outcomes illustrate that the adoption of AI in Nigerian higher education is impeded by two main constraints: financial and infrastructural. Unless issues related to costs, infrastructure, expertise, and policy are addressed, universities may find themselves trailing behind global developments, thereby forfeiting chances for digital transformation in teaching, learning, and administrative processes. These findings lend support to the Technology Acceptance Model (TAM), which posits that perceived ease of use and usefulness both negatively impacted by financial and infrastructural barriers directly influence the adoption behaviors of lecturers.

The research was confined to two public higher education institutions in Rivers State, which may not fully capture the experiences and difficulties faced by lecturers in other institutions. Future research should aim to include lecturers from a broader range of institutions.

In conclusion, this research investigated the financial and infrastructural obstacles that impede the adoption of Artificial Intelligence (AI) among lecturers in higher education institutions in Rivers State. The results indicate that although AI has considerable potential to enhance teaching, learning, and institutional efficiency, its implementation is significantly hampered by financial limitations and infrastructural challenges. The high expenses related to AI hardware, software, training, and licensing fees make it challenging for institutions to prioritize AI integration. Likewise, factors such as insufficient AI expertise, inadequate regulatory frameworks, data privacy issues, and algorithmic bias pose substantial technical obstacles.

These difficulties not only hinder the advancement of digital innovation in Nigerian universities but also deepen the digital divide between educational systems in developed and developing countries. Without proactive policy measures, capacity-building initiatives, and funding reforms, AI will continue to be underutilized, which will prevent Nigeria's higher education sector from achieving global competitiveness and enhancing quality.

Recommendations

Based on the findings, the following suggestions are proposed:

1. Increased funding from government and institutions: Government bodies and university administrations should set aside specific budgets for AI adoption, which should cover the costs of software procurement, infrastructure development, and staff training.

2. Universities should advocate for targeted policy measures, including subsidies or grants for AI infrastructure.

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