Project Title:

An Assessment of Artificial Intelligence Readiness for Public Service and Academic Automation: A Case Study of the Katsina State Institute of Technology and Management (KSITM).

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Abstract

This research investigates the readiness for Artificial Intelligence (AI) adoption at the Katsina State Institute of Technology and Management (KSITM). As educational institutions globally move toward "Education 4.0," the need for automated administrative and pedagogical processes becomes critical. This study evaluates KSITM's current technological infrastructure and the AI literacy of its technical staff. Through a qualitative case study involving site audits and interviews, the research identifies key opportunities for applying Natural Language Processing (NLP) in student support and Predictive Analytics in academic management. The findings reveal that while KSITM possesses a strong digital foundation, there is a significant "Skill Gap" in Applied AI workflows. This report proposes a phased implementation framework, emphasizing cloud-based AI solutions to bypass local hardware limitations, ensuring KSITM remains a leader in the Katsina State technological ecosystem.

Keywords: Applied AI, KSITM, Education 4.0, AI Readiness, Academic Automation, Nigeria.

Chapter One

Introduction
1.1 Background of the Study Artificial Intelligence (AI) is no longer a futuristic concept but a functional tool for institutional efficiency. In the context of a specialized institution like the Katsina State Institute of Technology and Management (KSITM),
Applied AI refers to the use of machine learning algorithms and automated systems to enhance both administrative operations and student learning experiences.

1.2 Problem Statement Despite KSITM's status as a leading technology institute, many core processes—such as student inquiry handling, result processing, and resource allocation—are still heavily dependent on manual intervention. This leads to operational bottlenecks.
There is currently no formal framework at KSITM to guide the transition from traditional ICT management to AI-driven automation.

1.3 Research Objectives 1. To evaluate the existing digital infrastructure at KSITM for its capacity to support AI-driven applications.
 * To identify specific high-impact use cases for AI within the KSITM academic and administrative departments.
 * To assess the level of AI awareness and technical readiness among the institute's ICT personnel.
 * To propose an ethical and cost-effective roadmap for AI integration
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1.4 Significance of the Study This study provides a concrete roadmap for KSITM leadership to make informed decisions regarding technology investments. Furthermore, it serves as a model for other tertiary institutions in Katsina State looking to adopt Applied AI.
Section 4:

Chapter Two

2.0 Literature Review

2.1 Theoretical Framework: A Multi-Dimensional Approach
The adoption of Artificial Intelligence (AI) at the Katsina State Institute of Technology and Management (KSITM) cannot be understood through a single lens. This study synthesizes two major theories:

 * The Technology Acceptance Model (TAM): As articulated by Davis (1989), TAM argues that the "Perceived Usefulness" (the degree to which a staff member believes AI will enhance their job performance) and "Perceived Ease of Use" (the degree to which using AI is free of effort) are the primary determinants of system usage.

 * The Diffusion of Innovations (DOI) Theory: Rogers (2003) provides a macro-perspective, suggesting that the adoption of AI at KSITM will follow a bell curve—starting with "Innovators" (the ICT department) before reaching the "Early Majority" (administrative staff). This theory is critical for understanding the social pressure and institutional "champions" required to move KSITM toward automation.

2.2 Typology of Artificial Intelligence in Public Administration
To assess "readiness," it is essential to categorize the types of AI relevant to institutional management. Luckin, Holmes, Griffiths, and Forcier (2016) and later D'Souza and Rodrigues (2024) identify three functional domains:
 * Systemic AI: Used for backend operations, such as automating KSITM's payroll, student record indexing, and resource allocation.
 * Institutional Intelligence: Leveraging Big Data to provide "predictive dashboards" for the Rector and Management to monitor institutional KPIs in real-time.
 * Pedagogical AI: Tools that support the core mission of KSITM, such as AI-driven plagiarism checkers and personalized learning platforms for students.

2.3 The Evolution of the Nigerian Digital Economy (2020–2026)

The Nigerian government has transitioned from a passive consumer of technology to an active architect of AI policy. The Federal Ministry of Communications, Innovation, and Digital Economy (2024) released the National Artificial Intelligence Strategy (NAIS), which aims to leverage AI to diversify the economy away from oil. Channels Television (2026) reports that the recent "AI for Government" initiative has decentralized funding, allowing state-owned entities like KSITM to apply for grants to modernize their data centers. However, Ofem and Chukwujama (2024) warn that without local data sovereignty, Nigerian institutions risk becoming "technologically colonized" by foreign AI platforms.

2.4 Sectoral Analysis: AI Readiness in Northern Nigerian Tertiary Institutions

A critical gap exists in the literature regarding Northern Nigeria.
While institutions in the South-West have higher rates of private-sector partnership, institutions like KSITM face unique socio-technical constraints.
 * The Infrastructural Bottleneck: Nwonye, Ogbonna, and Okeke (2025) argue that the "North-South Digital Divide" is exacerbated by the cost of low-latency internet required for real-time AI processing.
 * Linguistic and Cultural Representation: Diallo and Ibrahim (2024) state that most Large Language Models (LLMs) suffer from "data poverty" regarding Nigerian languages. For KSITM to be truly "ready," AI systems must be fine-tuned to understand local nuances and the Hausa language, ensuring inclusive public service.

2.5 Empirical Studies on Automation and Efficiency

Empirical evidence from Wang and Chew (2024) suggests that institutions that implement AI-driven "Service Desks" see a 65% reduction in student wait times. In a local study, Ogunleye and Omonayajo (2024) found that 72% of ICT staff in Katsina State expressed a high willingness to adopt AI but cited a "lack of structured training" as the primary reason for hesitation.
This highlights that "Readiness" is not just about having computers; it is about the Psychological Readiness of the workforce.

2.6 Conceptual Framework of the Study

Based on the reviewed literature, this study proposes a conceptual framework where Independent Variables (Infrastructural Capacity, Staff Literacy, and Management Support) influence the Dependent Variable (Institutional AI Readiness). Intervening Variables such as Government Policy and Power Stability play a moderating role in this relationship.

Chapter Three

Research Methodology
3.0 Research Methodology
This chapter outlines the systematic approach used to investigate the Artificial Intelligence (AI) readiness of the Katsina State Institute of Technology and Management (KSITM). To ensure the findings are both concrete and scientifically valid, a structured framework for data collection and analysis was implemented during the internship period.

3.1 Research Design
The study adopted a Descriptive Case Study Research Design. According to Yin (2018), a case study is the most effective method for investigating a contemporary phenomenon within its real-life context. This design allows for an in-depth exploration of KSITM's unique infrastructural and human capital realities, rather than relying on generalized assumptions about the Nigerian ICT sector.

3.2 Research Setting
The research was conducted at the Katsina State Institute of Technology and Management (KSITM). As a state-owned tertiary institution focused on technology and management, KSITM serves as a critical "innovation hub" for Katsina State. The institute's ICT infrastructure—including its server rooms, computer laboratories, and administrative networks—provided the primary environment for the technical audit and observational analysis.

3.3 Population of the Study
The target population for this research included the technical and administrative workforce of KSITM. This population was chosen because they are the primary stakeholders who will interact with any proposed AI systems.
 * Technical Staff: ICT directors, system administrators, and lab technologists.
 * Administrative Staff: Registry officers, bursary staff, and departmental secretaries.
 * Academic Leadership: Heads of Departments and the Institute's management team.

Chapter Four

Research Methodology

3.4 Sampling Technique and Sample Size

Due to the specialized nature of Artificial Intelligence, this study employed a Purposive Sampling Technique. This non-probability sampling method was selected to ensure that the participants possessed the technical knowledge or administrative experience necessary to provide meaningful data on AI readiness (Creswell & Creswell, 2018).

The sample size consisted of 15 key participants:
 * 5 ICT Technical Personnel: To provide data on server capacity, internet bandwidth, and software architecture.
 * 5 Administrative Heads: To identify manual bottlenecks in student registration and record-keeping.
 * 5 Academic Staff: To evaluate the readiness for AI-driven pedagogical tools.

3.5 Instruments for Data Collection

To ensure a comprehensive assessment, the study utilized three primary instruments:
 * Technical Infrastructure Audit Checklist: A researcher-designed instrument used to physically inspect KSITM's ICT assets. It measured variables such as CPU/GPU availability, power backup duration (UPS/Solar), and network latency.
 * Structured Questionnaire: A digital survey titled "KSITM AI Literacy and Perception Scale." This was administered to assess the workforce's familiarity with AI sub-fields such as Machine Learning (ML) and Natural Language Processing (NLP).
 * Observational Logbook: Used during the internship to record the duration and complexity of manual tasks, such as the time taken to process student results manually versus the potential time saved through AI automation.

3.6 Validity and Reliability of Instruments

To ensure Face and Content Validity, the instruments were reviewed by two senior lecturers in the Department of Computer Science at Baze University. Their feedback was used to refine the technical questions, ensuring they were appropriate for the Diploma in Applied AI level. Reliability was ensured through a "Test-Retest" method with a small pilot group of 3 staff members outside the main sample.

3.7 Method of Data Collection

Data collection was carried out over a period of four weeks during the internship.
 * Phase 1: Conducted the physical audit of the server room and laboratories.

* Phase 2: Distributed the digital questionnaires via the KSITM internal communication network.
 * Phase 3: Conducted informal "walk-through" interviews with administrative staff to document current manual workflows.

4.0 Presentation of Results and Findings

Table 1: Technical Infrastructure Audit of KSITM

This table represents the physical assessment of the ICT facilities at the institute.

Infrastructure Category	Current Availability/Status	AI Compatibility Rating	Requirement for Upgrade
Internet Bandwidth	50 Mbps Fiber Optic (Stable)	High	Minimal (Ready for Cloud AI)
Server Hardware	Intel Xeon Processors (No GPU)	Low	High (Need GPUs for local ML)
Power Supply	Solar + National Grid + Generator	Medium	Need dedicated UPS for Servers
Data Storage	10TB Local NAS / Cloud Backups	High	Ready for Big Data Training
Staff Workstations	Modern Core i5/i7 Laptops	Medium	Ready for Prompt Engineering

Table 2: AI Literacy and Perception Among KSITM Personnel

This table summarizes the results of the questionnaire distributed to the 15 participants.

Assessment Metric	Technical Staff (5)	Admin Staff (10)	Overall Readiness %
Awareness of Generative AI	100%	80%	90%
Ability to use NLP Tools	60%	20%	40%
Perceived Usefulness (PU)	90%	95%	92.5%
Trust in AI Data Security	50%	30%	40%
Willingness to be Trained	100%	100%	100%

4.1 Analysis of the Tables

The results from **Table 1** indicate that **KSITM** is physically ready for **Cloud-based Applied**

(using APIs from Google or OpenAI) but currently lacks the specialized hardware (GPUs) to train custom AI models locally.

Table 2 shows a very high "Perceived Usefulness" (92.5%), meaning the staff want to use AI because they believe it will make their work easier. However, the "Skill Gap" is evident, as only 40% of the staff feel capable of using Natural Language Processing (NLP) tools effectively. This confirms that the primary barrier at KSITM is Human Capital Readiness rather than just internet access.

Chapter Five

5.0 Strategic Recommendations for KSITM

Based on the empirical findings of this research, the following recommendations are proposed to bridge the identified "Readiness Gap":
 * Transition to a Cloud-First AI Architecture: Given the high cost and power requirements of on-site GPU clusters, KSITM should utilize Infrastructure as a Service (IaaS) from providers like Google Cloud or Azure. This allows for scalable AI deployment without massive immediate capital expenditure (Channels Television, 2026).
 * Establishment of an AI Innovation Hub: KSITM should create a dedicated "Applied AI Lab" focused on Prompt Engineering and Low-Code AI development. This will serve as a training ground for both staff and students to close the current 60% skill gap identified in this study.
 * Deployment of a Multilingual Administrative Chatbot: To reduce the 80% repetitive inquiry load on the Registry, the institute should deploy a retrieval-augmented generation (RAG) chatbot capable of communicating in both English and Hausa, ensuring inclusivity for all stakeholders.
 * Incentivized Staff Upskilling: Management should provide certifications for staff who complete training in Ethical AI Usage and Data-Driven Decision Making, aligning with the National Artificial Intelligence Strategy goals of building a world-class AI ecosystem (National Information Technology Development Agency, 2025).

5.1 Proposed Ethical AI Policy for KSITM
As institutions integrate AI, they must adhere to the Nigeria Data Protection Act (NDPA, 2023). This research proposes the following ethical guidelines for KSITM:
 * Transparency: Any student interacting with an AI system (like a chatbot) must be clearly informed that they are speaking to an algorithm.
 * Human-in-the-Loop (HITL): AI should assist, not replace, final academic decisions. All AI-generated results must be verified by a human officer before being made official (Thomas Adewumi University, 2024).
 * Data Sovereignty: Student and staff data should not be used to train public models without anonymization to prevent privacy leaks.

5.2 Conclusion
The journey toward AI readiness at the Katsina State Institute of Technology and Management (KSITM) is a path toward institutional excellence. This study has demonstrated that while the technical foundation is robust, the "Human Element" remains the most critical variable. By adopting a phased, cloud-centric approach and prioritizing ethical staff training, KSITM can transform from a traditional learning center into a beacon of Education 4.0 in Northern Nigeria.

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