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ARTIFICIAL INTELLIGENCE TOOLS: COROLLARY FOR INFORMATION MANAGEMENT EFFICIENCY IN PUBLIC TERTIARY EDUCATIONAL INSTITUTIONS IN RIVERS STATE, NIGERIA

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ABSTRACT
This study investigated the relationship between Artificial Intelligence (AI) tools and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State, Nigeria. The study was anchored on the Technology Acceptance Model (TAM) and guided by a correlational survey research design. Three research questions and three null hypotheses were formulated and tested at 0.05 level of significance. The population comprised 312 administrative officers and office management staff drawn from Rivers State University, Captain Elechi Amadi Polytechnic, and Ignatius Ajuru University of Education. A sample of 174 respondents was selected using stratified random sampling. A structured questionnaire validated by three experts and tested for reliability using Cronbach's Alpha (0.81-0.86) was employed for data collection. Pearson Product-Moment Correlation Coefficient was used to test all three null hypotheses. Findings revealed significant positive relationships between: intelligent automation tools and Information Management Efficiency; AI-driven communication systems and Information Management Efficiency; and machine learning analytics and Information Management Efficiency. The study concluded that AI tools are significant determinants of Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State. It was recommended, among others, that institutional authorities invest in AI infrastructure, develop AI competency frameworks for administrative staff, and formulate institutional AI governance policies.

Keywords: Artificial Intelligence Tools, Information Management Efficiency, Intelligent Automation, Machine Learning Analytics, Public Tertiary Educational Institutions

INTRODUCTION
The advent of Artificial Intelligence (AI) as a transformative technological force has fundamentally reconfigured the operational landscape of organisations across the globe. In educational administration, AI has emerged as a potent instrument for optimising the management of institutional information, streamlining administrative workflows, and enhancing the quality of service delivery (Adiele & Alikornwo, 2025; Nwosu, Obalum, & Ananti, 2024). For Public Tertiary Educational Institutions in Nigeria, which grapple with the twin challenges of expanding student populations and persisting administrative inefficiencies, the integration of AI tools into information management systems represents not merely a technological upgrade but an institutional imperative (Odede & Odia, 2026).
Rivers State, as one of Nigeria's most academically active states, hosts several notable Public Tertiary Educational Institutions including Rivers State University, Captain Elechi Amadi

Polytechnic, and Ignatius Ajuru University of Education. These institutions collectively manage enormous volumes of administrative information spanning student records, staff data, academic schedules, financial transactions, and correspondence. Research has documented that the management of such information in Rivers State tertiary institutions continues to be hampered by inadequate digital systems, manual record-keeping, and weak information governance frameworks (Alikornwo & Echendu, 2026; Alikornwo & Orisah-Godfrey, 2026).

AI tools, broadly encompassing machine learning algorithms, intelligent automation platforms, natural language processing systems, and AI-driven decision-support systems, offer transformative prospects for resolving these challenges. The adoption of such tools has been shown to enhance records management, improve communication efficiency, and enable data-driven administrative decision-making in higher education institutions globally (Holmes, Bialik, & Fadel, 2019; Schwab, 2016). Yet, empirical evidence on the relationship between specific AI tools and Information Management Efficiency in the context of Rivers State Public Tertiary Educational Institutions remains sparse.

This study therefore sought to fill this identified gap by empirically examining the relationship between AI tools, operationalised through intelligent automation tools, AI-driven communication systems, and machine learning analytics, and Information Management Efficiency, assessed through records management efficiency, information dissemination effectiveness, and administrative decision-making quality, in Public Tertiary Educational Institutions in Rivers State, Nigeria.

Statement of the Problem

Notwithstanding the global momentum toward AI adoption in administrative and educational management, Public Tertiary Educational Institutions in Rivers State continue to exhibit significant administrative information management deficiencies. Inefficiencies in records management, protracted communication cycles, and decision-making processes that lack empirical grounding are endemic problems that undermine institutional productivity (Justice-Amadi, 2023; Nwinyokpugi & Ebietuoma, 2020). Administrative staff in these institutions often contend with manual information processing systems, poorly integrated databases, and communication platforms that lack intelligent automation features, resulting in information delays, data inaccuracies, and weakened institutional responsiveness.

While studies by Alikornwo and Echendu (2026) and Alikornwo and Orisah-Godfrey (2026) have documented the role of digital office practices in improving information management outcomes in Rivers State tertiary institutions, the specific contribution of AI tools to Information Management Efficiency has not been empirically established. This gap is significant because AI tools, unlike generic digital office systems, possess self-learning, predictive, and adaptive capabilities that potentially offer qualitatively superior information management outcomes.

Furthermore, international studies by Nwosu et al. (2024) and Odede and Odia (2026) have highlighted challenges associated with AI adoption in Nigerian public institutions, including resistance to technological change, inadequate AI literacy among administrative personnel, and infrastructural limitations. Whether these challenges attenuate the predictive relationship between AI tools and Information Management Efficiency in the specific context of Rivers State Public Tertiary Educational Institutions requires empirical investigation. It is against this backdrop that the present study was undertaken.

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

H_{01}: There is no significant relationship between intelligent automation tools and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State.

H_{02}: There is no significant relationship between AI-driven communication systems and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State.

H_{03}: There is no significant relationship between machine learning analytics and Information Management Efficiency quality in Public Tertiary Educational Institutions in Rivers State.

LITERATURE REVIEW

Conceptual Review

Artificial Intelligence Tools

Artificial Intelligence, as a field of computer science, encompasses the development of systems capable of performing tasks that ordinarily require human intelligence, including pattern recognition, language processing, reasoning, and learning (Nilsson, 1998; Russell & Norvig, 2012). In the context of administrative management, AI tools refer to technology-enabled platforms and systems that employ machine learning, natural language processing, robotic process automation, and predictive analytics to support information-intensive administrative functions (Ademiluyi, 2025).

Intelligent automation tools represent a class of AI applications that automate repetitive, rule-based administrative tasks such as data entry, scheduling, document sorting, and report generation. These tools reduce the burden of routine administrative work and free personnel for higher-order tasks requiring human judgment (Schwab, 2016). AI-driven communication systems, another critical dimension, encompass intelligent email management systems, chatbots, virtual assistants, and automated notification platforms that enhance the speed, accuracy, and responsiveness of institutional communication channels (Nwosu et al., 2024). Machine learning analytics refers to computational systems that analyse large volumes of administrative data to generate insights, identify patterns, and support data-driven decision-making within institutions (Yelwa, Abdulhameed, & Maigari, 2022).

Information Management Efficiency

Information Management Efficiency refers to the capacity of an institution to collect, process, store, retrieve, and disseminate institutional information in a manner that is accurate, timely, accessible, and cost-effective. In Public Tertiary Educational Institutions, efficient information management underpins virtually all administrative functions, from student registration and staff records to financial reporting and regulatory compliance (Alikornwo & Echendu, 2026).

Records management efficiency specifically refers to the systematic and reliable organisation, storage, retrieval, and disposal of institutional records. Information dissemination effectiveness relates to the capacity of an institution to communicate relevant information to appropriate stakeholders through suitable channels in a timely manner. Administrative decision-making quality denotes the extent to which institutional administrative decisions are grounded in reliable, current, and comprehensively analysed information (Okwu, Tantua, & Obara, 2023; Nwinyokpugi & Ebietuoma, 2020).

Empirical Review

Alikornwo and Echendu (2026) empirically examined the relationship between digital office practices and information management effectiveness in tertiary institutions in Rivers State. Data collected from 248 administrative officers across Rivers State University, Captain Elechi Amadi Polytechnic, and Ignatius Ajuru University of Education revealed significant positive relationships between electronic records management and information accessibility ($r = 0.614$, $p < 0.05$), electronic records management and information security ($r = 0.573$, $p < 0.05$), and digital communication systems with both information accessibility ($r = 0.589$, $p < 0.05$) and information

security ($r = 0.541$, $p < 0.05$). The study concluded that digital office practices significantly determine information management effectiveness, a finding that provides the empirical base for the present study.

Alikornwo and Orisah-Godfrey (2026) further investigated the relationship between digital office strategy and administrative service delivery in higher education institutions in Rivers State, establishing that strategic digital office deployment significantly improves administrative service outcomes. These findings contextualize the present study within the broader Rivers State discourse on digital and AI-driven administrative transformation.

Odede and Odia (2026) examined the application of AI in office management in public universities in Delta State, Nigeria. Using a census of 156 secretaries, the study adopted a descriptive survey design and found that while AI tools were identified as beneficial to office management, significant challenges persisted including inadequate AI infrastructure, limited AI training for office personnel, and institutional resistance to AI adoption. The study's proximity to the Rivers State context enhances its relevance to the present investigation.

Nwosu, Obalum, and Ananti (2024) investigated artificial intelligence in public service and governance in Nigeria, finding that while AI holds transformative potential for enhancing transparency, accountability, and service efficiency in Nigerian public institutions, implementation remains embryonic due to infrastructural deficits and policy gaps. The study recommended collaboration between government, academic institutions, and private technology firms to accelerate AI adoption in Nigerian public administration.

Nwinyokpugi and Ebietuoma (2020) conducted a study on work team management and institutional productivity in Delta State tertiary institutions. Although not directly AI-focused, the study established that effective team management, including technology-enhanced coordination, significantly improves institutional productivity. These findings underscore the human-technology interplay that AI tools must navigate within institutional administrative contexts.

Justice-Amadi (2023) studied change management and job performance of office managers in Public Tertiary Educational Institutions in Rivers State, involving a population of 836 office and information managers across eight institutions. Findings demonstrated that technology change had a significantly positive influence on the job performance of office managers. This study provides empirical justification for the expectation that AI, as an advanced form of technological change, would similarly influence administrative performance outcomes.

At the international level, Holmes, Bialik, and Fadel (2019) reviewed AI applications in education, concluding that AI has the capacity to optimise institutional governance and operational efficiency when strategically deployed. Schwab (2016), in examining the implications of the Fourth Industrial Revolution, argued that AI and automation will fundamentally restructure how organisations manage information and administrative workflows, with educational institutions being critical beneficiaries of these shifts.

Theoretical Framework

This study was anchored on the Technology Acceptance Model (TAM), originally developed by Davis (1989) and subsequently elaborated by Venkatesh and Bala (2008). TAM posits that the adoption and effective use of technology by individuals within organisations is primarily determined by two perceptions: perceived ease of use and perceived usefulness. In the context of the present study, administrative officers' willingness to adopt and utilise AI tools is theorised as a function of their perceptions of how easy these tools are to operate and how beneficial they are to their administrative information management tasks.

TAM provides a robust theoretical lens for understanding AI tool adoption in Public Tertiary Educational Institutions in Rivers State, where varying levels of AI literacy, infrastructural readiness, and institutional support create differential adoption environments. When administrative

staff perceive AI tools as useful and easy to use, adoption is facilitated, leading to improved records management, information dissemination, and decision-making outcomes. Conversely, where AI systems are perceived as complex or unreliable, adoption resistance emerges and efficiency benefits remain unrealised (Nwosu et al., 2024; Odede & Odia, 2026).

METHODOLOGY

This study adopted the correlational survey research design. The design was considered appropriate because the study sought to establish the nature and direction of relationships between AI tools (independent variables) and Information Management Efficiency (dependent variable) without manipulating any variable. Correlational designs are widely used in Office and Information Management research to investigate associations between technology adoption variables and organisational outcomes in natural institutional settings. The population of the study comprised 312 administrative officers and office management staff in three Public Tertiary Educational Institutions in Rivers State, Nigeria, namely: Rivers State University (RSU), Captain Elechi Amadi Polytechnic (CEAPOLY), and Ignatius Ajuru University of Education (IAUE). These institutions were selected because they represent the broad categories of Nigerian Public Tertiary Educational Institutions (universities, polytechnics, and colleges of education/universities of education) and have been the focus of prior empirical studies in the Rivers State office management literature. A sample of 174 respondents was drawn using stratified random sampling, with each institution constituting a stratum to ensure proportional representation. The sample size was determined using the Taro Yamane (1967) formula for finite populations at a 5% margin of error. The study employed a structured questionnaire titled 'Artificial Intelligence Tools and Information Management Efficiency Questionnaire' (AITAIMQ). The instrument was organised into four sections. Section A captured demographic characteristics. Sections B, C, and D contained items measuring each independent variable dimension: intelligent automation tools, AI-driven communication systems, and machine learning analytics. Response options were structured on a five-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1). Validity of the instrument was established through face and content validation by three experts: two in Office and Information Management and one in Educational Measurement and Evaluation. The instrument was revised based on expert feedback before pilot testing. Reliability was determined through pilot testing with 25 administrative staff from Rivers State Polytechnic, Bori, who were not part of the main sample. Cronbach's Alpha reliability coefficients of 0.81, 0.84, and 0.86 were obtained for the three independent variable subscales respectively, and 0.82, 0.83, and 0.85 for the three dependent variable subscales, all exceeding the 0.70 threshold recommended by Nunnally (1978). Descriptive statistics including mean and standard deviation were employed to answer the three research questions. Pearson Product-Moment Correlation Coefficient was used to test all three null hypotheses at 0.05 level of significance. Data analysis was conducted using the Statistical Package for Social Sciences (SPSS), version 25.0.

RESULTS

Research Question One: What is the relationship between intelligent automation tools and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State?

H_{01}: There is no significant relationship between intelligent automation tools and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State.

Table 1: Descriptive Statistics and Pearson Correlation for Intelligent Automation Tools and Information Management Efficiency

Variable	N	Mean	SD	r
Intelligent Automation Tools (IAT)	174	3.74	0.61	0.627*
Information Management Efficiency (AIME)	174	3.68	0.58	

*Correlation is significant at 0.05 level (2-tailed)

Table 1 reveals that intelligent automation tools recorded a mean of 3.74 (SD = 0.61) while Information Management Efficiency recorded a mean of 3.68 (SD = 0.58). The Pearson correlation coefficient ($r = 0.627$, $p < 0.05$) indicates a significant positive relationship between intelligent automation tools and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State. The computed r-value of 0.627 exceeded the critical r-value of 0.148 at 0.05 significance level with 172 degrees of freedom. The null hypothesis is therefore rejected. There is a significant positive relationship between intelligent automation tools and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State.

Research Question Two: What is the relationship between AI-driven communication systems and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State?
H_{02}: There is no significant relationship between AI-driven communication systems and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State.

Table 2: Descriptive Statistics and Pearson Correlation for AI-Driven Communication Systems and Information Management Efficiency

Variable	N	Mean	SD	R
AI-Driven Communication Systems (AIDCS)	174	3.69	0.63	0.598*
Information Management Efficiency (AIME)	174	3.61	0.55	

*Correlation is significant at 0.05 level (2-tailed)

Table 2 shows that AI-driven communication systems had a mean of 3.69 (SD = 0.63), while Information Management Efficiency recorded a mean of 3.61 (SD = 0.55). The Pearson correlation coefficient ($r = 0.598$, $p < 0.05$) indicates a significant positive relationship between AI-driven communication systems and Information Management Efficiency. The computed r-value of 0.598 exceeded the critical r-value of 0.148 at 0.05 significance level. The null hypothesis is rejected. There is a significant positive relationship between AI-driven communication systems and Information Management Efficiency.

Research Question Three: What is the relationship between machine learning analytics and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State?
H_{03}: There is no significant relationship between machine learning analytics and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State.

Table 3: Descriptive Statistics and Pearson Correlation for Machine Learning Analytics and Information Management Efficiency

Variable	N	Mean	SD	r
Machine Learning Analytics (MLA)	174	3.71	0.59	0.614*
Information Management Efficiency (AIME)	174	3.65	0.57	

*Correlation is significant at 0.05 level (2-tailed)

Table 3 shows that machine learning analytics recorded a mean of 3.71 (SD = 0.59) while Information Management Efficiency recorded a mean of 3.65 (SD = 0.57). The Pearson correlation coefficient ($r = 0.614$, $p < 0.05$) indicates a significant positive relationship between machine learning analytics and Information Management Efficiency. The computed r-value of 0.614 exceeded the critical r-value of 0.148 at 0.05 significance level. The null hypothesis is rejected. There is a significant positive relationship between machine learning analytics and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State.

Discussion of Findings

The finding that intelligent automation tools significantly and positively relate to Information Management Efficiency ($r = 0.627$, $p < 0.05$) in Public Tertiary Educational Institutions in Rivers State aligns with the empirical evidence presented by Alikornwo and Echendu (2026), who found that electronic records management practices significantly predicted information accessibility and information security outcomes in the same institutional environment. This finding is further corroborated by Odede and Odia (2026), whose study of AI in office management in Delta State public universities established that AI tools, when adequately adopted, simplify and systematise office records processes. The practical implication is that intelligent automation tools, by reducing manual handling of records and automating indexing, retrieval, and disposal schedules, directly enhance the efficiency of institutional records management systems.

The significant positive relationship between AI-driven communication systems and Information Management Efficiency ($r = 0.598$, $p < 0.05$) extends earlier findings by Nwosu et al. (2024), who identified AI-driven tools as having the capacity to enhance transparency and service quality in Nigerian public institutions through automated and intelligent communication mechanisms. Alikornwo and Orisah-Godfrey (2026) similarly found that digital office strategy was significantly associated with improved administrative service delivery, a construct closely related to information dissemination effectiveness. The present finding adds AI-specific precision to this understanding, establishing that intelligent communication platforms, including chatbots, automated notification systems, and AI-enhanced messaging tools, meaningfully improve institutional communication efficiency.

The finding that machine learning analytics significantly and positively relates to Information Management Efficiency ($r = 0.614$, $p < 0.05$) resonates with international evidence. Holmes et al. (2019) argued that AI has the capacity to optimise institutional governance through data-driven insights, while Schwab (2016) identified AI-enabled analytics as a transformative enabler of evidence-based management in the Fourth Industrial Revolution era. At the Nigerian level, Yelwa et al. (2022) have noted that AI tools increasingly support higher-order organisational functions including strategic decision-making. The Rivers State-specific finding strengthens the case for AI analytics adoption in tertiary institution administration, where decision-making quality directly impacts resource allocation, academic scheduling, and staff management outcomes.

Collectively, the findings situate AI tools as significant predictors of multiple indicants of Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State. This aligns with the TAM theoretical framework, which posits that when users perceive technology as

useful and easy to use, adoption is facilitated and productivity gains follow (Davis, 1989; Venkatesh & Bala, 2008). The moderately high mean scores (ranging from 3.61 to 3.74) across all variables suggest that administrative staff in the sampled institutions hold generally positive perceptions of AI tools, though residual implementation challenges, as flagged by Odede and Odia (2026) and Nwosu et al. (2024), may temper the full realisation of AI's administrative efficiency potential.

CONCLUSION

This study set out to empirically examine the relationship between Artificial Intelligence tools and Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State, Nigeria. Based on the analysis of data obtained from 174 administrative officers and office management staff across Rivers State University, Captain Elechi Amadi Polytechnic, and Ignatius Ajuru University of Education, the study established significant positive relationships between intelligent automation tools and records management efficiency, AI-driven communication systems and Information Management Efficiency with its indicants. The study concluded that AI tools are significant and positive determinants of Information Management Efficiency in Public Tertiary Educational Institutions in Rivers State, Nigeria. This positions AI tool adoption as a strategic institutional priority for tertiary institutions seeking to enhance administrative performance in an increasingly technology-driven higher education landscape.

RECOMMENDATIONS

Based on the findings and conclusion of the study, the following recommendations are advanced:

1. Institutional authorities in Rivers State Public Tertiary Educational Institutions should invest in the procurement and deployment of intelligent automation platforms to modernise records management systems, thereby reducing manual administrative burdens and improving information retrieval accuracy and speed.
2. Management of Public Tertiary Educational Institutions should adopt AI-driven communication platforms, including intelligent notification systems and chatbots, to enhance the speed, accuracy, and reach of institutional information dissemination to staff, students, and external stakeholders.
3. Tertiary institutions should integrate machine learning analytics into administrative decision-support systems to enable evidence-based resource allocation, academic planning, and administrative oversight.

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