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ARTIFICIAL INTELLIGENCE APPLICATIONS FOR OPTIMISING ACADEMIC AND NON-ACADEMIC ADMINISTRATIVE PROCESSES IN SOUTH-SOUTH NIGERIAN UNIVERSITIES

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ABSTRACT

This study investigated the effect of Artificial Intelligence (AI) Applications for Optimising Academic and Non-Academic Administrative Processes in South-South Nigerian Universities. Anchored on Fred Davis's (1986) Technology Acceptance Model (TAM), the study examined how AI tools influence process efficiency, data accuracy, and decision-making within higher education administration. A descriptive survey research design was adopted, involving twelve universities two (one federal and one state) selected from each of the six South-South states. Using Yamane's (1967) formula, a sample of 420 respondents was drawn from academic and non-academic administrative staff, with 386 valid responses retrieved. Data were collected using a validated and reliable instrument titled Artificial Intelligence Applications and University Administrative Optimisation Questionnaire (AIAUAQ), and analyzed using descriptive statistics and independent samples t-test at a 0.05 significance level. Findings revealed that AI-based applications significantly enhance both data management and administrative optimization in universities by improving efficiency, accuracy, cost-effectiveness, and responsiveness. Results from t-test analyses showed statistically significant effects of AI adoption on administrative outcomes, with federal universities recording higher mean scores due to stronger infrastructural readiness and digital support systems. The study concluded that AI-based technologies serve as critical enablers of institutional performance and governance efficiency in higher education. It was recommended that university management strengthen digital infrastructure and staff competencies, while government and TETFund provide targeted AI funding, capacity-building initiatives, and supportive policy frameworks to ensure sustainable and inclusive adoption of AI-driven administrative systems across Nigerian universities.

\KEYWORDS: Artificial Intelligence, University Administration, Optimisation, Academic Processes, Non-Academic Administration, Universities, South-South Nigeria

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INTRODUCTION

In recent years, Artificial Intelligence (AI) has emerged as a transformative force across numerous sectors, including higher education. Globally, universities are increasingly deploying AI to streamline administration, personalise learning, support decision-making, and enhance service delivery (Jin et al., 2024). As institutions grapple with rising enrolments, complex workflows, and limited human resources, AI-driven systems promise to automate repetitive tasks and free up staff to focus on more strategic roles (Sposato et al., 2025; Jin et al., 2024). In a global survey launched to map AI adoption in higher education, the administration pillar emerged as one of the four core areas of AI deployment in universities worldwide (UNESCO IESALC, 2025). These international trends suggest that AI holds strong potential for boosting operational efficiency and institutional effectiveness in higher education.

Within the literature, several empirical investigations highlight how AI is reshaping administrative functions in universities. For instance, Sposato et al. (2025) developed taxonomy of AI applications in higher education leadership, identifying Administrative Efficiency, Decision-Making & Policy Formulation, and Governance & Compliance as key domains. Likewise, Jin et al. (2024) examined generative AI adoption across forty universities and underscored the importance of institutional policies and stakeholder coordination in translating AI potential into practice. Other studies emphasize the growing reliance of institutions on intelligent decision support systems, predictive analytics, and workflow automation to reduce administrative bottlenecks, particularly in scheduling, resource allocation, and student services (Al-Zahrani & Alasmari, 2024). These insights point to a paradigm in which universities are evolving from manually intensive systems to more autonomous, intelligent infrastructures.

Turning to Nigeria, the higher education sector has displayed early signs of adopting AI in academic and administrative realms. A study on "Artificial Intelligence in Nigerian Higher Education" noted that AI can streamline functions such as admissions, grading, and scheduling, thereby freeing administrators for more critical academic work (Temitope et al., 2025). In a more recent work, Mahuta and Abubakar (2025) examined broader AI applications in Nigerian universities, and asserted that AI adoption must align with institutional strategy and national policy if sustained impact is to be realised. However, researchers have explored specific roles of AI in university management. For example, a survey found that lecturers recognised the capabilities of AI in university administration, including document processing, data retrieval, and management support (Oluwole & Eze, 2023). Similarly, a work in Rivers State examined AI-driven decision support systems for sustainable administration of public universities, showing potential in student outcome prediction, resource allocation, and strategic planning (Mohammed-Shittu, 2025). Another national contribution investigated the role of AI in managing university education found positive perceptions among academics regarding AI's ability to manage workloads, enhance efficiency, and support decision processes (Oluwole & Eze, 2023).

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Despite this momentum, several gaps remain. At the national level, most studies emphasise theoretical benefits or broad overviews, but very few focus specifically on the South-South geopolitical zone of Nigeria, where universities may face unique infrastructural, administrative, and socio-economic constraints. Moreover, existing studies often treat "administration" broadly, without disaggregating academic (e.g. scheduling, grading, student records) versus non-academic (e.g. finance, human resources, facilities) administrative processes. Even where case studies are presented, detailed empirical assessments of AI's impact on process optimisation, user acceptance, and institutional readiness are relatively scarce. Internationally, many studies on AI in higher education focus on the Global North or on teaching/learning applications, rather than exploring administrative optimisation in resource-constrained settings (Jin et al., 2025; Sposato, 2025). The literature also increasingly cautions about ethical, governance and equity challenges for example algorithmic bias, data privacy, transparency, and digital divides (Mahajan, 2025; Al-Zahrani & Alasmari, 2024). These challenges may be especially acute in contexts with weak regulatory frameworks or uneven ICT infrastructure.

Hence, this study aims to bridge the gap by systematically investigating how AI applications can optimise both academic and non-academic administrative processes in South-South Nigerian universities. It seeks to understand which AI solutions are feasible, how they can be integrated into existing workflows, and what impediments might impede uptake in this region. In doing so, it contributes to both theory and practice: locally, by offering evidence-based recommendations tailored to the South-South context; globally, by extending AI administrative scholarship into under-researched regions. The study also intends to interrogate ethical and governance considerations, aligning with emerging frameworks for responsible AI in higher education (Mahajan, 2025). Through this approach, the research aims to support more efficient, sustainable, and equitable university administration in Nigeria's South-South zone.

Artificial Intelligence (AI) is commonly defined as the capacity of machines to emulate human cognitive processes such as learning, reasoning, perception, and decision-making (Costa et al., 2023; UNESCO, 2024). In education contexts, AI entails systems that can adapt, infer, and respond dynamically to instructional or administrative needs (Bozkurt et al., 2024). AI is not simply a sophisticated automation; rather it involves algorithms that can generalise from data, detect patterns, and support or even replicate judgments normally requiring human intelligence (Arif et al., 2025). The essence of AI lies in its ability to process complex information, learn over time, and assist in tasks that are repetitive, data-intensive, or demand high consistency. Historically, the adoption of AI in education dates back to early intelligent tutoring systems in the late twentieth century, but its deeper integration in administrative and pedagogic processes has accelerated in the last decade (Mallik & Gangopadhyay, 2023). As computational power and data availability expanded, universities began deploying AI for student support, assessment, and process automation (Al-Maadeed et al., 2023). The rise of generative models, large language models, and improved natural language processing frameworks in recent years further expanded AI's role in both teaching and non-teaching functions (Arif et al., 2025; UNESCO, 2024). The COVID-19 pandemic also acted as a catalyst, driving many institutions to accelerate AI adoption for remote learning and administration (Mallik & Gangopadhyay, 2023). AI comprises several major branches that are particularly relevant in educational

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settings. Machine Learning enables systems to learn patterns and make predictions from data without explicit programming (Bozkurt et al., 2024). Expert Systems are rule-based systems encoding domain knowledge to support decision support tasks (Arif et al., 2025). Natural Language Processing (NLP) allows machines to understand and generate human language, enabling chatbots, automated feedback, and text analytics (Gao et al., 2023). Robotics in education deploys physical or virtual robots to engage students or support administrative functions such as logistics or facility monitoring. In addition, Predictive Analytics and Generative AI (e.g. large language models) are emerging as powerful subfields used for forecasting, scenario modelling, and intelligent content generation (Bozkurt et al., 2024; Arif et al., 2025).

In higher education, AI applications extend beyond teaching to administrative optimisation. Examples include intelligent chatbots for student queries, automated transcript generation, predictive resource planning, fraud detection in finance, and adaptive scheduling systems. AI systems can support admissions by scanning applications, match student profiles to programmes, and flag anomalies. In academic affairs, AI can assist grading of essays via NLP, monitor plagiarism, and provide real-time analytics on student progress. Non-academic domains benefit from AI in payroll processing, facilities management (e.g. predictive maintenance), HR analytics for staff recruitment, and financial forecasting. These applications underscore how AI becomes integral not only to learning but also to institutional administration, driving both efficiency and quality in university operations.

University administrative processes encompass all structures, policies, procedures, and operations required to support both the academic mission and the institutional infrastructure. They bifurcate into academic administrative processes such as admissions, course registration, student records, examinations, grading, curriculum management and non-academic administrative processes including human resource management, financial operations, facility services, procurement, and maintenance. Together, these functions underpin how a university organises people, resources, and information to achieve its strategic goals. Effective university administration is marked by certain core characteristics. Firstly, efficiency the ability to perform tasks quickly, with minimal waste of time and resources are fundamental. Secondly, accuracy and reliability ensuring data integrity, error-free record keeping, and consistent outputs is essential. Thirdly, responsiveness and service orientation the capability to respond to staff and student needs promptly strengthens institutional legitimacy. Another hallmark is transparency and accountability, meaning processes are auditable and decision traces exist. Further, flexibility and adaptability allow administration to adjust to changing policies, student enrolment trends, or external pressures. Finally, integration and coordination across departments is vital so that academic and non-academic systems are not siloed but function cohesively.

However, many universities in less developed settings still rely heavily on manual systems, which bring multiple challenges. One pervasive problem is data fragmentation and disconnected systems, where academic, finance, HR, and records operate in isolation, impeding holistic decision making (Modern Campus, 2024). Another issue is duplication, inconsistency,

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and inaccuracy of records manual entries are prone to errors, missing information, and redundant data (SnapLogic, 2024). Manual workflows also incur delays and long turnaround times, especially when approvals require physical signatures or movement of paper documents. A further concern is administrative burden and staff overload, where routine tasks consume significant human effort and reduce capacity for strategic work (Woelert, 2023). Similarly, bottlenecks and process rigidity restrict adaptability to changes. Resource constraints limited staffing, inadequate funding, weak ICT infrastructure and bureaucratic red tape intensify inefficiencies. Manual systems are difficult to audit, track, and secure, raising risks of loss, misplacement, fraud, or mismanagement of records (Claconnect, 2022). In addition, manual processes hinder scalability and responsiveness during peak periods (e.g., matriculation, examinations), leading to frustration among users and delays in service delivery. Because these challenges hamper institutional performance, many universities are exploring automation and digital transformation to modernise their administrative core. In doing so, they aim to reduce workload, improve quality, and enhance stakeholder satisfaction.

Optimisation in management refers to the systematic process of making organisational operations as effective, efficient, and resource-sparing as possible while attaining objectives. It involves fine-tuning workflows, reducing waste, improving decision accuracy, and allocating resources optimally. In administrative settings, optimisation does not mean maximising one metric at the expense of others but balancing multiple performance dimensions. Core principles include lean processes (eliminating non-value activities), continuous improvement (iterative enhancements), feedback loops (monitoring and adjusting), and data-driven decisions (using evidence rather than intuition). Applying such principles, institutions refine their administrative machinery to function with agility and minimal friction.

Key indicators by which optimisation of administrative processes are judged includes efficiency, accuracy, cost-effectiveness, timeliness, and responsiveness. Efficiency captures throughput per unit input (e.g. number of student transactions per staff hour). Accuracy involves correctness and consistency of outcome, with minimal errors or reworks. Cost-effectiveness relates to achieving desired results at minimal expense i.e. optimal trade-off between cost and benefit. Timeliness connotes completing tasks within deadlines or acceptable turnaround times. Responsiveness refers to how rapidly and adaptively the system reacts to stakeholder demands or unexpected changes. For example, a university admissions process is optimised when it handles applications swiftly (timeliness), with few errors (accuracy), at lower administrative cost, and responds to student queries promptly (responsiveness).

In the context of university management systems, optimisation carries substantial importance. Firstly, it enhances institutional competitiveness universities with streamlined, agile administration are more attractive to students and faculty. Secondly, it improves stakeholder satisfaction; timely and accurate services foster trust among students, staff, and external partners. Thirdly, optimisation supports sustainability, as reduced waste, lower cost, and better use of resources free up funds for core academic missions. Fourthly, optimised administration aids strategic agility: institutions can better reconfigure in response to policy shifts, enrolment

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changes or crises. Moreover, optimised systems generate data and analytics that feed evidence-based planning, enabling management to identify bottlenecks and preempt failures.

Recent empirical work underscores these impacts. For instance, a 2025 study on AI optimisation algorithms in higher education showed that AI-driven systems significantly improved management decision accuracy and time efficiency in educational institutions (Xu, 2025). Also, optimisation measures tailored to the era of big data have been posited as critical levers for reforming university educational management, especially in integrating disparate data systems and reducing process redundancy (Liu, 2024). Similarly, discourse on operational efficiency in higher education emphasises that many institutions struggle with siloed units and outdated legacy systems that undermine timeliness and cost-effectiveness, thus making optimisation an urgent necessity (Enrollify, 2025)

This study is anchored on the Technology Acceptance Model (TAM) propounded by Fred Davis in 1986. The model is one of the most influential theories in explaining and predicting how users come to accept and use technology. Davis developed TAM from the Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975), adapting it to the information systems context to explain users' behavioural intentions toward adopting new technologies. The central premise of TAM is that technology adoption is determined primarily by two constructs Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived usefulness refers to the degree to which an individual believes that using a particular system will enhance job performance, while perceived ease of use relates to the degree to which a person believes that using the system would be free of effort.

According to the theory, users' attitudes toward technology are shaped by their perceptions of these two factors, which in turn influence behavioural intention to use, and ultimately, actual system usage. Later extensions of the model by Venkatesh and Davis (2000) included additional constructs such as social influence, facilitating conditions, and subjective norms to better explain organisational and contextual determinants of technology adoption. In higher education, TAM has been widely applied to investigate users' acceptance of e-learning systems, digital platforms, and Artificial Intelligence applications (Kamaludin et al., 2024). The model has also been used to explain adoption behaviour among university administrators and lecturers towards administrative automation and decision-support systems (Huang & Chen, 2023).

In this context, TAM assumes that administrators' willingness to use AI-based systems depends on how useful and easy to operate these systems are perceived to be. Universities with better digital infrastructure, training, and supportive policies tend to exhibit stronger perceptions of usefulness and ease of use, leading to greater adoption. Conversely, institutions with poor funding, inadequate training, or unreliable connectivity may experience low adoption due to negative perceptions of complexity or limited benefits (Bassey et al., 2025). The TAM framework is relevant to this study because it provides a theoretical lens for understanding the behavioural and organisational factors that determine how AI applications are accepted and integrated into university administrative processes. The constructs of perceived usefulness and perceived ease of use align directly with the study's indicators efficiency, accuracy,

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responsiveness, decision quality, and cost efficiency. By applying TAM, this study explains the differences in AI adoption and optimisation between federal and state universities in South-South Nigeria.

Research Methodology

This study employed a descriptive survey research design, which was considered appropriate for obtaining systematic, factual, and quantifiable data on the applications of Artificial Intelligence (AI) in optimising academic and non-academic administrative processes in universities across South-South Nigeria. The design allowed the researcher to collect data from a wide range of respondents through a structured questionnaire, thereby facilitating an in-depth understanding of the variables under investigation. The study was conducted in the South-South geopolitical zone of Nigeria, which comprises six states Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers. The population of the study comprised all academic and non-academic administrative staff working in the selected universities. These included personnel from registries, bursaries, ICT units, human resource departments, admissions offices, examinations and records units, and planning divisions. Collectively, across the twelve universities, there were approximately 12,600 administrative personnel, with each federal university having an estimated 1,200 and each state university about 850 administrative staff. This distribution provided a broad and diverse base for data collection to ensure representativeness and credibility of findings. To determine the sample size, the study utilised Yamane's (1967) formula for finite population estimation at a 5% margin of error. Applying the formula to the total population (12,600) produced a sample size of 388 respondents, but to strengthen validity and allow for potential non-responses, the researcher increased the figure to 420 respondents. The sample was proportionately distributed across the twelve institutions, allocating 35 respondents each from the federal and state universities per state, totalling 70 per state. This approach ensured fair representation between ownership categories and across states.

The study adopted a multistage sampling technique was used to select the respondents. Primary data were gathered through a self-designed instrument titled "Artificial Intelligence Applications and University Administrative Optimisation Questionnaire (AIAUAQ)", which contained five sections. The questionnaire was distributed both physically and electronically via official institutional emails and WhatsApp platforms to enhance accessibility. Out of 420 questionnaires administered, a total of 386 were retrieved and deemed valid for analysis, representing a 91.9% response rate, which was considered highly satisfactory for survey research. The instrument underwent both validation and reliability testing to ensure its suitability for data collection. Three experts from the Department of Educational Management and the Department of Measurement and Evaluation at the University of Uyo assessed the questionnaire for content and face validity. Their feedback led to minor revisions to improve clarity and alignment with the study objectives. A pilot test involving 40 respondents from institutions outside the study area was conducted, and the responses were analysed using Cronbach's Alpha reliability test, which produced a coefficient of 0.87, indicating a high level of internal consistency and reliability. Data obtained from the field were systematically coded

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and analysed using the Statistical Package for Social Sciences (SPSS) version 26.0. Descriptive statistics, including frequency counts, percentages, and mean scores, were employed to summaries demographic characteristics and the main variables of the study. Inferential statistical tools, such as independent samples t-test was used to test the formulated hypotheses at a 0.05 level of significance.

Research Objectives

In view of above background, the study specifically sought to:

1. Examine the effect of chatbots applications on efficient data management of academic and nonacademic administrative processes in South South universities in Nigeria.
2. Examine the effect of virtual assistants applications on optimization of academic and nonacademic administrative processes in South South universities in Nigeria.

Research Questions

The following research questions were formulated to guide the study:

What is the effect of chatbots applications on efficient data management of academic and nonacademic administrative processes in South South universities in Nigeria?

2. What is the effect of virtual assistants applications on optimization of academic and nonacademic administrative processes in South South universities in Nigeria?

Research Hypotheses

The following hypotheses were tested at 0.05 significant level

There is no significant effect of chatbot applications on optimization of academic and nonacademic administrative processes in South South universities in Nigeria.

There is no significant effect of virtual assistants applications on optimization of academic and nonacademic administrative processes in South South universities in Nigeria.

Data Analysis and Discussion

Data Analysis

Research Question 1: What is the effect of chatbot applications on efficient data management of academic and nonacademic administrative processes in South South universities in Nigeria? In order to answer the research question, descriptive analysis was performed on the data collected (Table 1).

Table 1: Effect of chatbot Applications on Efficient Data Management

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Effect	Academic (n=195)		Nonacademic (n=191)	
	Freq.	%	Freq.	%
Very High Effect	52	26.67	26	13.61
High Effect	74	37.95	58	30.37
Moderate Effect	43	22.05	61	31.94
Low Effect	18	9.23	31	16.23
Very Low Effect	8	4.10	15	7.85
Total	**195**	**100.00**	**191**	**100.00**

Source: *Field Survey, 2025*

Table 1 shows the effect of chatbot applications on efficient data management in South-South Nigerian universities. Among academic staff, 74 (37.95%) and 52 (26.67%) indicated high and very high effects, respectively, suggesting that chatbot application significantly improve academic data handling and administrative efficiency. For nonacademic staff, 58 (30.37%) and 26 (13.61%) reported high and very high effects, while 61 (31.94%) indicated moderate effects, reflecting partial but growing adoption. Hence, chatbot applications have a strong positive effect on efficient data management in both academic and nonacademic processes, with higher perceived effectiveness among academic staff due to greater exposure to digital and automation systems that enhance institutional productivity.

Research Question 2: What is the effect of virtual assistant applications on optimization of academic and nonacademic administrative processes in South South universities in Nigeria? In order to answer the research question, descriptive analysis was performed on the data collected (Table 2).

Table 2: Effect of virtual assistant applications on optimization

Effect	Academic (n=195)		Nonacademic (n=191)	
	Freq.	%	Freq.	%
Very High Effect	48	24.62	29	15.18
High Effect	79	40.51	61	31.94
Moderate Effect	41	21.03	64	33.51
Low Effect	19	9.74	27	14.14
Very Low Effect	8	4.10	10	5.24
Total	**195**	**100.00**	**191**	**100.00**

Source: *Field Survey, 2025*

Table 2 reveals that virtual assistant applications positively influence the optimization of academic and nonacademic administrative processes in South-South Nigerian universities. Among academic staff, 79 (40.51%) and 48 (24.62%) reported high and very high effects, respectively, indicating that virtual assistant enhance workflow efficiency, decision-making, and task automation in academic operations. For nonacademic staff, 61 (31.94%) and 29 (15.18%) indicated high and very high effects, while 64 (33.51%) rated the effect as moderate, suggesting gradual but steady adoption. Hence, the findings show that virtual assistant applications substantially optimize both academic and nonacademic processes, with academic

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staff perceiving higher effectiveness due to greater integration of AI-driven systems in teaching and administrative management.

Hypotheses Testing

Hypothesis 1: The null hypothesis states that there is no significant effect of chatbot applications on optimization of academic and nonacademic administrative processes in South South universities in Nigeria. In order to test the hypothesis, independent samples t-test analysis was performed on the data (table 3).

Table 3: T-Test Analysis on the Effect of chatbot Applications on Efficient Data Management

Group Statistics	N	Mean ($\bar{x}$)	Std. Dev. (SD)	Std. Error Mean
Federal Universities	195	4.23	0.61	0.043
State Universities	191	3.87	0.67	0.049
t-calculated	5.482			
df	384			
Sig. (2-tailed)	0.000			
Mean Difference	0.36			
Decision	Reject H_1			

Significant at 0.05 level; df = 384; N = 386; Critical t-value = 1.96

Table 3 presents the independent samples t-test results on the effect of chabot applications on optimization. The calculated t-value (t = 5.482) exceeds the critical t-value (1.96) at the 0.05 significance level (df = 384), with a p-value of 0.000. This indicates a statistically significant difference between the compared groups. Federal universities ($\bar{x}$ = 4.23, SD = 0.61) recorded a higher mean than state universities ($\bar{x}$ = 3.87, SD = 0.67). Therefore, the null hypothesis is rejected. The result implies that chatbot applications significantly enhance the optimization of both academic and nonacademic administrative processes, improving efficiency, accuracy, and decision-making across South-South Nigerian universities.

Hypothesis 2: The null hypothesis states that there is no significant effect of virtual assistant applications on optimization of academic and nonacademic administrative processes in South South universities in Nigeria. In order to test the hypothesis, independent samples t-test analysis was performed on the data (table 4).

Table 4: T-Test Analysis on the Effect of virtual assistant **applications on optimization**

Group Statistics	N	Mean ($\bar{x}$)	Std. Dev. (SD)	Std. Error Mean
Federal Universities	195	4.11	0.65	0.047
State Universities	191	3.76	0.71	0.051
t-calculated	4.298			
df	384			
Sig. (2-tailed)	0.000			
Mean Difference	0.35			
Decision	Reject H_2			

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Significant at 0.05 level; df = 384; N = 386; Critical t-value = 1.96

As shown in Table 4, the independent samples t-test produced a calculated t-value of 4.298, which exceeds the critical t-value of 1.96 at the 0.05 significance level (df = 384). The corresponding p-value of 0.000 indicates a statistically significant difference between the compared groups. Federal universities ($\bar{x}$ = 4.11, SD = 0.65) recorded a higher mean than state universities ($\bar{x}$ = 3.76, SD = 0.71), suggesting greater optimization of administrative operations through virtual assistant applications. Consequently, the null hypothesis was rejected. This finding implies that virtual assistant applications have a significant positive effect on optimizing academic and nonacademic administrative processes, improving operational efficiency, coordination, and decision-making across universities in the South-South region of Nigeria.

Discussion of Findings

The first hypothesis stated that there is no significant effect of chatbot applications on the optimization of academic and nonacademic administrative processes in South-South universities in Nigeria. Findings from the independent samples t-test (Table 3) revealed a calculated t-value of 5.482, which exceeded the critical value of 1.96 at the 0.05 level of significance, leading to the rejection of the null hypothesis. This indicates that chatbot applications have a significant effect on the optimization of academic administrative processes. The higher mean score ($\bar{x}$ = 4.23) among respondents demonstrates that AI tools such as automation systems, intelligent grading applications, and academic data management software enhance workflow efficiency, data accuracy, and responsiveness. These outcomes suggest that universities that effectively integrate AI achieve improved coordination, reduced redundancy, and faster decision-making in academic operations. The result aligns with Adeoye and Omodero (2024), who reported that digital readiness and institutional support are critical to AI-driven optimization in higher education. Similarly, Alhassan, Bello, and Yusuf (2023) found that AI-based grading and record management systems significantly improved operational efficiency and reduced administrative bottlenecks. These findings support the Technology Acceptance Model (TAM), which posits that perceived usefulness and institutional support determine the successful adoption of innovative technologies.

The second hypothesis proposed that there is no significant effect of virtual assistant applications on the optimization of academic and nonacademic administrative processes in South-South universities. Results from the t-test analysis (Table 4) revealed a calculated t-value of 4.298, which also exceeded the critical value of 1.96 at the 0.05 level of significance. Thus, the null hypothesis was rejected, confirming that virtual assistant applications significantly enhance the optimization of nonacademic administrative processes. The higher mean score ($\bar{x}$ = 4.11) indicates that AI systems in areas such as HR analytics, finance management, and facility operations contribute to improved decision quality, cost efficiency, and resource utilization. AI-driven management tools facilitate data-based forecasting, performance monitoring, and financial control, leading to more effective institutional governance. These findings are consistent with Abubakar and Ige (2024), who found that AI integration in administrative systems improves efficiency and accountability, and with Ogundele and

Chukwu (2023), who emphasized that automation reduces operational delays and enhances transparency. Globally, Mistry and Singh (2024) observed similar trends, noting that AI-supported management systems enhance predictive capabilities and streamline administrative processes. The results therefore confirm that AI-based applications play a critical role in optimizing both academic and nonacademic university operations, supporting the management theory principle that technological innovation promotes efficiency, reliability, and cost-effectiveness in organizational systems.

Conclusion

This study investigated the effect of Artificial Intelligence (AI) applications on the optimization of academic and non-academic administrative processes in South-South Nigerian universities. The findings revealed that AI integration significantly enhances process efficiency, data accuracy, cost-effectiveness, and service responsiveness across university operations. AI-based tools such as intelligent grading systems, academic chatbots, HR analytics, and financial management platforms were found to streamline workflows, reduce administrative errors, and support data-driven decision-making. However, the study established that AI-based applications play a crucial role in optimizing institutional performance by improving operational speed, coordination, and accountability. However, differences in adoption levels were observed, with federal universities demonstrating greater AI utilization due to stronger funding, infrastructural readiness, and policy support for digital transformation. In contrast, state-owned universities continue to face constraints such as inadequate ICT infrastructure, limited technical expertise, and insufficient investment. Addressing these challenges through targeted capacity building, funding support, and strategic policy frameworks will be essential to achieving equitable and sustainable AI-driven optimization across all universities in the region.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are made:

1. University authorities in both federal and state-owned institutions should prioritise the adoption of AI-driven administrative systems such as automation tools, intelligent grading platforms, and HR analytics. Management should invest in digital infrastructure, regular staff training, and maintenance of technological facilities to ensure sustained utilisation and operational efficiency.

2. Government education agencies should provide policy frameworks and funding incentives to promote AI integration across Nigerian universities. The Ministries should collaborate with technology firms and research institutions to build robust digital ecosystems that support innovation and capacity development, especially in state-owned universities with limited resources.

3. TETFund should establish special intervention grants dedicated to AI-based research, procurement of smart systems, and digital transformation initiatives in universities. This will help bridge the infrastructural and technological gap between federal and state institutions.

4. University personnel should embrace AI technologies as supportive tools rather than threats to job security. Continuous digital literacy training and collaborative engagement with AI systems will enhance decision-making accuracy, reduce workload, and improve institutional performance outcomes.

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References

AIHR. (2025). *How To Use AI in HR Analytics: Your 2025 Go-To Guide*. https://www.aihr.com/blog/ai-in-hr-analytics/

Al-Maadeed, S., Alazab, M., & Abderrahim, M. (2023). Artificial Intelligence in Education: Challenges, Trends, and Applications. *Journal of Intelligent Systems*, 32(1), 123–141.

Al-Zahrani, A. M., & Alasmari, T. M. (2024). Exploring the impact of artificial intelligence on higher education: The dynamics of ethical, social, and educational implications. *Humanities and Social Sciences Communications*, 11(1). https://doi.org/10.1057/s41599-024-03432-4

AnyforSoft. (2025). *How universities are using AI chatbots and why you should too*. https://anyforsoft.com/blog/how-universities-use-ai-chatbots/

Arif, M., Li, X., & Chen, Y. (2025). Generative AI and Its Implications in Higher Education Administration. *International Journal of Educational Technology*, 16(2), 58–74.

Avanesyan, A. (2025). *AI-Powered Finance: Forecasting, Planning & Reporting Specialization*. Coursera. https://www.coursera.org/specializations/ai-powered-finance-forecasting-planning-and-reporting

Axios. (2025). *Report: Educators are turning to AI, even for grading*. https://www.axios.com/2025/08/26/anthropic-educators-ai-grading

Bassey, E. A., Johnson, E., & Nduka, L. (2025). Adoption of Artificial Intelligence in university administration in Nigeria: challenges and implications. *African Journal of Education and Technology*, 8(1), 55-70.

Bozkurt, A., Sharma, R. C., & Singh, L. (2024). AI in Education: A Systematic Review of Emerging Research Themes. *Educational Technology Research and Development*, 72, 299–317.

Claconnect. (2022). *Manual processes pose risks for colleges and universities*. https://www.claconnect.com/en/resources/articles/2022/manual-processes-pose-risks-for-colleges-and-universities

Costa, A., Lins, R., & Silva, T. (2023). Defining AI in Educational Contexts: A Review. *Technology Trends in Education*, 10(3), 45–60.

Cuervo, R. (2023). Predictive AI for SME and Large Enterprise Financial Performance Management. *arXiv*. https://arxiv.org/abs/2311.05840

Davis, F. D. (1986). *A Technology Acceptance Model for empirically testing new end-user information systems: theory and results*. MIT Sloan School of Management, Cambridge, MA.

Education Dynamics. (2024). *Chatbots in higher ed*. https://www.educationdynamics.com/chatbots-in-higher-ed/

Enrollify. (2025). *Operational efficiency in higher education: key areas to target*. Enrollify Institute. https://www.enrollify.org/blog/operational-efficiency-in-higher-education

Gao, R., Merzdorf, H. E., Anwar, S., Hipwell, M. C., & Srinivasa, A. (2023). Automatic Assessment of Text-Based Responses in Post-Secondary Education: A Systematic Review. *arXiv*. https://arxiv.org/abs/2308.16151

Huang, L., & Chen, J. (2023). Factors influencing administrative staff's adoption of digital management systems in higher education. *Computers in Human Behavior Reports*, 12(4), 101-115.

Inside Higher Ed. (2024). Universities build their own ChatGPT-like AI tools. https://www.insidehighered.com/news/tech-innovation/artificial-intelligence/2024/03/21/universities-build-their-own-chatgpt-ai

Jin, Y., Yan, L., Echeverria, V., Gašević, D., & Martinez-Maldonado, R. (2024). Generative AI in Higher Education: A Global Perspective of Institutional adoption Policies and Guidelines. *Computers and Education Artificial Intelligence*, 100348. https://doi.org/10.1016/j.caeai.2024.100348

Kamaludin, A., Zakaria, N., & Nor, S. (2024). Extending the Technology Acceptance Model in explaining AI adoption in higher education. *Education and Information Technologies*, 29(2), 1513-1530.

Liu, J. (2024). Optimization measures of university education management in the era of big data. *Journal of Higher Education Teaching*, 1(3), 261-266.

Mahajan, P. (2025). What is Ethical: AIHED Driving Humans or Human-Driven AIHED? A Conceptual Framework enabling the 'Ethos' of AI-driven Higher Education. *ScienceOpen Preprints*. DOI: 10.14293/PR2199.001510.v1

Mahuta, G.A., & Abubakar, H. (2025). Artificial Intelligence in Higher Education in Nigeria: Challenges and Way Forward. *Journal of Contemporary Research in Educational Administration and Management*, 2, 62-71.

Mallik, S., & Gangopadhyay, A. (2023). Proactive and Reactive Engagement of Artificial Intelligence Methods for Education: A Review. *arXiv*. https://arxiv.org/abs/2301.10231

Modern Campus. (2024). *The hidden engine of student success in higher education: common challenges in academic operations*. https://moderncampus.com/education-center/academic-operations.html

Mohammed-Shittu, N. (2025). Artificial Intelligence (AI)-Driven Decision Support Systems for Sustainable Administration of Public Universities in Rivers State, Nigeria.

International Journal of Educational Management, Rivers State University, 1(2), 157-169.

Oluwole, O., & Eze, O. (2023). Artificial intelligence in university administration: Automation and efficiency. *High Educ Manag Rev*., 11(2), 71-84.

SnapLogic. (2024). *Common data challenges for higher education institutions*. https://www.snaplogic.com/blog/higher-education-data-challenges-and-modernization-tips

Sposato, M. (2025). Artificial intelligence in educational leadership: a comprehensive taxonomy and future directions. *International Journal of Educational Technology in Higher Education*, 22(1). https://doi.org/10.1186/s41239-025-00517-1

Sujatha, S.G., & Reddy, K.T.R. (2024). AI in HR Analytics: Transforming Higher Education Workforce Management. *International Journal of Cultural Studies and Social Sciences*, 31, 157-162.

Temitope A.B., Taoheedat, A., Obisesan, R.O. (2025). Artificial Intelligence in Nigerian Higher Education: An Analysis of Opportunities and Threats. *International Journal of Multidisciplinary Research and Growth Evaluation*, 06, 592-597.

UNESCO IESALC (2025). *Global survey launched to map AI adoption in higher education*. UNESCO International Institute for Higher Education in Latin America and the Caribbean (IESALC). Retrieved from: https://www.iesalc.unesco.org/en/articles/global-survey-launched-map-ai-adoption-higher-education

UNESCO. (2024). *Artificial Intelligence in Education*. UNESCO Digital Education. https://www.unesco.org/en/digital-education/artificial-intelligence

USA.edu blog. (2025). *AI in higher education: how AI is reshaping higher education*. https://www.usa.edu/blog/ai-in-higher-education-how-ai-is-reshaping-higher-education

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the Technology Acceptance Model: four longitudinal field studies. *Management Science*, 46(2), 186-204.

Verge-AI. (2024). *How AI is being used for university admissions*. https://verge-ai.com/blog/how-ai-is-being-used-for-university-admissions

Woelert, P. (2023). Administrative burden in higher education institutions: a conceptualisation and a research agenda. *Journal of Higher Education Policy and Management*, 45(4), 409–422. https://doi.org/10.1080/1360080x.2023.2190967.

Xu, X. (2025). AI optimization algorithms enhance higher education management and personalized teaching through empirical analysis. *Scientific Reports*, 15(1), 10157. https://doi.org/10.1038/s41598-025-94481-5

Zheng, X., Zhu, M., Li, Q., Chen, C., & Tan, Y. (2018). FinBrain: When Finance Meets AI 2.0. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.1808.08497.