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ARTIFICIAL INTELLIGENCE–SUPPORTED ADMINISTRATIVE LEADERSHIP AND SUSTAINABLE INSTITUTIONAL DEVELOPMENT IN PUBLIC COLLEGES OF EDUCATION IN SOUTH-WEST NIGERIA

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ABSTRACT
Artificial intelligence (AI) is increasingly discussed as a tool for improving administrative decision-making, communication, monitoring and institutional planning in higher education. However, evidence concerning whether AI-supported administrative leadership is associated with sustainable institutional development in Nigerian Colleges of Education remains limited. This study examined the relationship between AI-supported administrative leadership and sustainable institutional development in public Colleges of Education in South-West Nigeria. A correlational survey design was adopted. The stated population was 1,291 academic staff across four selected Colleges of Education. The questionnaire was distributed electronically and 255 responses were received. Because some respondents did not complete all substantive items, 221 complete cases were used for correlation and regression analyses. The 18-item AIDAL-SIDQ comprised 10 administrative-leadership items and eight sustainable-development items. Mean, standard deviation, Pearson correlation and simple linear regression were used at the .05 level. AI-supported/digitally enabled administrative leadership recorded M = 2.64, SD = 1.04, while sustainable institutional development recorded M = 3.73, SD = 1.20. Pearson correlation showed a very weak positive relationship ($r = .019$, $p = .783$). Regression was also non-significant, $R^2 = .000$, $F(1,219) = .076$, $p = .783$, with $B = .021$ and $\beta = .019$. The findings indicate that the measured AI-supported/digitally enabled administrative leadership was not statistically associated with sustainable institutional development in the achieved sample. The study therefore emphasises evidence-based, context-sensitive and responsible technology governance rather than assuming that AI adoption automatically produces institutional sustainability.

Keywords: artificial intelligence, administrative leadership, digital transformation, sustainable institutional development, Colleges of Education, Nigeria.

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Introduction

Artificial intelligence has moved from a largely technical concern to an institutional and governance issue in education. AI systems can support information processing, prediction, communication, automation and decision support, but their educational value depends on how institutions organise, govern and evaluate their use. UNESCO emphasises human-centred policy, capacity development, ethical safeguards, privacy, inclusion and equity rather than technological adoption alone (Miao et al., 2021; Miao & Holmes, 2023). The European Commission likewise stresses AI and data literacy and ethical engagement by educational staff.

Higher education institutions operate under pressure from increasing enrolment, constrained resources, accountability requirements and changing educational demands. These conditions have increased interest in digital systems and AI-supported administrative processes. Recent research shows that AI scholarship in higher education now covers decision-making, governance, efficiency, leadership and sustainability (Castillo-Martínez et al., 2024; Ifenthaler et al., 2024; Wang, 2024).

The Nigerian context is important because AI adoption occurs alongside uneven infrastructure, digital skills gaps, data-governance concerns and institutional readiness challenges. Recent Nigerian studies report potential administrative benefits but also identify barriers including inadequate infrastructure, limited competence and weak governance implementation (Eleje et al., 2025; Nnaji et al., 2026). Other Nigerian studies report positive associations between AI integration and selected administrative outcomes (Jamaica & Tagbo, 2025; Osegi & Oduma, 2025). These findings do not establish that AI-supported leadership necessarily improves broader institutional sustainability, particularly in Colleges of Education.

This study therefore examined the relationship between AI-supported administrative leadership and sustainable institutional development in public Colleges of Education in South-West Nigeria. A measurement clarification is important: the administered instrument included both explicitly AI-related items and broader digitally enabled practices. The predictor is consequently interpreted as AI-supported/digitally enabled administrative leadership rather than exclusive use of generative AI.

Statement of the Problem

Although AI is frequently presented as a means of improving educational administration, empirical evidence from Nigerian Colleges of Education remains limited. Much existing work focuses on universities, teaching and learning, or general perceptions of AI. There is less evidence concerning whether AI-supported administrative leadership is statistically associated with sustainable institutional development. Technology also operates within organisational, infrastructural, human and policy conditions. UNESCO therefore recommends context-sensitive implementation and institutional preparedness rather than technology adoption for its own sake (Miao & Holmes, 2023). This study provides evidence from four public Colleges of Education while explicitly limiting its generalisation to the achieved sample.

Purpose of the Study

The study examined the relationship between AI-supported administrative leadership and sustainable institutional development. Specifically, it determined the level of AI-supported administrative leadership, the level of sustainable institutional development, the relationship between the constructs, and whether AI-supported administrative leadership predicted sustainable institutional development.

Research Questions

1. What is the level of AI-supported administrative leadership in the participating Colleges of Education?
2. What is the level of sustainable institutional development in the participating Colleges of Education?
3. What relationship exists between AI-supported administrative leadership and sustainable institutional development?
4. To what extent does AI-supported administrative leadership predict sustainable institutional development?

Hypotheses

H01: There is no significant relationship between AI-supported administrative leadership and sustainable institutional development in public Colleges of Education in South-West Nigeria.

H02: AI-supported administrative leadership does not significantly predict sustainable institutional development in public Colleges of Education in South-West Nigeria.

Literature Review

AI-supported administrative leadership refers in this study to the use of AI-related and digitally enabled information, analytical and communication technologies by institutional leaders to support administrative decisions, monitoring, communication, policy formulation, innovation and service delivery. The emphasis is on technology as an aid to human leadership, not replacement of administrators. UNESCO (2021, 2023) stresses human agency, ethical governance and data protection. Recent Nigerian research reports potential benefits in administrative efficiency and decision-making while noting infrastructure and skills constraints (Jamaica & Tagbo, 2025; Nnaji et al., 2026; Osegi & Oduma, 2025).

Sustainable institutional development concerns an institution's capacity to maintain continuous improvement, use resources effectively, adapt to changing demands, sustain important operations, monitor quality and pursue long-term goals. In this study it was measured through continuous improvement, resource use, adaptation, quality monitoring, continuity, long-term resource management, response to emerging challenges and information-based monitoring of development objectives.

Recent work on AI, sustainability and higher education identifies resource optimisation and governance as important themes but also highlights policy and implementation challenges (International Journal of Educational Management, 2025). Sustainability should therefore not be reduced to technology adoption; it depends on institutional systems that can maintain improvements over time.

AI may improve information access, administrative speed and analytical capacity, but it can also create concerns about privacy, bias, transparency, accountability and over-reliance on automated outputs. Wang (2024) argues that algorithmic decisions have governance consequences, while UNESCO (2023) calls for ethical validation and institutional capacity. Nnaji et al. (2026) identify digital literacy, infrastructure, governance implementation and readiness as major issues in Nigerian higher education. These conditions justify empirical testing rather than assuming a positive AI-sustainability relationship.

Theoretical Framework: Technology–Organisation–Environment Framework

The study was anchored in the Technology–Organisation–Environment (TOE) framework of Tornatzky and Fleischer (1990). TOE explains technology adoption through technological, organisational and environmental conditions. The framework is relevant because technology-related leadership in Colleges of Education is unlikely to operate independently of organisational

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readiness, infrastructure, leadership capacity, policies and external pressures. It therefore provides a useful basis for interpreting why technology adoption may not translate automatically into sustainable institutional development.

Methodology

A correlational survey design was adopted because the study examined association and prediction without manipulating either construct. The stated population comprised 1,291 academic staff: Federal College of Education, Abeokuta (730); Federal College of Education (Technical), Akoka (254); Federal College of Education, Ilawe-Ekiti (167); and Oyo State College of Education, Lanlate (140). The institutions were purposively selected. The questionnaire was distributed electronically and participation was voluntary. The achieved sample is therefore accurately described as an online convenience/voluntary-response sample rather than a documented simple-random sample. A total of 255 responses were received: Abeokuta 84, Akoka 61, Ilawe-Ekiti 58 and Lanlate 52. The AIDAL-SIDQ contained 18 substantive items: 10 on AI-supported/digitally enabled administrative leadership and eight on sustainable institutional development. Responses were scored Strongly Agree = 5, Agree = 4, Neutral/Undecided = 3, Disagree = 2 and Strongly Disagree = 1. Several predictor items referred to digital systems, digital technologies or emerging technologies in addition to explicit AI references; the revised manuscript therefore does not retrospectively describe the instrument as exclusively AI-specific. Cronbach's alpha calculated from the actual main-study responses was .934 for the 10 administrative-leadership items, .968 for the eight sustainable-development items, and .899 for all 18 items. No pilot dataset is claimed. Of the 255 responses, complete responses were available for 251 cases on items 1–10 and 225 cases on items 11–18. A total of 221 respondents had complete data across all 18 substantive items. Correlation and regression were therefore based on the same 221 complete cases. Means and standard deviations summarised the constructs. Pearson product-moment correlation tested the relationship and simple linear regression tested prediction at $\alpha = .05$. Descriptive interpretation used five equal bands: 1.00–1.80 very low; 1.81–2.60 low; 2.61–3.40 moderate; 3.41–4.20 high; and 4.21–5.00 very high.

Results

Descriptive Results

Variable	N	Mean	SD
AI-supported/digitally enabled administrative leadership	255	2.64	1.04
Sustainable institutional development	255	3.73	1.20

The mean of 2.64 indicates a moderate level of AI-supported/digitally enabled administrative leadership, while 3.73 indicates a high level of sustainable institutional development.

Correlation and Regression

N	r	p	R^2	F(1,219)	B / β
221	.019	.783	.000	.076	.021 / .019

Pearson correlation was $r = .019$, $p = .783$. The relationship was negligible and not statistically significant; H01 was retained. Simple regression was also non-significant, $R^2 = .000$, $F(1,219) = .076$, $p = .783$. The unstandardised slope was $B = .021$ and the standardised coefficient was $\beta = .019$. The distinction corrects the earlier labelling of B as beta. H02 was retained. The predictor explained approximately 0.03% of the observed variance, which rounds to $R^2 = .000$.

Discussion

The moderate mean for AI-supported/digitally enabled administrative leadership suggests that respondents perceived technology-related administrative practices as present but not strongly established. This is broadly compatible with recent Nigerian literature describing emerging AI adoption alongside infrastructure, skills and governance constraints (Eleje et al., 2025; Nnaji et al., 2026).

The high mean for sustainable institutional development indicates relatively favourable perceptions of continuous improvement, resource use, adaptation, quality monitoring and long-term institutional processes. Importantly, this outcome occurred without a significant relationship with the measured AI-supported leadership construct. Institutional development may therefore depend on several factors beyond AI, including conventional leadership, funding, organisational culture, staff commitment, infrastructure, quality assurance and policy implementation.

The central finding was the absence of a significant relationship between AI-supported/digitally enabled administrative leadership and sustainable institutional development ($r = .019$, $p = .783$). This differs from some Nigerian studies reporting positive associations between AI integration and selected administrative outcomes (Jamaica & Tagbo, 2025; Osegi & Oduma, 2025). Differences may reflect different populations, constructs, institutional settings, levels of technology maturity, sampling approaches and outcome measures. The present finding should therefore be treated as evidence from the achieved sample rather than as evidence that AI can never contribute to sustainability.

The regression result reinforces the correlation finding. The single predictor explained essentially none of the observed variance in the sustainability measure. The result supports a systems perspective in which AI is only one possible component of institutional transformation. Current guidance and research emphasise infrastructure, digital competence, governance, ethical safeguards and human oversight as conditions shaping AI use (Miao & Holmes, 2023; Nnaji et al., 2026; Wang, 2024).

Implications for Policy and Practice

Colleges of Education should evaluate AI-related investments against clearly defined administrative problems and measurable outcomes rather than assuming that adoption itself produces institutional sustainability. AI initiatives should be accompanied by staff capacity development, reliable infrastructure, data governance, ethical safeguards and monitoring. UNESCO's human-centred approach is relevant because it places human agency, privacy, equity and preparedness alongside technological innovation.

Future research should use more clearly AI-specific indicators, such as AI-enabled predictive analytics, intelligent decision-support systems, automated administrative workflows and documented AI governance practices. Separating AI-specific adoption from general digital technology use would provide a more precise test of the proposed relationship.

Conclusion

The study found moderate AI-supported/digitally enabled administrative leadership and high sustainable institutional development, but no statistically significant relationship between the two constructs. AI-supported leadership also did not significantly predict sustainable institutional development. The findings therefore do not support a claim that the measured technology-related leadership produced institutional sustainability in the achieved sample. Instead, they point to the need to examine AI within the wider organisational, infrastructural, human and governance system.

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Recommendations

1. Management should assess specific administrative needs before investing in AI-related systems and evaluate whether each technology produces measurable improvements.
2. Institutions should strengthen staff AI and digital literacy, including privacy, data quality, bias, responsible use and limitations of AI outputs.
3. AI initiatives should be integrated with institutional planning, quality assurance, resource management and continuous-improvement systems.
4. Colleges should establish procedures for responsible use of AI and digital systems, including data protection, accountability and human oversight.
5. Future studies should use probability sampling where feasible, larger and more balanced samples, and clearer AI-specific measures.
6. Future models should examine multiple predictors of sustainable institutional development, including leadership, infrastructure, funding, staff capacity, organisational culture and policy implementation.

Limitations

The study has three major limitations. First, online voluntary participation produced uneven institutional returns and limits generalisability. Second, the instrument combined explicit AI items with broader digital-technology items, so the predictor is appropriately described as AI-supported/digitally enabled administrative leadership. Third, the cross-sectional design does not establish causation. Missing responses also reduced the inferential sample from 255 to 221 complete cases.

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