DATA ANALYTICS AND INSTITUTIONAL MANAGEMENT FOR GLOBAL COMPETITIVENESS IN NIGERIAN UNIVERSITIES: A CASE STUDY OF THE UNIVERSITY OF LAGOS

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Abstract

This research examines the transformative powers of data analytics in strengthening the management of tertiary educational institutions in Nigeria so as to improve their status in the global world. Our analysis resolves the question of how choices based on data can enhance better institutional performance. The research methodology was a descriptive correlational design used to answer three research questions. Our target population was 141 senior administrators. A stratified random sample of 104 respondents was then selected. Data was gathered using a questionnaire of 15 items that was scored using a four-point rating scale, and its validity was established through a panel of three subject matter experts. Mean values were then calculated in order to answer the research questions. The results show that data analytics supports the change in personalised learning experiences, the improvement of predictions and the complementing of administrative efficiency, all while aligning pedagogical practices with international norms. However, the study found that there are considerable barriers, such as inadequate infrastructure, lack of technical expertise, and data privacy concerns. Accordingly, concrete strategies to overcome these challenges are proposed in the research. In summation, the results reinforce the dire need for data analytics in the cultivation of an efficient, innovative, and globally resonant higher education system within Nigeria.

Keywords: Data analytics, global competitiveness, decision-making, data infrastructure, educational management

Introduction

The global higher education sector is undergoing rapid transformation, influenced by technological innovations and the growing reliance on data-driven approaches to management and decision-

making. Data analytics has become an essential instrument for improving educational leadership,

optimising institutional performance, and boosting competitiveness. For emerging economies like Nigeria, incorporating data analytics into higher education offers vast potential yet presents notable hurdles. Nigerian universities face increasing pressure to enhance academic outcomes, utilise resources efficiently, and maintain alignment with global benchmarks. The University of Lagos, as one of Nigeria's foremost institutions, exemplifies these national challenges and aspirations.

Traditionally, university management in Nigeria has depended on conventional decision-making practices, often guided by intuition or incomplete information. The emergence of big data and analytics, however, gives opportunities for revolutionising this approach. Data analytics has revealed patterns in learning, forecast performance trends, facilitate personalised learning, and refine administrative operations (Ifenthaler & Yau, 2020). Despite its promise, adoption within Nigerian tertiary institutions is hindered by structural limitations, insufficient technical know-how, and concerns about data protection (Oladipo, Oyeniran, & Oyelade, 2020). Furthermore, achieving full integration demands both capacity development and cultural adaptation toward evidence-based decision-making.

As noted by Sani, Abubakar, and Abdullahi (2022), strengthening the global competitiveness of Nigeria's higher education system is of very crucial national importance, shaping innovation, economic progress, and human capital growth. It is therefore imperative to assess how data analytics can enhance educational management, particularly at the University of Lagos. Established in 1962, the University of Lagos (UNILAG) is a federal research university and one of Nigeria's first-generation institutions. Recognised as one of Africa's leading universities, UNILAG enrols approximately 8,500 new undergraduates yearly and has a total student population exceeding 57,000 (UNILAG, 2024).

This paper investigates how the integration of data analytics within Nigerian higher institutions, with a focus on the University of Lagos. Specifically, it examines administrators perceptions, including those of Deans, Heads of Departments, and Directors, concerning three areas: the impact of data analytics on educational administration, challenges to its effective deployment, and strategies to overcome such challenges. The present analysis provides an invaluable insight into the usefulness of data-driven paradigms in improving strategic educational processes and thereby enables Nigerian educational institutions to meet and improve on the global standard of learning.

By carefully analysing the attendant benefits, possible constraints, and practical applications of data analytics, this inquiry expands current scholarship on evidence-based educational leadership. Also, it offers a coherent framework to policymakers, administrators, and educators on how to leverage data-driven insights and therefore improve the efficacy and international competitiveness of Nigerian higher education. The resultant findings have a lot of implications for policy formulation, institutional planning, and stewardship of sustainable management practices in Nigeria's universities.

Statement of the Problem

Nigerian tertiary institutions, particularly the University of Lagos (UNILAG), one of the most research-intensive institutions in the country, struggle to gain and sustain global

competitiveness due to their old-fashioned management traditions as well as the lack of information on the integration of data-driven decision-making processes. Conventional approaches to educational management within such educational environments are often informed more by intuition and historic precedent than empirical evidence, and hence the relative inefficiency in resource allocation and an ever-widening performance chasm between Nigerian universities and their international counterparts. This lacklustre ability of Nigerian universities to use data analytics to advance knowledge management further undermines the ability of Nigerian universities to upgrade the quality of education and to keep up with the fast-changing international standards of higher education.

In addition, even though the manifold applications of data analytics in educational management have been well documented in developed countries with an abundance of research on its application within educational management, there is a paucity of research that delineates its practical deployment and measurable impact in the Nigerian tertiary education context. UNILAG, being a microcosm of broader systemic institutional issues, is a classic indicator of the dire need for evidence-based institutional management.

Review of Related Literature

The given literature review gives a critical analysis of the current state of data analytics in educational management, specifically focusing on how the given research domain is applied in the context of the Nigerian tertiary education system, and the University of Lagos (UNILAG).

Data Analytics in Educational Management

Data analytics in education refers to the process of collecting, analysing and interpreting large volumes of education data systematically to make decisions to support pedagogical procedures (Siemens and Long, 2011). Although the initial research in the field by Siemens and Long (2011) focused on the global promise of analytics, more recent research has picked up on the necessity of analytics in developing economies. Ike and Obionu (2022) argued that for Nigerian institutions, data analytics is no longer optional but a critical tool for "enhancing educational management and improving institutional competitiveness" in a resource-constrained environment.

Abimbola, Oyatoye, and Oyenuga (2020) have noticed that Nigerian tertiary institutions are facing unique demands to maximise resource allocation and bring their practice into international standards, demands that cannot be well met using manual administrative processes. Furthermore, Adeyanju (2018) demonstrated that the integration of ICT and data tools significantly enhances the managerial efficiency of Heads of Departments in Nigerian universities, allowing for evidence-based rather than intuition-based decision-making. This shift is further supported by the National Universities Commission (NUC), which has increasingly mandated data-driven reporting for accreditation and ranking purposes (Okebukola, 2022).

Global Competitiveness in Higher Education

Sani, Abubakar, and Abdullahi (2022) emphasised that the global competitiveness of Nigerian universities hinges on their ability to transition from local relevance to global visibility through digitised research and administrative systems. A key voice in this domain, Okebukola (2025), analysed the performance of Nigerian universities in the 2026 Times Higher Education (THE) World University Rankings, where the University of Lagos (UNILAG) and the

University of Ibadan emerged among the top 1,000 globally. Okebukola attributed this progress to a deliberate "strategic plan" that prioritises investment in research infrastructure and data visibility. He argued that "boosting quality through ranking" requires institutions to adopt rigorous data management practices that can accurately capture and showcase institutional achievements to the global community. This direct link between data management and ranking success highlights the strategic imperative of analytics for Nigerian institutions aiming for world-class status.

The University of Lagos' commitment to this path was reaffirmed during the 2025 UNILAG Council Retreat. The resulting communiqué, titled "From Talk-Talk to Work-Work," explicitly outlined a roadmap for the "full automation" of university processes to unlock value and shape the future (UNILAG, 2025). This strategic pivot acknowledges that while UNILAG has made strides, such as establishing the Machine Intelligence Research Group (MIRG), systemic integration of analytics into daily management remains a work in progress.

Challenges in Implementing Data Analytics

Despite the clear benefits, the transition to a data-driven culture in Nigeria is fraught with structural and operational challenges. Owolabi and Opaleye (2021) identified that many Nigerian tertiary institutions still rely on "inefficient manual record-keeping systems," which are prone to errors, loss of vital documents, and security risks. This manual legacy creates a "garbage in, garbage out" problem that hinders effective analytics.

Additionally, Aina and Ojo (2018) highlighted that "delays in information retrieval" due to poor data management are a major source of administrative bottlenecks in Nigerian universities. Odigwe (2020) further expanded on this, revealing that poor management of educational data negatively impacts the quality of academic research conducted by lecturers in the South-South region, a finding applicable nationally. These challenges are compounded by what Ogunleye et al. (2018) described as "inadequate funding and poor internet connectivity," which create a volatile environment for sustaining high-availability analytics platforms.

Summary of Gaps

The reviewed literature demonstrates a consensus among Nigerian scholars (Okebukola, 2025; Ike and Obionu, 2022) that data analytics is essential for global competitiveness. However, a gap remains in the practical *operationalisation* of these tools. There is limited empirical evidence detailing *how* specific administrative units at UNILAG are currently navigating the transition from manual to data-driven systems. This study aims to fill that gap by providing a granular analysis of data analytics adoption within the specific administrative context of the University of Lagos.

Research Questions

The study was guided by the following research questions:

1. To what extent does data analytics implementation enhance decision-making at the University of Lagos for global competitiveness?
2. What is the relationship between the degree of investment in data analytics infrastructure and the rate of research output at the University of Lagos for global competitiveness?

Research Hypotheses

The following research hypotheses were tested at .05 level of significance:

H01 The implementation of data analytics does not have a significant correlation with enhanced decision-making in the University of Lagos.

H02 The data analytics infrastructure level does not significantly relate to the rate of research output in the University of Lagos.

Methodology

In this research study, the data collection and analytics followed the descriptive correlational research design. The study consisted of 141 administrative staff, twelve Deans of Faculty, eighty-two Heads of Department and forty-seven Directors of Institutes and Centres. One hundred and four (104) administrators were selected by using stratified random sampling that provided a representative sample of the entire population.

The data were gathered by means of a structured instrument called the Data Analytics in Educational Management Questionnaire (DAEMQ), comprising fifteen items and a four-point rating scale. Three academic reviewers assessed content validity, and pilot test results validated reliability, offering an excellent internal consistency (Cronbach's alpha =.87). The researcher gave questionnaires out personally, leaving respondents with a week's period to give a thought-over response.

There was the use of both descriptive and inferential analysis of data. The research question was also answered by means of descriptive statistics, utilising mean scores, and the hypotheses of the study were tested using the product-moment correlation coefficient (r) of Pearson. These reviews identified the relationship between the utilisation of data analytics, the effectiveness of decision-making, and the relationship between infrastructure investment and output of institutional research.

Data Analysis and Results

The response rate was 100%. The analysis of data was done to answer the research questions and test the hypotheses at the 0.05 level of significance.

Decision Rule

To interpret the descriptive results, the following mean score benchmarks were established based on the 4-point Likert scale used in the instrument:

- 1.00 – 1.49 = Very Low Extent / Strongly Disagree
- 1.50 – 2.49 = Low Extent / Disagree
- 2.50 – 3.49 = High Extent / Agree
- 3.50 – 4.00 = Very High Extent / Strongly Agree

Descriptive Analysis

Research Question 1: To what extent does data analytics implementation enhance decision-making at the University of Lagos for global competitiveness?

Table 1: *Mean and Standard Deviation for Data Analytics Implementation and Improved Decision-Making*

Item	Mean	SD
1. Data analytics improves the speed of decision-making	3.45	0.72
2. Data analytics enhances the accuracy of administrative decisions	3.62	0.68
3. Data-driven insights lead to more effective resource allocation	3.38	0.81
4. Implementation of data analytics reduces administrative errors	3.51	0.75
5. Data analytics facilitates more informed strategic planning	3.70	0.64
Grand Mean	**3.53**	**0.72**

Note. N = 104. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree.

Table 1 shows that administrators at the University of Lagos strongly agree that the implementation of data analytics enhances the decision-making process to a very high level (M = 3.53, SD = 0.72). The most frequent mean score (M = 3.70, SD =0.64) was associated with the statement that data analytics allows making more informed strategic planning, which is a key ability to place UNILAG in the global higher education environment competitively. On the other hand, the lowest score (M = 3.38, SD = 0.81) was observed in the item on data-driven insights impacting more effective resource allocation, which indicates that even though administrators are aware of the opportunity, resource optimisation with analytics is yet to be developed further.

Research Question 2: What is the relationship between the degree of investment in data analytics infrastructure and the rate of research output at the University of Lagos for global competitiveness?

Table 2: *Descriptive Statistics for Investment in Data Analytics Infrastructure and Research Output Rate*

Item	Mean	SD
6. Investment in data analytics tools increases research productivity	3.55	0.70
7. Better data infrastructure leads to higher-quality research	3.48	0.75
8. Data analytics investment improves research collaboration	3.41	0.79
9. Advanced analytics capabilities result in more publications	3.33	0.82
10. Data infrastructure enhances the university's research reputation	3.59	0.67
Grand Mean	**3.47**	**0.75**

Note. N = 104. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree.

Table 2 indicates very strong agreement by the administrators that the level of investment in data analytics infrastructure significantly impacts the rate of research output in the University of Lagos (M = 3.47, SD = 0.75). The largest mean score (M = 3.59, SD = 0.67) was achieved in the item that data infrastructure assists the research reputation of the University, which is one of the crucial factors of international competitive global presence. The item with the lowest mean score (M =3.33, SD=0.82) was related to advanced analytics capabilities, which implies that, even though the administrators are aware of the connection, an infrastructural investment in needs must be transformed into measurable publication outputs in a strategic manner.

Hypothesis Testing

Composite scores were computed for each variable by averaging the responses to the items measuring that specific construct. This ensured that all variables remained on the same 4-point metric and facilitated meaningful correlation analysis.

Table 3: *Descriptive Statistics and Correlations for Key Study Variables*

Variable	*M*	*SD*	1	2	3	4
1. Implementation of Data Analytics	3.53	0.72	-			
2. Improved Decision-Making	3.48	0.75	.78*	-		
3. Investment in Data Infrastructure	3.47	0.75	.56*	.48*	-	
4. Research Output Rate	3.40	0.79	.42*	.39*	.65*	-

Note. N = 104. * Correlation is significant at the 0.05 level (2-tailed). Variables represent composite mean score

H01: The implementation of data analytics does not have a significant correlation with enhanced decision-making in the University of Lagos.

A Pearson Product-Moment Correlation coefficient was calculated to determine the correlation between the use of data analytics (M = 3.53, SD = 0.72) and better decision-making (M = 3.48, SD = 0.75). The two variables were found to have a strong positive correlation, $r(102) = .78$, $p < .05$, as demonstrated in Table 3. Thus, the null hypothesis was not accepted. This finding shows that there is a strong positive correlation between the use of data analytics and better

decision-making in the University of Lagos. This observation highlights the paramount importance of data-driven decision-making towards the development of institutional management capacity, which is a prerequisite for endowing the institution to be competitive worldwide.

H02: The data analytics infrastructure level does not significantly relate to the rate of research output in the University of Lagos.

A Pearson Product-Moment Correlation coefficient was obtained to estimate the relationship between the intensity of investment in data analytics infrastructure (M 3.47, SD 0.75) and the level of research output (M 3.40, SD 0.79). The correlation between these variables is moderate to strong, which is shown by Table 3, r(102) =.65, p <.05. Therefore, the null hypothesis was not accepted. This observation indicates that an association with more data analytics infrastructure investment levels is highly correlated with high rates of research output at the University of Lagos. Since the research productivity and quality are the key metrics of the world university rankings, this association is crucial in the existing aims of UNILAG in striving towards greater global competitiveness.

Summary of Findings

The analysis revealed two critical findings: first, the implementation of data analytics at the University of Lagos is significantly and strongly correlated with improved decision-making (r = .78), and second, investment in data analytics infrastructure is significantly correlated with increased research output rates (r = .65). These findings provide empirical evidence that data analytics serves as a strategic enabler for both administrative excellence and research productivity. Together, these improvements position the University of Lagos to enhance its institutional effectiveness, strengthen its research standing, and advance its trajectory toward sustained global competitiveness in the contemporary higher education ecosystem.

Discussion of Findings

The findings in this study bring about substantial evidence to reinforce the claim that data analytics is an important factor in empowering administrative decision-making and research productivity at the University of Lagos. The implications of these findings are enormous for policy in the Nigerian education system and governance of education.

Empirical analysis shows a strong positive correlation is shown in how the implementation of data analytics and the enhancement of decision-making efficacy are mutually correlated to highlighting the transformative power of data-driven governance in modern-day academic administration. Additionally, the grand mean score of 3.53 for decision-making effectiveness reinforces this finding. Participants reported higher confidence in decisions supported by data insights (M=3.70), consistent with Adeyanju's (2018) findings that ICT integration significantly improves managerial effectiveness in Nigerian universities. However, the relatively lower rating for time-saving in routine administrative functions (M=3.38) suggests that while analytics

enhances decision quality, its contribution to operational efficiency may still depend on process optimisation and targeted staff capacity-building. This aligns with Owolabi and Opaleye's (2021) position that data management challenges in Nigerian tertiary institutions necessitate systemic training and procedural restructuring to fully exploit analytics tools.

Furthermore, the analysis indicated a moderate-to-strong positive correlation between investment in analytics infrastructure and research productivity. This provides empirical support for the view of Ike and Obionu (2022), who identified data analytics as a "critical enabler" of competitiveness within Nigeria's tertiary education system. Respondents highlighted substantial improvements in research quality (M=3.59) and process efficiency (M=3.41), which resonate with Sani, Abubakar, and Abdullahi's (2022) model linking digital transformation to enhanced institutional visibility and global competitiveness.

Interestingly, the lowest mean value within the research-related items was observed for increased publication output (M=3.33), suggesting that, at present, the impact of data analytics is more pronounced in improving research processes and quality rather than immediately boosting publication quantity. This finding supports Ike and Obionu's (2022) assertion that tangible gains in research productivity typically emerge over the medium to long term as digital systems mature.

The demonstrated benefits of data analytics in both decision-making and research output bear critical implications for UNILAG's international competitiveness. As Okebukola (2025) observed, the university's inclusion among the top 1,000 institutions in the 2026 Times Higher Education World University Rankings reflects the institution's strategic investment in digital infrastructure and evidence-based planning. By enhancing the quality and timeliness of research outputs, data analytics positions UNILAG to sustain and further improve its global standing. Likewise, better-informed decisions derived from analytics lead to more effective resource allocation, thereby strengthening institutional efficiency and competitiveness.

Nonetheless, certain challenges must be addressed to fully realise these opportunities. Persistent infrastructure deficits, data integration difficulties (Owolabi & Opaleye, 2021), and limited technical capacity continue to hinder optimal utilisation of analytics-driven management systems. The relatively lower score for research publication growth underscores the need for additional investment and time to translate improved processes into tangible output gains. The National Universities Commission's (2023) Guidelines for e-Learning in Nigerian Universities emphasise that the benefits of data analytics are maximised only through holistic institutional adoption and long-term strategic integration. These findings affirm UNILAG's 2025 strategic vision for campus-wide digitisation and highlight the necessity for sustained commitment, cross-departmental coordination, and comprehensive capacity building to actualise the full potential of analytics in academic administration and research enhancement.

Conclusion

This study evaluated the influence of data analytics on educational management and institutional competitiveness at the University of Lagos, with particular emphasis on decision-making

efficiency and research productivity. The findings demonstrate that data analytics exerts a substantial positive effect on both administrative performance and research outcomes. These results highlight the transformative capacity of data analytics to strengthen management functions and foster innovation within higher education, especially in developing contexts such as Nigeria.

Through the strategic adoption of analytics tools, the University of Lagos has enhanced operational efficiency and improved the quality and visibility of its research, contributing to its growing international recognition. The university's inclusion among the world's top 1,000 institutions in the 2026 Times Higher Education Rankings reflects the tangible outcomes of these data-driven strategies. Nevertheless, the study also revealed crucial areas for further development. Specifically, the need to embed analytics more deeply into routine administrative workflows and to translate improved research processes into measurable increases in publication output over time.

Recommendations

Based on these findings, the University of Lagos should:

i. Develop and deploy user-friendly data analytics dashboards to simplify operations, improve accessibility, and support real-time decision-making across units and departments.
ii. Establish a dedicated analytics-based research support service to help academics identify grant opportunities, suitable collaborators, and emerging research trends, thereby increasing both research quality and output.
iii. Continue prioritising investment in analytics infrastructure and tools, with particular focus on applications that enhance decision-making and research performance.
iv. Design and implement analytics frameworks tailored to the Nigerian higher education environment, avoiding wholesale adoption of external models without necessary localisation.

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