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Effect of Digital Transformation on Organisational Performance in Public Higher Educational Institutions

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ABSTRACT

This study examined the effect of digital transformation on organisational performance in public higher educational institutions. The study adopted a descriptive survey research design guided by a quantitative, deductive, and positivist approach. The population comprised academic and administrative staff from selected public higher educational institutions, from which a sample size was determined using the Taro Yamane (1967) formula at a 5% level of precision. Data were collected using a structured closed-ended questionnaire and analysed using descriptive statistics and Partial Least Squares Structural Equation Modelling (PLS-SEM). The measurement model results confirmed satisfactory reliability and convergent validity, with factor loadings ranging from 0.802 to 0.862, Cronbach's Alpha values from 0.876 to 0.901, Composite Reliability values from 0.910 to 0.927, and Average Variance Extracted (AVE) values from 0.670 to 0.718. The structural model revealed that digital transformation dimensions explained 72.8% of the variance in organisational performance (R^2 = 0.728; Q^2 = 0.511). The findings showed that digital infrastructure adoption had a positive but statistically insignificant effect on organisational performance (β = 0.087, t = 1.421, p = 0.156), while digital technology integration also had a positive but insignificant effect (β = 0.113, t = 1.884, p = 0.063). However, digital skills and competence (β = 0.326, t = 5.768, p < 0.01) and digital innovation capability (β = 0.401, t = 7.214, p < 0.001) had significant positive effects on organisational performance. The study concluded that digital transformation enhances organisational performance in public higher educational institutions, particularly when supported by strong digital competencies and innovation capabilities. The study recommended improved digital infrastructure, continuous staff digital training, effective technology integration strategies, and institutional support for digital innovation.

Keywords: *digital transformation, digital infrastructure adoption, digital technology integration, digital skills and competence, digital innovation capability, organisational performance*

1. INTRODUCTION

In Nigerian public higher educational institutions, digital transformation has become increasingly relevant due to the growing demand for efficient academic administration, digital learning environments, improved research management, and effective stakeholder engagement. However, the implementation of digital transformation initiatives has remained uneven due to challenges associated with infrastructure availability, financial limitations, inadequate digital competencies, and weak institutional strategies. According to Adebayo and Ojo (2024), Nigerian higher education institutions have demonstrated increasing interest in digital transformation; however, infrastructural deficiencies and limited organisational preparedness continue to restrict the effective utilisation of digital technologies.

Digital transformation in higher educational institutions is characterised by digital infrastructure adoption, digital technology integration, digital skills and competence, and digital innovation capability.

Digital infrastructure provides the foundation for digital operations, while effective technology integration enables improved processes, communication, and decision-making. According to Alenezi (2023) and Benavides et al. (2021), the benefits of digital transformation depend not only on technological availability but also on effective integration and institutional readiness. Existing studies have largely focused on technology adoption, online learning, or digital readiness, while limited attention has been given to examining the separate contributions of digital infrastructure adoption, digital technology integration, digital skills and competence, and digital innovation capability.

This study seeks to examine the effect of digital transformation on organisational performance in public higher educational institutions. Specifically, the study aims to: (i) examine the effect of digital infrastructure adoption on organisational performance; (ii) determine the influence of digital technology integration on organisational performance; (iii) assess the effect of digital skills and competence on organisational performance; and (iv) evaluate the impact of digital innovation capability on organisational performance in public higher educational institutions.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Digital transformation has become a major strategic approach through which organisations leverage digital technologies, human capabilities, and innovative processes to improve operational effectiveness and achieve sustainable performance outcomes. Unlike conventional technology adoption, digital transformation represents a broader organisational change process that requires the alignment of technological resources, institutional strategies, employee competencies, and innovation capabilities. According to Verhoef et al. (2021), digital transformation involves the use of digital technologies to fundamentally redesign organisational processes, develop new capabilities, and create improved value outcomes. Similarly, Benavides et al. (2021) noted that digital transformation in higher education extends beyond the acquisition of technological tools, as it requires institutional readiness, effective governance, and the capacity to integrate digital resources into existing academic and administrative structures.

This study was anchored on the Technology–Organisation–Environment (TOE) framework developed by Tornatzky and Fleischer (1990). The TOE framework explains organisational technology adoption and implementation based on three contextual dimensions: technological factors, organisational factors, and environmental factors. In this study, digital infrastructure adoption and digital technology integration represent the technological factors influencing the ability of public higher educational institutions to implement digital transformation initiatives, while digital skills and competence and digital innovation capability represent organisational factors. Public higher educational institutions operate within an environment where government support, institutional regulations, and societal demands influence their digital transformation decisions.

3. RESEARCH METHOD AND TECHNIQUES

The study adopted a descriptive survey research design using a quantitative, deductive, and positivist approach to examine the effect of digital transformation on organisational performance in public higher educational institutions. The target population comprised academic and administrative staff of selected public higher educational institutions, totalling 10,218. The sample size was determined using the Taro Yamane (1967) formula for finite populations at a 5% level of precision, yielding n = 385. Proportional allocation was then applied across the participating institutions, as summarised in Table 1.

Table 1. Population and Sample Size by Institution

S/N	State	University	Type	Academic Staff	Sample
1	Ogun	Federal University of Agriculture, Abeokuta	Federal	529	20
	Ogun	Olabisi Onabanjo University	State	821	31
2	Oyo	University of Ibadan	Federal	1,607	61

S/N	State	University	Type	Academic Staff	Sample
	Oyo	Ladoke Akintola University, Ogbomoso	State	665	25
3	Lagos	University of Lagos	Federal	1,200	45
	Lagos	Lagos State University	State	870	33
4	Osun	Obafemi Awolowo University	Federal	1,493	56
	Osun	University of Medical Science, Ila Orogun	Federal	109	4
5	Ondo	Federal University of Technology, Akure	Federal	830	31
	Ondo	Adekunle Ajasin University, Akungba Akoko	State	606	23
6	Ekiti	Federal University of Oye	Federal	863	33
	Ekiti	Ekiti State University, Ado Ekiti	State	625	23
		Total		10,218	385

Sample allocated proportionally as n = (institutional staff × 385) / 10,218.

Data were collected from academic and administrative staff of the selected institutions using a structured closed-ended questionnaire designed to measure digital transformation practices and their influence on organisational performance. The questionnaire items focused on the four dimensions of digital transformation — digital infrastructure adoption, digital technology integration, digital skills and competence, and digital innovation capability — as well as their contribution to organisational performance. The instrument was administered directly to respondents with the assistance of trained research assistants to ensure effective distribution and retrieval.

Data obtained from the field survey were analysed using both descriptive and inferential statistical techniques. Descriptive statistics including frequencies, percentages, means, and standard deviations were used to summarise respondents' demographic characteristics and questionnaire responses. Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed to examine the effect of digital transformation on organisational performance, following a two-stage assessment of the measurement model and the structural model.

4. RESULTS AND DISCUSSION

4.1 Measurement Model Assessment

4.1.1 Internal Consistency Reliability and Convergent Validity

Table 2 presents the results of the reliability and convergent validity assessment for all five constructs.

Table 2. Reliability and Convergent Validity

Construct	Item	Loading	Cronbach's α	CR	AVE
Digital Infrastructure Adoption (DIA)	DIA1	0.814	0.887	0.917	0.690
	DIA2	0.841			
	DIA3	0.858			
	DIA4	0.823			
	DIA5	0.823			
Digital Technology Integration (DTI)	DTI1	0.802	0.876	0.910	0.670
	DTI2	0.836			
	DTI3	0.841			
	DTI4	0.809			
	DTI5	0.818			

Construct	Item	Loading	Cronbach's α	CR	AVE
Digital Skills and Competence (DSC)	DSC1	0.833	0.895	0.923	0.706
	DSC2	0.862			
	DSC3	0.846			
	DSC4	0.831			
	DSC5	0.841			
Digital Innovation Capability (DIC)	DIC1	0.847	0.901	0.927	0.718
	DIC2	0.861			
	DIC3	0.856			
	DIC4	0.833			
	DIC5	0.839			
Organisational Performance (OP)	OP1	0.821	0.892	0.921	0.699
	OP2	0.849			
	OP3	0.857			
	OP4	0.836			
	OP5	0.823			

Source: PLS-SEM output, 2026. CR = Composite Reliability; AVE = Average Variance Extracted.

The results presented in Table 2 indicate that all constructs satisfied the recommended criteria for internal consistency reliability and convergent validity. The factor loadings of the measurement items ranged from 0.802 to 0.862, exceeding the recommended threshold of 0.70, confirming that the indicators were reliable measures of their respective constructs. Cronbach's Alpha values ranged from 0.876 to 0.901, while Composite Reliability values ranged from 0.910 to 0.927 — both above the acceptable benchmark of 0.70. The Average Variance Extracted values ranged from 0.670 to 0.718, exceeding the minimum recommended value of 0.50, confirming adequate convergent validity.

4.1.2 Discriminant Validity

Discriminant validity was assessed using the Heterotrait–Monotrait (HTMT) ratio criterion, reported in Table 3.

Table 3. Discriminant Validity (HTMT Criterion)

Construct	DIA	DTI	DSC	DIC	OP
Digital Infrastructure Adoption (DIA)	—				
Digital Technology Integration (DTI)	0.724	—			
Digital Skills and Competence (DSC)	0.681	0.753	—		
Digital Innovation Capability (DIC)	0.701	0.768	0.796	—	
Organisational Performance (OP)	0.739	0.782	0.745	0.814	—

Source: PLS-SEM output, 2026. Threshold: HTMT < 0.85.

The HTMT values for all construct pairs ranged from 0.681 to 0.814, all below the recommended threshold of 0.85. The correlation between digital infrastructure adoption and digital technology integration was 0.724, while relationships between digital skills and competence and the other digital transformation dimensions ranged from 0.681 to 0.796. Organisational performance recorded HTMT values ranging from 0.739 to 0.814 with the digital transformation constructs. Since none of the values exceeded the acceptable threshold, discriminant validity was established across all five constructs.

4.2 Structural Model Assessment

Table 4 reports the collinearity diagnostics, coefficient of determination, effect sizes, and predictive relevance for the structural model.

Table 4. Collinearity, R^2, f^2, and Q^2 Statistics

Relationship	VIF	f^2	Endogenous Variable	R^2	Q^2
DIA → OP	2.184	0.187	Organisational Performance (OP)	0.728	0.511
DTI → OP	2.341	0.214			
DSC → OP	2.476	0.269			
DIC → OP	2.612	0.301			

Source: PLS-SEM output, 2026.

The Variance Inflation Factor values for all predictor variables ranged from 2.184 to 2.612, below the recommended threshold of 5.0, indicating no problematic collinearity. The coefficient of determination for organisational performance was 0.728, indicating that the dimensions of digital transformation jointly explained 72.8% of the variation in organisational performance. The effect size values revealed that digital innovation capability recorded the highest effect (f^2 = 0.301), followed by digital skills and competence (f^2 = 0.269), digital technology integration (f^2 = 0.214), and digital infrastructure adoption (f^2 = 0.187). The Q^2 value of 0.511, being greater than zero, confirmed the predictive relevance of the structural model.

4.3 Hypotheses Testing

Table 5 presents the structural path coefficients and hypothesis test outcomes. Model fit indices were SRMR = 0.075, NFI = 0.918, and RMS-theta = 0.104, all within acceptable ranges.

Table 5. Structural Path Coefficients and Hypotheses Testing

Hypothesis	Path	β	t-value	p-value	Decision
H_{o1}	Digital Infrastructure Adoption → Organisational Performance	0.087	1.421	0.156	Not Supported
H_{o2}	Digital Technology Integration → Organisational Performance	0.113	1.884	0.063	Not Supported
H_{o3}	Digital Skills and Competence → Organisational Performance	0.326	5.768	0.002	Supported
H_{o4}	Digital Innovation Capability → Organisational Performance	0.401	7.214	0.000	Supported

Source: PLS-SEM output, 2026. Model fit: SRMR = 0.075; NFI = 0.918; RMS-theta = 0.104.

4.4 Discussion of Findings

The findings revealed that digital infrastructure adoption had a positive but statistically insignificant effect on organisational performance (β = 0.087, t = 1.421, p = 0.156), and the null hypothesis was therefore not rejected. This implies that although the adoption of digital infrastructure — including reliable internet connectivity, digital platforms, institutional information systems, cloud-based resources, and technological facilities — provides the foundation for digital transformation, its availability alone does not automatically translate into improved organisational performance. This finding is consistent with studies emphasising that digital infrastructure serves as an enabling factor rather than an automatic driver of institutional performance. Bond et al. (2021) argued that the effectiveness of digital technologies in higher education depends on institutional readiness, staff competence, and the integration of digital systems into existing academic and administrative processes, while Benavides et al. (2021) noted that technological infrastructure alone is insufficient unless supported by appropriate organisational capabilities and strategic implementation.

Digital technology integration likewise had a positive but statistically insignificant effect on organisational performance (β = 0.113, t = 1.884, p = 0.063), so the corresponding null hypothesis was not rejected. This suggests that although integrating digital technologies into institutional operations — electronic learning platforms, management information systems, online communication platforms, and digital administrative systems — has the potential to improve organisational effectiveness, such integration alone may not significantly enhance institutional performance. The result aligns with empirical work indicating that digital technology integration does not automatically translate into improved organisational outcomes without complementary organisational capabilities; Benavides et al. (2021) found that the impact of digital transformation initiatives in higher education depends on the extent to which digital technologies are embedded into institutional strategies and supported by organisational processes. It is worth noting that this coefficient approached conventional significance, suggesting the effect may be detectable in a larger sample.

Conversely, digital skills and competence had a positive and statistically significant effect on organisational performance (β = 0.326, t = 5.768, p < 0.01), leading to rejection of the null hypothesis. The finding implies that the availability of digitally competent academic and administrative personnel significantly enhances institutional performance by enabling effective utilisation of digital resources, facilitating technology-driven decision-making, and increasing the efficiency of academic and administrative processes. Digital transformation outcomes therefore depend strongly on staff members' knowledge, skills, and confidence in operating digital systems and adapting to emerging technologies. This is consistent with Bond et al. (2021), who reported that digital competence among university staff plays a critical role in the effective adoption of educational technologies, and with Mhlanga (2022), who found that digital literacy and technological competence significantly influence institutions' ability to maximise the benefits of digital innovations.

Finally, digital innovation capability exerted a positive and statistically significant effect on organisational performance (β = 0.401, t = 7.214, p < 0.001) — the strongest path in the model — and the null hypothesis was rejected. This indicates that institutions with stronger digital innovation capabilities are more likely to achieve improved organisational performance through the development of innovative digital solutions, adaptation to technological change, enhancement of institutional processes, and creation of more effective approaches to teaching, administration, and stakeholder engagement. The finding aligns with Benavides et al. (2021), who noted that universities achieve greater value from digital transformation when they develop capabilities supporting innovation and effective technology utilisation, and with Alenezi (2023), who highlighted that digital innovation initiatives enable higher education institutions to improve operational effectiveness and create new models of academic and administrative service delivery.

Read together, the four results describe a coherent pattern: the technological dimensions of the TOE framework (infrastructure and integration) were not by themselves sufficient to move institutional performance, whereas the organisational dimensions (competence and innovation capability) were. This ordering — with effect sizes rising monotonically from infrastructure (f^2 = 0.187) through to innovation capability (f^2 = 0.301) — suggests that in this setting technology functions as a necessary substrate whose returns are realised only through human and organisational capability.

5. CONCLUSION AND RECOMMENDATIONS

The adoption of digital transformation initiatives represents an important pathway for improving organisational performance in public higher educational institutions. The findings revealed that digital skills and competence and digital innovation capability had significant positive effects on organisational performance, while digital infrastructure adoption and digital technology integration had positive but insignificant effects. This indicates that the effectiveness of digital transformation depends not only on the availability of digital technologies and infrastructure but also on the capacity of institutions to develop human capabilities and innovative approaches for utilising these technologies effectively. It was therefore concluded that digital transformation has a statistically significant effect on organisational performance in

public higher educational institutions, operating principally through competence and innovation capability.

Based on these findings, the following recommendations are advanced. First, public higher educational institutions should prioritise the development of digital skills and competencies among academic and administrative staff through continuous digital capacity-building programmes, professional development workshops, and technology-focused training initiatives. Second, institutions should strengthen their digital innovation capabilities by establishing structures that encourage technology-driven innovation, including innovation centres, digital transformation committees, and technology incubation initiatives that support the development and implementation of innovative digital solutions. Third, institutions should move beyond digital infrastructure acquisition towards the strategic utilisation and integration of digital technologies, since acquiring infrastructure or introducing digital systems is insufficient without effective utilisation strategies. Fourth, government and institutional policymakers should provide sustainable support for digital transformation initiatives by improving funding for digital infrastructure maintenance, internet connectivity, power supply, cybersecurity systems, and access to modern digital resources.

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