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Cost, Time and Quality Performance in Tertiary Institution Construction Projects in Nigeria: Drivers, Indicators and Implications for Procurement Reform

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Abstract

Persistent cost overrun, schedule delay and quality failure in Nigerian tertiary institution construction projects represent a long-standing governance and procurement challenge. This study examines cost, time and quality performance indicators in tertiary institution construction projects in South-South, Nigeria, identifies their principal drivers, and develops implications for procurement reform. A quantitative cross-sectional survey was conducted with 310 construction professionals, comprising architects, builders, quantity surveyors, civil and structural engineers, and project managers, drawn from federal and state tertiary institutions across six South-South states. Data were collected through a structured five-point Likert-scale questionnaire and analysed using descriptive statistics, the Relative Importance Index (RII), and Spearman rank-order correlation. Schedule overrun (RII = 0.842), cost overrun (RII = 0.822) and rework frequency (RII = 0.808) emerged as the most critical performance challenges. Spearman correlation confirmed significant positive relationships between post-contract monitoring, procurement strategy alignment, contractor prequalification, and PPA 2007 compliance with all three performance dimensions at $p < 0.001$. Post-contract monitoring recorded the strongest correlation with quality performance ($r = 0.688$). Findings support targeted procurement reforms encompassing structured strategy selection, rigorous contractor prequalification, PPA 2007 enforcement, and the establishment of

dedicated project monitoring units in institutional works departments. This study contributes original sub-regional empirical evidence on the tripartite performance of tertiary institution construction projects in Nigeria and advances a procurement reform framework grounded in field data from South-South institutions.

Keywords: Construction project performance; procurement reform; tertiary institutions; Public Procurement Act.

1.1 Introduction

The performance of construction projects commissioned by tertiary institutions in Nigeria has emerged as a critical policy and professional concern. In spite of the huge capital investment in this sector through the Tertiary Education Trust Fund (TETFund) and the institutional budgets, empirical evidence consistently shows that construction projects in this sector do not meet the set cost, time and quality benchmarks (Adedokun et al., 2022; Bamidele et al., 2019; Mangvwat et al., 2020). The consequences are manifold: dilapidated academic infrastructure, increasing public expenditure, project abandonment and a structural mismatch between capital outlay and educational service delivery outcomes.

The tripartite framework of cost, time and quality is recognised worldwide as the base criterion to measure the success of construction projects (Chan et al., 2002). This framework, often referred to as the “iron triangle”, provides a systematic basis for measuring project performance against contractual commitments and client expectations. However, the application of these performance criteria in tertiary institution projects in the Nigerian public sector is inconsistent, poorly enforced and rarely followed by systematic post-project evaluation (Ekung et al., 2017; Michell et al., 2007). The result is a pattern of chronic underperformance repeated in successive cycles of capital budgeting.

Nigeria's South-South geopolitical zone, comprising Akwa Ibom, Cross River, Rivers, Bayelsa, Edo, and Delta states, hosts a significant concentration of federal and state tertiary institutions with active construction programmes. Yet empirical studies examining the performance dynamics of construction projects within this sub-regional institutional context remain limited (Ogbu & Imafidor, 2020). The scarcity of context-specific data constrains the capacity of institutional managers, procurement practitioners, and policymakers to design evidence-based interventions.

Beyond documenting performance gaps, this study advances a procurement reform orientation by linking observed performance deficits to identifiable drivers, including procurement strategy misalignment, weak contractor prequalification, non-compliance with the Public Procurement Act (PPA) 2007, and inadequate post-contract monitoring. This framing reflects a growing consensus in construction management literature that systemic performance

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failure in developing economy public sectors is fundamentally a procurement governance problem, not merely a technical construction challenge (Moneke, 2020; Maduekeh & Obinwa, 2022; Yahaya *et al.*, 2019).

This study therefore sets out to (i) assess cost, time, and quality performance indicators in tertiary institution construction projects in South-South, Nigeria; (ii) identify the principal procurement-related drivers of performance outcomes; and (iii) derive implications for procurement reform in the tertiary education construction sector. The findings advance sub-regional empirical knowledge and provide actionable guidance for institutional reform.

2 Literature Review

2.1 Theoretical Framing: Procurement Governance and Project Performance

The relationship between procurement governance and construction project performance is theoretically grounded in principal–agent theory and institutional economics (North, 1990). In the public sector context, the client (principal) delegates project delivery authority to procurement agents, including consultants, contractors, and institutional works departments, whose actions and incentives are not always aligned with performance objectives. Information asymmetry, weak monitoring mechanisms, and inadequate enforcement of contractual obligations create conditions under which cost, time, and quality deviations accumulate without correction (Moneke, 2020; Adedokun *et al.*, 2019).

The 'iron triangle' of cost, time, and quality, as articulated by Chan *et al.* (2002), provides the empirical framework for operationalising project performance in this study. Within the Nigerian tertiary education sector, this framework has been applied in multiple studies (Oladinrin *et al.*, 2013; Bamidele *et al.*, 2019; Meshram *et al.*, 2020), each documenting significant performance shortfalls attributable to procurement and institutional governance weaknesses. This study extends that tradition by integrating a procurement reform dimension, examining how specific procurement variables mediate performance outcomes.

2.2 Cost Performance in Tertiary Institution Construction Projects

Cost performance is how well a construction project stays within its budget. It is measured through indicators such as cost overrun magnitude, budget adherence, unit cost deviation from benchmarks, variation order impact, and the cost effects of delayed payment (Oladinrin *et al.*, 2013; Chan *et al.*, 2002). In Nigerian public tertiary institutions, cost overruns are endemic. Adedokun *et al.* (2022) documented pervasive risk-related cost escalation in public tertiary education projects, attributing it to inaccurate initial estimates, scope creep, delayed TETFund approvals disrupting contractor cash flow, and the procurement of contractors without adequate financial capacity.

Mangvwat *et al.* (2020) demonstrated that fixed-price building contracts in tertiary institutions in Plateau State recorded significant cost escalations arising from inaccurate tender estimates and unsupported contingency allocations. Zadawa *et al.* (2018) identified fraudulent procurement practices, including bid rigging and contract inflation, as among the most critical drivers of cost non-performance in Nigerian public procurement. These findings underscore that cost performance in this sector is not merely a technical budgeting challenge but a procurement governance failure with identifiable institutional and behavioural antecedents.

2.3 Time Performance in Tertiary Institution Construction Projects

Time performance denotes the extent to which project completion conforms to the contractually agreed schedule. Its principal indicators include schedule overrun frequency, delayed payment-induced work stoppages, the adequacy of pre-commencement planning, and the impact of regulatory approval delays (Ekung *et al.*, 2017; Lee *et al.*, 2005). Bamidele *et al.* (2019) established that tertiary institution construction projects in Nigeria are characterised by persistent schedule overruns, linking this pattern to the delayed disbursement of TETFund allocations and non-compliance with procurement transparency requirements that foster corruption and delay contract initiation.

Muhktar *et al.* (2021) identified delayed payment, incomplete designs, and delayed regulatory approvals as the leading time-performance drivers in tertiary education sector projects in North-East Nigeria. Ogbeifun and Pretorius (2022) attributed delayed project completion to weak post-contract management, particularly inadequate monitoring and delayed certification, which allows time overruns to accumulate unchecked. The systemic nature of these delays points to procurement workflow failures at multiple stages of the project lifecycle, from design completeness at tender to payment administration during execution.

2.4 Quality Performance in Tertiary Institution Construction Projects

Quality performance is the extent to which a finished building meets design specifications, functional requirements, and relevant standards (Michell *et al.*, 2007; Ikediashi *et al.*, 2012). In the Nigerian public sector context, quality performance is compromised by the use of substandard materials, inadequate site supervision, rework arising from specification non-conformance, and limited institutional capacity for quality assurance. Maduekeh and Obinwa (2022) identified the absence of professional engagement in project supervision and the procurement of substandard materials as the most prominent quality performance challenges in Nigerian tertiary institution construction projects.

Ling (2004) demonstrated that rework, driven by specification deviation and inadequate quality control, is a primary driver of both quality failure and cost escalation in public construction projects. In the tertiary institution context, the absence of dedicated quality

assurance units within works departments means that specification deviation frequently goes undetected until significant cost and time penalties have accumulated. Meshram *et al.* (2020) positioned rework frequency and specification conformance as the two most critical quality performance indicators in public construction, a finding that resonates strongly with the Nigerian tertiary institution context.

2.5 Performance Variables: A Synthesis from Literature

A systematic review of the literature was conducted to identify cost, time, and quality performance variables, their categories, sub-indicators, and empirical sources. Table 1 presents the synthesised framework of variables.

Table 1: Cost, Time, Quality and Procurement Reform Performance

S/N	Performance Dimension	Category	Sub-Indicator	Source(s)
1	Cost Performance	Budget overrun / adherence	Budgetary compliance; final cost vs. approved estimate	Chan <i>et al.</i> (2002); Oladinrin <i>et al.</i> (2013); Adedokun <i>et al.</i> (2022)
2	Cost Performance	Variation order impact	Cost escalation from scope and design changes	Mangvwat <i>et al.</i> (2020); Meshram <i>et al.</i> (2020)
3	Cost Performance	Unit cost benchmark deviation	Cost per functional unit against industry norms	Oladinrin <i>et al.</i> (2013); Lee <i>et al.</i> (2005)
4	Cost Performance	Delayed payment–cost nexus	Cost escalation from disrupted contractor cash flow	Muhktar <i>et al.</i> (2021); Ogbeifun & Pretorius (2022)
5	Time Performance	Schedule overrun frequency	Completion time relative to contractual duration	Bamidele <i>et al.</i> (2019); Ekung <i>et al.</i> (2017)
6	Time Performance	Delayed payment–time nexus	Work stoppages driven by payment delays	Muhktar <i>et al.</i> (2021); Ogbeifun & Pretorius (2022)
7	Time Performance	Pre-commencement planning adequacy	Design completeness and mobilisation readiness	Adedokun <i>et al.</i> (2019); Mangvwat <i>et al.</i> (2020)
8	Time Performance	Regulatory approval delays	TETFUND/BPP approval bottlenecks extending duration	Bamidele <i>et al.</i> (2019); Moneke (2020)
9	Quality Performance	Specification conformance	Completed work vs. approved design drawings	Michell <i>et al.</i> (2007); Ikediashi <i>et al.</i> (2012)
10	Quality Performance	Rework frequency	Incidence of defects requiring re-execution	Meshram <i>et al.</i> (2020); Ling (2004)
11	Quality Performance	Use of substandard materials	Procurement of non-compliant construction materials	Maduekeh & Obinwa (2022); Zadawa <i>et al.</i> (2018)

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12	Quality Performance	Client / user satisfaction	Functional fitness-for-purpose of completed facility	Chan <i>et al.</i> (2002); Navarre & Schaan (1990)
13	Procurement Reform	Procurement strategy alignment	Fit between project type and delivery strategy	Oladinrin <i>et al.</i> (2013); Hosseini <i>et al.</i> (2016)
14	Procurement Reform	Contractor prequalification	Rigour of financial and technical capacity screening	Adedokun <i>et al.</i> (2019); Moneke (2020)
15	Procurement Reform	PPA 2007 compliance	Adherence to Public Procurement Act provisions	Moneke (2020); Maduekeh & Obinwa (2022)
16	Procurement Reform	Post-contract monitoring	Site supervision and contract administration quality	Ogbeifun & Pretorius (2022); Yahaya <i>et al.</i> (2019)

Source: Authors' Compilation from Literature Review (2026)

As shown in Table 1, the study operationalises 16 variables across four dimensions: cost performance (4 variables), time performance (4 variables), quality performance (4 variables), and procurement reform indicators (4 variables). The procurement reform dimension, encompassing procurement strategy alignment, contractor prequalification, PPA 2007 compliance, and post-contract monitoring, reflects this study's analytical contribution relative to prior work that treats performance variables in isolation from their procurement governance antecedents (Oladinrin *et al.*, 2013; Ekung *et al.*, 2017).

2.6 Procurement Governance as a Driver of Performance Outcomes

The role of procurement governance in shaping construction project performance has been extensively documented. Oladinrin *et al.* (2013) found that procurement strategy type significantly influences cost, time, and quality outcomes in Nigerian building projects, with the design-build strategy demonstrating superior cost performance and construction management demonstrating stronger quality outcomes. Hosseini *et al.* (2016) identified criteria for selecting procurement strategies for infrastructure projects and argued that client objectives, project complexity, and risk allocation should guide strategy choice.

Moneke (2020) assessed the impact of PPA 2007 on construction project execution in South-East federal tertiary institutions and found that while the Act positively influences certain performance, particularly transparent tendering and contract documentation, significant compliance gaps persist in monitoring, contractor selection, and transparency. Maduekeh and Obinwa (2022) corroborated these findings, identifying corruption, high tendering costs, and limited professional participation as key impediments to PPA compliance in Nigerian tertiary institutions.

Adedokun *et al.* (2019) placed the bulk of performance challenges in building projects within the tertiary education sector on contractor-related issues, including poor financial capacity,

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inadequate technical expertise, and supply chain vulnerabilities, suggesting that prequalification failures generate cascading performance deficits. Yahaya *et al.* (2019) identified inadequate post-contract monitoring, weak enforcement of procurement guidelines, and manual tendering as current implementation challenges undermining procurement reform effectiveness in Nigeria's public sector. Akinradewo *et al.* (2022) further confirmed that while institutional compliance with PPA tenets is generally acknowledged, significant divergence persists across institution types, particularly with respect to monitoring and contract administration.

3. Research Methodology

3.1 Research Design and Approach

This study adopted a quantitative research approach using a cross-sectional survey design. The positivist epistemological stance underpinning this approach is consistent with the study's objective of systematically measuring performance indicators and statistically testing relationships between procurement governance variables and project outcomes (Blaxter *et al.*, 2001). The cross-sectional survey is particularly suited to this study because it enables the efficient collection of standardised data from geographically dispersed construction professionals across multiple institutions.

3.2 Population and Sample

The target population comprised construction professionals engaged in tertiary institution construction projects across the six states of South-South, Nigeria. These professionals are employed in or engaged by the Directorate of Physical Planning, Works Departments, and Procurement Units of federal and state universities, polytechnics, and colleges of education in the region. The enumeration of accessible professionals across 21 institutions in the study area established the total population at $N = 1,371$.

The sample size of $n = 310$ was determined using the Taro Yamane (1967) formula:

$$n = N / (1 + N \cdot e^2)$$

Where $N = 1,371$ and $e = 0.05$ (significance level), yielding $n = 310.08 \approx 310$. Proportionate stratified random sampling was applied across professional categories (construction experts, procurement personnel, consultants, and contractors) and across states, ensuring equitable subgroup representation consistent with Kish (1965).

3.3 Instrument Development and Validity

A structured questionnaire was developed as the primary data collection instrument. The instrument comprised four sections: (i) respondent demographic information; (ii) 18 items assessing cost, time, and quality performance indicators on a five-point Likert scale (1 = Strongly Disagree/Never; 5 = Strongly Agree/Always); (iii) 16 items on procurement governance factors; and (iv) 4 items on PPA 2007 compliance and its perceived performance influence. Item development was guided by the literature review and reviewed by three academic experts in construction management and procurement before field deployment. A pilot test involving 25 practitioners outside the main sample yielded a Cronbach alpha reliability coefficient of $\alpha = 0.83$, indicating acceptable internal consistency (Nunnally, 1978). All 310 distributed questionnaires were returned and found valid for analysis.

3.4 Data Analysis Methods

Data were analysed using three complementary statistical methods. First, descriptive statistics (frequencies, means, and standard deviations) characterised the respondent profile and performance indicator ratings. Second, the Relative Importance Index (RII) was computed for each performance indicator using the formula:

$$RII = \Sigma W / (A \times N)$$

Where ΣW = sum of all weights assigned by respondents, A = highest weight (5), and N = total number of respondents. RII ranges from 0 to 1, with higher values indicating greater relative importance. Third, Spearman's Rank Order Correlation (ρ) was used to examine relationships between procurement governance variables and each performance dimension. Spearman correlation is appropriate for ordinal Likert-scale data and is robust to non-normality (Field, 2013). Statistical significance was set at $\alpha = 0.05$ (two-tailed). IBM SPSS version 25 was used for all analyses.

4. Results And Discussion

4.1 Respondent Profile

All 310 distributed questionnaires were retrieved, representing a 100% response rate achieved through face-to-face administration. Table 2 presents the demographic profile of respondents.

Table 2: Demographic Profile of Respondents (N = 310)

Category	Sub-Category	Frequency	Percent (%)	Cumulative (%)
Qualification	HND	38	12.3	12.3
	B.Sc/B.Tech	72	23.2	35.5
	PGD	48	15.5	51.0
	M.Sc/M.Tech	91	29.4	80.4
	PhD	61	19.6	100.0
Professional Experience	1–5 years	44	14.2	14.2
	6–10 years	87	28.1	42.3
	11–15 years	98	31.6	73.9
	> 15 years	81	26.1	100.0
Professional Category	Architect	55	17.7	17.7
	Builder	74	23.9	41.6
	Quantity Surveyor	62	20.0	61.6
	Civil/Structural	68	21.9	83.5
	Engineer			
	Project Manager	51	16.5	100.0
Institution Type	Federal University	82	26.5	26.5
	State University	68	21.9	48.4
	Federal Polytechnic	62	20.0	68.4
	State Polytechnic	54	17.4	85.8
	College of Education	44	14.2	100.0

Source: Authors' Field Survey (2026)

As presented in Table 2, the majority of respondents held postgraduate qualifications, with M.Sc/M.Tech (29.4%) and PhD (19.6%) holders constituting 49.0% of the sample. This reflects the high academic calibre of construction professionals employed in the works departments of Nigerian tertiary institutions. In terms of experience, 57.7% of respondents had more than ten years of professional engagement in tertiary institution construction, a characteristic that substantially strengthens the reliability and validity of their performance assessments. Builders (23.9%) and civil/structural engineers (21.9%) formed the two largest professional categories, consistent with the staffing structure of Nigerian public works departments. The inclusion of respondents from all five institution types, federal universities, state universities, federal polytechnics, state polytechnics, and colleges of education, ensures the breadth needed for generalisation within the South-South zone.

4.2 Cost Performance Indicators

Table 3 presents the descriptive statistics and Relative Importance Index (RII) for cost performance indicators, ranked in descending order of significance. The results in Table 3 reveal that the extent of cost overrun on completed projects ranked first among cost

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performance indicators (mean = 4.11; RII = 0.822), followed by budget adherence relative to approved estimates (mean = 3.82; RII = 0.764) and unit cost deviation from benchmark (mean = 3.71; RII = 0.742). The overall mean RII for cost performance was 0.748, indicating that cost-related underperformance is a significant and widespread phenomenon in the study area. These findings are consistent with Adedokun *et al.* (2022), who documented pervasive risk-related cost escalation in public tertiary education projects in Nigeria, and with Mangvwat *et al.* (2020), who identified inaccurate initial estimates and inadequate contingency provision as primary cost performance drivers.

Table 3: Cost Performance

Cost Performance Indicator	Mean	SD	RII	Rank
Extent of cost overrun on completed projects	4.11	0.74	0.822	1st
Budget adherence relative to approved estimate	3.82	0.81	0.764	2nd
Unit cost deviation from benchmark standard	3.71	0.79	0.742	3rd
Impact of variation orders on final project cost	3.67	0.93	0.734	4th
Cost escalation attributable to delayed payment	3.60	0.95	0.720	5th
Adequacy of contingency provision in project budget	3.54	0.88	0.708	6th
Overall mean RII for cost performance	3.74	—	0.748	—

Source: Authors' Field Survey (2026). SD = Standard Deviation; RII = Relative

Importance Index

The relatively lower ranking of contingency provision adequacy (mean = 3.54; RII = 0.708) suggests that many tertiary institution projects enter execution without adequate financial buffers against inevitable cost uncertainties. The cost escalation attributable to delayed payment (mean = 3.60; RII = 0.720) underscores the disruption in cash flow caused by institutional payment delays, which leads to cost penalties for contractors, a cycle documented by both Muhktar *et al.* (2021) and Ogbeifun and Pretorius (2022). Together, these findings confirm that cost underperformance in this sector is a multi-causal phenomenon requiring procurement reform interventions at planning, tendering, and execution stages.

4.3 Time Performance Indicators

Table 4 presents the descriptive results and RII for time performance indicators. The frequency of schedule overruns had the highest RII of all 18 performance indicators in this study (mean = 4.21; RII = 0.842), making it the most important and common performance problem in South-South tertiary institution construction. This finding corroborates Bamidele *et al.* (2019) and Muhktar *et al.* (2021), both of whom identified schedule deviation as the dominant performance concern in this sector. The second-ranked indicator, delayed payment as a driver of work stoppages (mean = 3.98; RII = 0.796), confirms the critical payment administration pathway

through which institutional financial management failures transmit into construction schedule disruptions. The overall mean RII for time performance (0.759) was the highest of the three performance dimensions, indicating that schedule performance is the most acute dimension of underperformance in the study area.

Table 4: Time Performance

Time Performance Indicator	Mean	SD	RII	Rank
Frequency of schedule overrun on completed projects	4.21	0.69	0.842	1st
Delayed payment as driver of work stoppages	3.98	0.83	0.796	2nd
Effect of regulatory approval delays on schedule	3.88	0.77	0.776	3rd
Completion within mutually agreed project scope	3.72	0.86	0.744	4th
Adequacy of project planning at pre-commencement	3.55	0.91	0.710	5th
Contractor mobilisation time and readiness	3.44	0.94	0.688	6th
Overall mean RII for time performance	3.80	—	0.759	—

Source: Authors' Field Survey (2026)

The effect of regulatory approval delays on schedule (mean = 3.88; RII = 0.776) highlights the institutional bottleneck created when TETFund approvals, Board of Works endorsements, and Bureau of Public Procurement clearances are delayed, stalling project commencement and mid-project fund releases. Bamidele *et al.* (2019) linked this pattern to institutional governance deficits in TETFund's project approval and disbursement mechanisms. The relatively lower ranking of contractor mobilisation time (mean = 3.44; RII = 0.688) suggests that mobilisation readiness, while a contributing factor, is subordinate to the institutional and financial causes of schedule overrun, pointing clearly to demand-side governance reform rather than supply-side contractor interventions as the primary corrective priority.

4.4 Quality Performance Indicators

Table 5 summarises the descriptive results for quality performance indicators.

Table 5: Descriptive Statistics and RII for Quality Performance Indicators

Quality Performance Indicator	Mean	SD	RII	Rank
Rework / defect frequency on completed projects	4.04	0.76	0.808	1st
Conformance of completed work to design specifications	3.79	0.82	0.758	2nd
Level of client and end-user satisfaction with facility	3.70	0.87	0.740	3rd
Use of substandard or non-compliant materials	3.65	0.90	0.730	4th

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Compliance with health, safety and environmental standards	3.55	0.88	0.710	5th
Adequacy of site supervision throughout construction	3.48	0.93	0.696	6th
Overall mean RII for quality performance	3.70	—	0.740	—

Source: Authors' Field Survey (2026).

Rework/defect frequency ranked highest among quality performance indicators (mean = 4.04; RII = 0.808), followed by conformance to design specifications (mean = 3.79; RII = 0.758) and client/user satisfaction (mean = 3.70; RII = 0.740). The overall mean RII for quality performance (0.740) was the lowest of the three performance dimensions, suggesting that while quality underperformance is significant, it is perceived as slightly less acute than cost and schedule failures. This is, however, a relative assessment; an RII of 0.740 still represents a high-severity performance challenge.

The high rework frequency index (0.808) is particularly significant because rework is not merely a quality indicator; it is a performance multiplier that simultaneously generates additional cost and schedule penalties, amplifying deficits across all three dimensions of the iron triangle. This finding is consistent with Ling (2004) and Meshram *et al.* (2020), who positioned rework as a central driver of compounded project performance failure. The use of substandard or non-compliant materials (mean = 3.65; RII = 0.730) reflects the quality governance failure that occurs when contractor prequalification is inadequate and post-contract material inspection is weak, findings that directly implicate procurement reform as the appropriate corrective mechanism (Maduekeh & Obinwa, 2022). Site supervision adequacy recorded the lowest quality RII (0.696), consistent with Ikediashi *et al.* (2012), who noted the chronic under-resourcing of institutional site supervision functions in Nigerian public construction.

4.5 Procurement Governance Drivers: Spearman Correlation Analysis

To establish the statistical relationship between procurement governance variables and each performance dimension, Spearman rank-order correlation analysis was conducted. The hypotheses tested were that procurement strategy alignment, contractor prequalification, PPA 2007 compliance, and post-contract monitoring have no significant relationship with cost, time, and quality performance. Table 6 presents the results.

Table 6: Correlation between Procurement Governance and Project Performance

Variable Pair	r	p-value	N	Sig.	Decision
Procurement strategy alignment → Cost Performance	0.612	0.000	310	Sig.	H01 Rejected
Procurement strategy alignment → Time Performance	0.587	0.000	310	Sig.	H02 Rejected
Procurement strategy alignment → Quality Performance	0.643	0.000	310	Sig.	H03 Rejected
Contractor prequalification → Cost Performance	0.524	0.000	310	Sig.	H04 Rejected
Contractor prequalification → Time Performance	0.498	0.001	310	Sig.	H05 Rejected
Contractor prequalification → Quality Performance	0.571	0.000	310	Sig.	H06 Rejected
PPA 2007 compliance → Overall Performance	0.559	0.000	310	Sig.	H07 Rejected
Post-contract monitoring → Cost Performance	0.641	0.000	310	Sig.	H08 Rejected
Post-contract monitoring → Time Performance	0.674	0.000	310	Sig.	H09 Rejected
Post-contract monitoring → Quality Performance	0.688	0.000	310	Sig.	H10 Rejected

Source: Authors' Field Survey (2026). All correlations significant at $p < 0.05$ (two-tailed). Sig. = Statistically Significant.

The results in Table 6 demonstrate statistically significant positive correlations between all four procurement governance variables and each of the three performance dimensions, leading to the rejection of all null hypotheses. Post-contract monitoring recorded the strongest individual correlation in the analysis ($r = 0.688$, $p < 0.001$ with quality performance), confirming its centrality as a determinant of construction quality in tertiary institution projects. This finding resonates with Ogbeifun and Pretorius (2022), who established that inadequate post-contract monitoring is a primary driver of schedule overrun and quality failure in adequately funded Nigerian construction projects, and with Yahaya *et al.* (2019), who identified weak field monitoring by supervisory agents as a recurring implementation challenge in Nigerian procurement reform.

Procurement strategy alignment demonstrated strong positive correlations with quality ($r = 0.643$), cost ($r = 0.612$), and time ($r = 0.587$) performance, confirming that the selection of an appropriate procurement strategy is a foundational determinant of delivery outcomes across all three dimensions. This conclusion is consistent with Oladinrin *et al.* (2013), who found that the type of procurement strategy significantly influences performance in Nigerian building projects, and with Hosseini *et al.* (2016), who argued that strategy misalignment is a primary

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source of project performance risk. Contractor prequalification correlated significantly with all three performance dimensions. The strongest relationship was observed for quality performance ($r = 0.571$), confirming Adedokun *et al.*'s (2019) finding that contractor-related capacity deficits generate the most prominent performance challenges in tertiary institution building projects. PPA 2007 compliance recorded an overall performance correlation of $r = 0.559$ ($p < 0.001$), reinforcing Moneke's (2020) conclusion that compliance with the act measurably improves outcomes in construction project execution at federal tertiary institutions and Akinradewo *et al.*'s (2022) finding that institutional divergence in compliance levels produces measurable performance variation.

5. Implications For Procurement Reform

The convergence of RII findings and Spearman correlation results points clearly to procurement governance as the critical lever for improving construction project performance in Nigerian tertiary institutions. Table 7 creates the study's procurement reform implications, mapping identified performance gaps to recommended interventions and responsible actors.

Table 7: Procurement Reform Implications: Performance Gaps, Interventions and Responsible Actors

Reform Lever	Identified Performance Gap	Recommended Intervention	Responsible Actor
Strategy Alignment	Mismatch between project type and delivery strategy inflates cost and delays schedule	Adopt structured procurement strategy selection matrix tied to project complexity and value	Procurement units, Works Directors
Contractor Prequalification	Financially and technically weak contractors generate rework, overruns and abandonment	Enforce rigorous two-stage prequalification assessing past performance and financial capacity	Procurement committees, TETFUND
PPA 2007 Compliance	Non-compliance enables bid manipulation, inflated costs and quality compromise	Train procurement staff; institute external compliance audits post-award	BPP, Institutional management
Post-contract Monitoring	Weak field supervision allows specification deviation and delayed defect rectification	Establish dedicated project monitoring units staffed by certified professionals	Physical Planning, Works Departments
Payment Certification	Delayed payment drives schedule overrun and cost escalation via idle time and inflation	Implement milestone-based payment schedules tied to verified project progress	Finance departments, TETFUND

Source: Authors' Synthesis from Field Data and Literature (2026). BPP = Bureau of Public Procurement; TETFUND = Tertiary Education Trust Fund.

As Table 7 demonstrates, each of the four procurement governance variables examined in this study corresponds to an identifiable institutional reform lever. The gap in aligning procurement strategies, shown by the ongoing use of design-bid-build methods for complex, high-value institutional projects, requires a structured decision-support framework that matches delivery strategy to project characteristics (Hosseini *et al.*, 2016). The contractor prequalification gap, reflected in the significant correlation between prequalification rigour and quality performance ($r = 0.571$), requires a shift from compliance-based to performance-based prequalification, incorporating past project track records as mandatory evaluation criteria (Adedokun *et al.*, 2019).

The PPA 2007 compliance gap identified in this study corroborates the findings of Moneke (2020), Maduekeh and Obinwa (2022), and Akinradewo *et al.* (2022) in demonstrating that legislative procurement reform has not translated into consistent operational practice within Nigerian tertiary institutions. External compliance auditing, professional training for procurement staff, and the digitisation of tendering and contract management processes are the most actionable interventions for bridging this gap. The post-contract monitoring gap, the single strongest procurement governance driver identified in this study, demands the most urgent institutional response, including the establishment of dedicated project monitoring units with the staffing, authority, and resources to enforce contractual compliance throughout project execution.

6. Conclusion

This study assessed cost, time, and quality performance indicators in tertiary institution construction projects in South-South Nigeria, identified their procurement governance drivers, and derived implications for institutional reform. Three principal findings emerge from the analysis. First, construction projects in the South-South tertiary education sector demonstrate significant underperformance across all three dimensions of the iron triangle, with schedule overrun ($RII = 0.842$), cost overrun ($RII = 0.822$), and rework frequency ($RII = 0.808$) constituting the most critical challenges. Second, Spearman correlation analysis confirmed statistically significant positive relationships between all four procurement governance variables, procurement strategy alignment, contractor prequalification, PPA 2007 compliance, and post-contract monitoring and each of the three performance dimensions, establishing that performance failure in this sector is fundamentally a procurement governance problem. Third, post-contract monitoring emerges as the single most influential procurement reform lever, recording the strongest correlation with quality performance ($r = 0.688$) and significant relationships with cost and time performance.

These findings have direct practical implications for TETFund, the Bureau of Public Procurement, institutional management, and professional bodies. The endemic performance



deficits documented in this study are not inevitable features of construction in a developing economy context; they are the predictable outcomes of procurement governance failures that are remediable through targeted institutional intervention. Procurement strategy selection frameworks, rigorous two-stage contractor prequalification, enforced PPA 2007 compliance auditing, and dedicated post-contract monitoring units represent the four pillars of a reform agenda that this study's evidence base supports.

Future research should extend this framework to encompass all six geopolitical zones of Nigeria to enable comparative performance analysis and to validate the procurement reform implications across diverse institutional and regulatory contexts. Additionally, qualitative investigations through case studies and key informant interviews would complement the quantitative findings of this study by elucidating the institutional mechanisms and actor-level behaviours through which procurement governance failures translate into project performance deficits.

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