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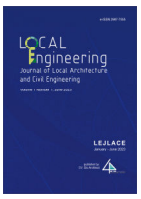

Architecture – Research Article

Impact of Risk Associated with Procurement Process on Cost Performance of Public Tertiary Education Institution Projects in Ondo State, Nigeria

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A B S T R A C T

The procurement process remains a critical component in determining the success of construction projects, especially in public institutions. This study evaluates the impact of risks associated with procurement processes on the cost performance of building projects in public tertiary education institutions in Ondo State, Nigeria. Data were gathered from 63 construction projects using structured questionnaires and a pro forma. Analytical tools employed include frequency, mean item score, Paired-Samples T-Test, Shapiro-Wilk Test, Kruskal-Wallis Test, Mann-Whitney U Test, and Cronbach's Alpha. Results revealed a statistically significant difference between initial and final project costs, with major procurement risks identified at the planning, specification, and bid evaluation stages. The study recommends stricter attention to procurement planning and risk assessment to improve cost performance in public building projects.

INTRODUCTION

Procurement in construction is an intricate process that involves coordination among multiple stakeholders to deliver built infrastructure. As defined by Masterman (1996), procurement refers to the organizational structure needed to design and build construction projects for a specific client. Similarly, The Aqua Group (2001) describes it as the process of obtaining goods and services for value.

In public construction projects, particularly within Nigeria's tertiary education institutions, procurement risks are critical because of the magnitude of government investments and the prevalence of cost overruns (Ewa 2013). Risk, as defined by Abba (2008), refers to events that could affect the achievement of project objectives. Chapman and Ward (1997) further categorize risk management into identification, evaluation, and control.

Despite the government's intervention in public projects, cost overruns remain frequent (Apolot and Sambasivan 2007). This study explores procurement-associated risks and how they influence cost performance in public tertiary institution projects in Ondo State.

Literature review

Theoretical overview of procurement in construction

Procurement in construction refers to the strategic processes by which construction-related goods, services, and works are obtained. It encompasses a wide range of activities including planning, tendering, contract negotiation, and project delivery. Masterman (1996) defines procurement as the organizational structure that enables the design and construction of projects for a specific client, highlighting its importance in shaping project outcomes. The Chartered Institute of Procurement and Supply (CIPS 2005) frames procurement as a business management function crucial for sourcing and managing external resources in alignment with an organization's strategic objectives. Thus,

procurement is not merely administrative; it is strategic and performance-defining.

Procurement systems vary in structure and suitability. Traditional systems separate design from construction, whereas integrated systems such as design-and-build promote streamlined decision-making and faster delivery (Naoum 1991). However, each system presents unique risk profiles, especially when improperly managed or mismatched to project types. According to Ogunsanmi (2013), the choice and implementation of procurement methods greatly influence project performance in terms of cost, time, and quality.

Procurement in the Nigerian context

The Nigerian construction sector has struggled with inefficient procurement practices, particularly in public sector projects. Mansfield, Ugwu, and Doran (1994) noted that Nigeria's construction industry is plagued by time and cost overruns, largely attributed to inconsistent procurement procedures, political interference, and poor contractor performance. (Kakwezi and Nyeko 2010) found that public entities frequently fail to comply with set procurement guidelines, resulting in irregularities and cost escalation. In the educational sector, where procurement is typically funded through government or agency allocations (e.g., Tet-fund), such inefficiencies can significantly affect infrastructure development and educational outcomes.

Research by Ewa (2013) underscores the critical role of procurement efficiency in delivering value from government investment in education. Lædre et al. (2006) argue that procurement procedures should be tailored to project-specific requirements to achieve performance goals. Unfortunately, a "one-size-fits-all" approach remains prevalent in many public institutions in Nigeria, resulting in systemic under-performance.

Risk in procurement processes

Risk in construction procurement is inevitable due to uncertainties inherent in construction activities and stakeholder relationships. Risk has been broadly defined as an uncertain event or condition that, if it occurs, has a positive or negative effect on project objectives (Chapman and Ward 1997). In the procurement context, risks can emerge at any stage: from misidentifying needs to poor contractor evaluation and weak contract administration.

Smith (1996) emphasized the need for robust risk identification and mitigation strategies during procurement, while Bunni (1985) and Abrahamson (1984), as cited in Murdoch, Hughes, and Champion (2008), categorize risks into physical risks, financial risks, legal risks, and external risks. These classifications help in structuring risk management practices during procurement. Risks associated with procurement have led to alternative strategies such as public-private partnerships (PPPs), turnkey contracts, and design-build models that shift or share risk responsibilities between parties.

A study by Sukulpat (2007) highlighted 17 key sources of procurement-related risks, including poor project definitions, inadequate contractor capabilities, and volatile economic conditions. These risks, if unmanaged, escalate into cost overruns, disputes, or even project abandonment.

Empirical studies on procurement risks and cost performance

Numerous empirical studies have documented the relationship between procurement risk and cost performance. Apolot and Sambasivan (2007) found that procurement delays and misjudged contractor selections were among the top causes of cost overruns in Ugandan public projects. Similarly, Odeyinka and Iyaba (2000) identified risk mismanagement during procurement as a critical cause of cost escalation in Nigerian construction projects.

Skitmore and Marsden (1988) found that vague bid documents and unclear evaluation criteria were major risk factors in procurement systems, leading to bidder confusion, underpricing, and subsequent contract variations. Rashid, Taib, and Zainordin (2006) argue that procurement structures that inadequately define responsibilities and evaluation frameworks invite subjective decision-making and increased financial risks. These findings are especially relevant in Nigeria’s context, where procurement often lacks transparency and is influenced by non-technical considerations (Ogunsanmi 2013).

In terms of quantitative metrics, Gido and Clements (2003) identify cost variance (CV) and cost performance index (CPI) as effective tools for measuring the impact of procurement inefficiencies. The Nigerian construction industry, according to Ogunsemi and Jagboro (2006), frequently records negative cost variances, signaling the need for tighter procurement controls.

Integrating procurement risk with cost performance

Procurement processes and cost performance are deeply interlinked. Poor procurement planning, unclear specifications, and misaligned contract conditions can directly lead to increased project costs (Le-Hoai, Lee, and Lee 2008). These linkages have been explored in studies by Azhar, Farooqui, and Ahmed (2008) and Nawaz et al. (2013), who conclude that effective procurement risk management significantly reduces cost overruns.

Kakwezi and Nyeko (2010) recommend process automation, transparent bid evaluations, and stakeholder training as vital steps toward minimizing procurement-related risks. In support, Batenburg and Versendaal (2006) argue that performance-oriented procurement not only improves cost outcomes but also enhances quality and delivery time.

Moreover, Project Management Institute (2015) emphasizes that procurement planning should involve cross-functional teams and be integrated into the overall project risk management framework. By conducting early risk assessments, projects can avoid scope creep, contractor default, and rework, all of which are known cost escalators.

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Gaps in literature and relevance to current study

While many studies have examined procurement systems and risks in general, few have investigated their direct impact on cost performance in public tertiary education construction projects a major area of government spending in Nigeria. Most existing research (Ogunsanmi 2013; Rashid, Taib, and Zainordin 2006) generalizes findings across sectors or focuses on private construction, leaving a contextual gap in public institutional procurement.

This study therefore contributes to knowledge by isolating procurement process risks and empirically measuring their effect on cost performance specifically within public tertiary institutions in Ondo State, Nigeria. It builds on established theories of procurement management, applies risk identification models, and utilizes statistical tools to produce context-specific recommendations.

METHODS

Research design and population

The study adopted a mixed-methods approach involving survey questionnaires and cost performance data from 63 construction projects. The study covered five institutions: Federal University of Technology Akure (FUTA), Adekunle Ajasin university Akungba-Akoko (AAUA), Adeyemi college of Education Ondo (ACEO), Ondo State University of Science and Technology Okitipupa (OSUSTECH), and Rufus Giwa Polytechnic Owo (RUGIPO). A total of 207 professionals (clients' reps, contractors, consultants) were sampled from a population of 452.

Data collection

Procurement risk data were collected via a structured questionnaire while initial and final costs were retrieved using a pro forma. Reliability testing using Cronbach's Alpha yielded a coefficient above 0.70, confirming consistency.

Analytical tools

The analysis involved descriptive statistics (frequency, MIS), Paired-Samples T-Test for cost comparison, Shapiro-Wilk test for normality, and Kruskal-Wallis and Mann-Whitney U tests for non-parametric comparisons (Pallant 2005; Tabachnick and Fidell 2001).

RESULTS AND DISCUSSION

This section presents the analytical outcomes derived from the quantitative data gathered through structured questionnaires and pro forma. The data were analyzed using descriptive and inferential statistical tools including Mean Item Score (MIS), Paired-Samples T-Test, Kruskal-Wallis Test, and Mann-Whitney U Test. The results are discussed in alignment with the research objectives, namely: (i) assessing procurement processes used in public tertiary institutions; (ii) identifying associated risks and their frequency; and (iii) determining the impact of these risks on cost performance.

Cost performance of public tertiary institution projects

The cost performance of the 63 building projects assessed was measured by comparing their initial estimates with final actual costs. A Paired-Samples T-Test was conducted to test for significant differences.

Result:

Mean Cost Deviation : 4.17%

T-value : 4.925

p-value : 0.000 ($p < 0.05$)

This statistically significant result indicates that most of the construction projects exceeded their budgeted cost, suggesting inefficiencies or mismanagement in the procurement or execution phases. According to the National Institute of Building Sciences (2013), a 2–3% deviation is generally acceptable, hence the observed deviation reflects only a moderate performance level.

Evaluation of procurement processes

Respondents assessed 11 procurement stages. The MIS was used to determine their significance. A benchmark MIS of 3.5 was set to indicate regular use.

Table 1. MIS ranking of procurement processes across stakeholders

Procurement process	MIS (Overall)	Rank
Identifying the Need and Planning the Procurement	4.34	1
Selecting the Procurement Method	4.26	2
Procurement Documentation	4.23	3
Evaluating Bids	4.19	4
Selecting the Successful Bidder	3.98	5
Negotiations	3.90	6
Contract Management	3.85	7
Disposals/Contract Close-out	3.54	8
Inviting, Clarifying, and Closing	3.49	9
Developing Specifications/Terms of Reference	3.49	9
Evaluating the Procurement Process	3.23	11

This indicates that while stakeholders regularly employ key procurement stages, later stages such as disposal and evaluation are less emphasized, which may explain why performance indicators like cost control are weak.

Frequency of risk occurrence by procurement stage

A total of 48 procurement-related risks were identified. The following risks showed the highest frequency of occurrence:

Table 2. Top frequently occurring risks

Risk factor	MIS (Frequency)	Rank
Insufficient Funding	4.14	1
Understatement of Need	3.54	2

Risk factor	MIS (Frequency)	Rank
Inadequate Statement of Requirements	3.33	3
Selecting Inappropriate Procurement Method	3.46	4
Providing Inadequate Information	3.67	5
Subjective Bid Evaluation	3.17	6
Selecting Inappropriate Product or Supplier	3.45	7
Failure to Reflect Agreed Terms in Contract	3.54	8
Price/Forex Variations	3.67	9
Inadequate Tender Management	3.56	10

While some of these risks such as inadequate specifications are procedural, others like funding and forex issues are structural, requiring systemic reform.

Impact of risks on procurement process

The same risks were rated based on their perceived impact on procurement effectiveness. Mann-Whitney tests were used to assess statistical gaps between frequency and impact scores.

Table 3. High-impact risk factors

Risk factor	MIS (Impact)	Gap (Impact - freq.)
Insufficient Funding	4.66	+0.52
Selecting Inappropriate Method	4.27	+0.81
Inadequate Statement of Requirements	3.82	+0.49
Failure to Reflect Terms in Contract	3.91	+0.37
Forex/Price Variations	4.40	+0.73
Subjective Evaluation	3.96	+0.79
Inadequate Tender Management	3.56	0.00

The large positive gaps between frequency and impact, especially for "Forex/Price Variations" and "Subjective Evaluation," imply that these risks are under-recognized in frequency but devastating in effect when they occur.

Relationship between procurement risk and cost performance

Respondents were also asked to assess how each risk factor influences cost performance specifically. Table 4 below summarizes the top risk factors affecting cost:

Table 4. Risk factors with highest impact on cost performance

Risk factor	MIS (Impact on cost)	Rank
Misinterpretation of Needs	4.50	1
Overstatement of the Need	4.33	2
Inadequate Statement of Requirements	4.30	3
Selecting Inappropriate Procurement Method	4.27	4
Price/Forex Variations	4.40	5
Unauthorized Scope Expansion	4.11	6
Commencement of Work Before Contract Finalization	3.94	7
Inadequate Contract Administration	3.88	8

These findings reveal a strong linkage between poor procurement risk management and negative cost outcomes. Notably, conceptual missteps such as misinterpreting or overstating needs are just as costly as logistical failures like contract mismanagement or forex shocks.

Discussion of key findings

This study reinforces previous research that links procurement-related inefficiencies with cost overruns in public sector construction (Odeyinka and Iyaba, 2000; Ogunsanmi, 2013). However, by focusing on tertiary education projects in Ondo State, this study offers a contextualized view.

Critical phases: The planning, specification, and evaluation phases of procurement emerged as critical. Failures in these early stages cascade into larger cost problems during implementation.

Stakeholder divergence: Kruskal-Wallis results reveal occasional divergence in how stakeholders perceive risk factors (e.g., understatement of needs), suggesting a lack of shared understanding among clients, contractors, and consultants.

Risk underestimation: Mann-Whitney results show that many low-frequency risks have high impact potential. This underscores the need for proactive not reactive risk management, even for rare events like contract disputes or product mismatch.

CONCLUSION

This study has demonstrated that procurement-related risks significantly affect the cost performance of public tertiary education building projects in Ondo State. Key procurement stages such as planning, specification development, and bid evaluation are especially prone to risks that escalate project costs. The statistical analysis confirmed widespread cost overruns linked to mismanagement and systemic inefficiencies. Divergent stakeholder perceptions further complicate risk mitigation efforts. Therefore, strategic procurement planning, transparent evaluation, and proactive risk management are essential. Strengthening institutional procurement frameworks will enhance cost control and improve project outcomes across the sector.

Recommendations

Based on the findings of the study, the following recommendations are proposed to address the risks associated with procurement and improve the cost performance of construction projects in public tertiary institutions:

Strengthen procurement planning capacities

The early stages of procurement particularly needs identification and planning are critical to project success. Institutions must invest in structured procurement planning that involves multidisciplinary teams, including end users, technical experts, and financial managers. This collaborative planning approach

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will reduce the risks of overstatement, understatement, or misalignment of project needs and specifications.

a. Introduce formal training for project initiators on how to translate functional needs into technical requirements.
b. Use standard procurement planning templates that enforce strategic alignment, cost realism, and scope clarity.

Institutionalize specification development standards

The study revealed that poorly developed specifications and vague terms of reference significantly contributed to cost overruns. Tertiary institutions should adopt standardized specification guidelines that are reviewed and validated by internal technical review boards before procurement initiation.

a. Encourage the adoption of industry best practices such as the Construction Specifications Institute (CSI) framework.
b. Require that all bid documents include performance-based specifications, which offer greater flexibility and reduce the risk of variation orders.

Improve transparency and objectivity in bid evaluation

Subjective and biased evaluation processes were identified as significant risk factors. Evaluation panels should be composed of trained, cross-functional personnel with no conflict of interest in the outcome. The use of weighted scoring systems, with publicly disclosed criteria, will also help curb favoritism and improve accountability.

a. Deploy electronic procurement platforms that automate bid comparison and scoring.
b. Require evaluators to submit justification reports for high-impact decisions, particularly in cases of disqualification or waiver.

Introduce procurement risk management frameworks

Institutions should embed a risk management component within their procurement units. This would involve systematic risk identification, classification, and treatment strategies for all projects above a certain financial threshold.

a. Develop a procurement risk register and update it regularly based on past project experiences.
b. Conduct periodic procurement risk audits and share results across institutions as part of a national benchmarking effort.

Address structural and macro-economic risk factors

While not all risks are internal to the institution, macro-level risks like forex instability and inadequate budget releases require mitigation strategies. Institutions must:

a. Include contingency allowances in project budgets (not exceeding 10%) to absorb macroeconomic shocks.
b. Push for legislative reforms that improve the timing and predictability of public fund disbursement, especially through engagement with TETFund and relevant regulatory bodies.

Monitor and evaluate procurement outcomes

Post-contract evaluations are essential for learning and continuous improvement. Institutions should create feedback loops where lessons learned from past procurements are documented, shared, and used to improve future projects.

a. Create a Procurement Performance Evaluation Committee (PPEC) for large projects.
b. Publish procurement performance reports annually, highlighting successes, challenges, and learning points

Promote stakeholder harmonization and communication

Divergent perceptions among clients, consultants, and contractors contribute to misalignments that exacerbate procurement risks. Institutions should establish integrated project teams and regular coordination meetings from pre-procurement to post-construction stages.

a. Adopt a stakeholder engagement framework that ensures all voices are heard at critical decision points.
b. Facilitate periodic procurement forums for all stakeholder categories within the state tertiary education sector.

Improving cost performance in public construction is not solely a technical challenge; it is fundamentally a governance issue. The procurement process, when treated as a strategic activity rather than a bureaucratic formality, can significantly reduce waste, improve project outcomes, and deliver value for money in Nigeria's public tertiary institutions.

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