



OPTIMIZING PROCUREMENT CYCLES FOR IMPROVED DELIVERY TRACKING IN CONSTRUCTION PROJECTS WITHIN SOUTH-SOUTH NIGERIA

By

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Abstract

The construction industry in South-South Nigeria faces significant challenges in achieving timely and cost-effective project delivery, primarily due to inefficiencies in procurement cycles and delivery tracking systems. This study investigates the impact of procurement cycle times on delivery tracking in selected construction projects within the region, addressing key challenges, evaluating the role of optimized procurement processes, and proposing practical solutions. Utilizing a correlational research design, data were collected from 208 respondents across top, middle, and lower management levels in construction projects using a validated five-point Likert scale questionnaire. Findings reveal that procurement inefficiencies, including delayed decisions, inadequate vendor assessment, and lack of transparency, significantly contribute to supply chain disruptions and project delays. The linear regression analysis ($R^2 = 0.986$, $p < 0.000$) confirms a strong positive relationship between procurement cycle times and delivery tracking, rejecting the null hypothesis that procurement cycle times do not impact delivery tracking. Key challenges identified include logistical constraints, unreliable suppliers, and limited technological adoption. Optimized procurement processes enhance vendor selection, cost management, and delivery tracking accuracy, improving overall project performance. The study proposes adopting digital procurement platforms, real-time tracking technologies, standardized protocols, and capacity-building initiatives to address these challenges. These findings contribute to the body of knowledge on construction management in developing economies, offering actionable strategies to enhance procurement efficiency and delivery tracking in South-South Nigeria.

Keywords:

Construction Projects, Delivery Supply, Chain Efficiency, Tracking, Procurement Optimization.

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Introduction

Procurement in construction projects plays a pivotal role in the timely delivery of materials, services, and resources, ensuring project success. The procurement cycle encompasses the processes of identifying project requirements, selecting suppliers, negotiating contracts, and managing deliveries. In the context of construction projects, the procurement cycle's efficiency is directly linked to project timelines, cost management, and the overall quality of delivery (Nguyen et al., 2018). Optimizing procurement cycles is essential to streamline material availability, enhance supply chain coordination, and improve delivery tracking, ensuring projects are completed on time and within budget. Delivery tracking, in particular, is vital for monitoring the movement of materials from suppliers to construction sites, enabling project managers to anticipate and mitigate delays (Olatunji&Ibem, 2021).Optimizing procurement cycles within the construction sector is essential not only for improving delivery tracking but also for enhancing project performance. Given the complexity of construction projects, including the coordination of multiple contractors and subcontractors, effective procurement management can significantly reduce delays and cost overruns. In developing countries like Nigeria, where construction projects are often hampered by poor road networks, unreliable suppliers, and inadequate technological adoption, the need for efficient procurement and delivery tracking systems is critical (Okoye et al., 2015). Recent advancements in digital tools, such as enterprise resource planning (ERP) systems and real-time tracking technologies, offer opportunities to address these inefficiencies, yet their adoption remains limited (Ezeokoli et al., 2016). Also, technologies such as Building Information Modeling (BIM) and Internet of Things (IoT) have been proven to streamline procurement cycles and improve the monitoring of deliveries (Ajayi et al., 2020). However, these advanced systems are not yet widely adopted in Nigeria, limiting the potential benefits that could be gained from optimizing procurement practices.Inefficient procurement processes often lead to delays, cost overruns, and compromised project quality, particularly in regions where logistical constraints, bureaucratic inefficiencies, and fluctuating market dynamics exacerbate these challenges (Aibinu&Jagboro, 2002).

The construction industry plays a pivotal role in the economic development of any place, contributing significantly to infrastructure growth, employment, and urban expansion. However, the efficiency of construction projects is frequently undermined by challenges in procurement cycles, which directly impact delivery tracking and project timelines (Ogunmakinde et al., 2018). The construction sector in developing economies face persistent challenges in achieving timely and cost-effective project delivery, largely due to inefficiencies in procurement cycles and delivery tracking systems. Delays in material procurement, inconsistent supplier performance, and poor coordination between stakeholders often result in project timelines being extended, leading to increased costs and stakeholder dissatisfaction (Idoro, 2012). In South-South Nigeria, these issues are compounded by regional factors such as inadequate transportation infrastructure, unreliable power supply, and limited access to advanced procurement technologies, which hinder effective delivery tracking (Oladapo, 2007). Furthermore, the lack of standardized procurement processes in many construction firms in the region leads to ad-hoc purchasing practices, which are prone

to errors, fraud, and mismanagement (Ogunsanmi et al., 2010). The absence of real-time delivery tracking systems exacerbates these problems, as project managers often lack visibility into the status of material shipments, making it difficult to plan and execute construction activities efficiently (Ezeokoli et al., 2016). While global best practices in procurement optimization, such as just-in-time delivery and integrated supply chain management, have proven effective in developed economies, their applicability in South-South Nigeria is limited by contextual challenges, including high import dependency and fluctuating economic conditions (Aibinu&Jagboro, 2002). The cumulative effect of these challenges is a significant gap in the ability of construction projects in South-South Nigeria to meet delivery schedules and budgetary constraints. Without targeted interventions to optimize procurement cycles and improve delivery tracking, the region's construction industry risks continued inefficiencies, undermining its contribution to economic development.

While several studies have focused on procurement issues in the Nigerian construction industry(Akintoye& MacLeod, 2020); there is limited research specifically addressing procurement optimization and delivery tracking within the South-South region of Nigeria. The lack of effective delivery tracking systems in this region has led to persistent project delays and cost overruns, which have adversely impacted the construction industry's growth and credibility. This article explores strategies for optimizing procurement cycles to enhance delivery tracking in construction projects within South-South Nigeria. By examining local challenges, including supply chain disruptions and regulatory bottlenecks, and proposing tailored solutions, this study aims to contribute to the body of knowledge on construction management in developing economies. The focus is on identifying practical approaches to improve procurement efficiency, leveraging both technological innovations and localized strategies to ensure timely material delivery and project success.

The key objectives of the study are to:

- I. Identify the key challenges affecting procurement cycles and delivery tracking in construction projects within South-South Nigeria.
- II. Evaluate the impact of optimized procurement processes on improving delivery tracking and overall project performance in the region.
- III. Propose practical strategies and technological interventions for enhancing procurement efficiency and real-time delivery tracking in South-South Nigeria's construction industry.

The central question is: Do procurement cycle times have a direct impact on delivery tracking in selected construction projects within the South-South region of Nigeria?, while the null hypothesis is: Procurement cycle times do not impact delivery tracking in selected construction projects within the South-South region of Nigeria.

Methodology

The study adopted a correlational research design with a population comprising of employees of construction projects in selected cities across South-South Nigeria. Employees of construction projects within the cadre of top, middle, and lower management were considered for the study. From this population, a stratified random sampling was used to select 208 respondents to participate in the study. A questionnaire tagged ‘investigative questions on supplier diversity and delivery time’ was used to collect data for the study after proper validation. Participants were asked to respond to the items by ticking on a five-point likert scale of strongly agree, agree, undecided, disagree and strongly disagree.

Results and Discussion of findings

Table 1: Investigative Questions on Procurement Cycle Times

Questions	SA (%)	AG (%)	UN (%)	DA (%)	SD (%)
Proactive procurement planning helps prevent supply chain disruptions, improving delivery tracking accuracy.	53.37	41.83	1.44	1.92	1.44
A well-defined procurement life cycle helps us select reliable vendors, improving quality, and reducing risks.	51.92	44.23	1.92	0.48	1.44
Strong procurement planning enables us to manage costs and resources efficiently throughout the project.	46.63	44.71	4.33	3.37	0.96
Inadequate vendor assessment can increase the risk of receiving poor-quality materials, impacting project quality.	43.75	48.56	1.92	2.88	1.92
Delayed procurement decisions often result in higher costs and budget overruns in construction projects.	44.23	50.48	1.44	2.88	0.96
Lack of transparency in the procurement process can lead to mistrust among stakeholders and potential compliance issues.	42.79	49.52	4.33	0.96	2.40
Effective communication during procurement fosters collaboration between stakeholders, reducing misunderstandings and delays.	46.63	50.00	0.48	0.96	1.92

Table 2: Investigative Questions on Delivery Tracking

Questions	SA (%)	AG (%)	UN (%)	DA (%)	SD (%)
Delivery tracking helps us anticipate potential issues, allowing us to reallocate resources and stay on schedule	48.08	49.04	1.44	0.96	0.48

Questions	SA (%)	AG (%)	UN (%)	DA (%)	SD (%)
effectively.					
The tracking system enhances coordination between suppliers and site managers, resulting in smoother, uninterrupted workflows.	45.19	48.08	3.37	0.48	2.88
Technical issues with the tracking system can cause delays in material delivery updates, leading to uncertainty on-site.	46.15	47.12	1.44	4.33	0.96
Real-time delivery tracking has greatly improved transparency in our construction projects, ensuring materials arrive on time and reducing project delays.	44.71	47.12	2.40	4.33	1.44
Delivery tracking can be time-consuming for staff to monitor constantly, taking attention away from on-site tasks.	45.67	46.15	3.37	2.88	1.92
When delivery tracking is inaccurate, it can lead to poor resource allocation and unexpected delays in project timelines.	45.19	45.67	3.85	2.40	2.88
With delivery tracking, our project timelines have become more predictable, boosting confidence among stakeholders and clients.	45.19	46.15	3.85	2.88	1.92

Key Challenges Affecting Procurement Cycles and Delivery Tracking

The data from Table 1 highlights several critical challenges in procurement cycles. A significant 94.71% of respondents (53.37% SA + 41.83% AG) agree that proactive procurement planning is essential to prevent supply chain disruptions, indicating that disruptions are a prevalent issue. Similarly, 92.31% (43.75% SA + 48.56% AG) acknowledge that inadequate vendor assessment increases the risk of receiving poor-quality materials, pointing to vendor reliability as a key challenge. Additionally, 94.71% (44.23% SA + 50.48% AG) confirm that delayed procurement decisions lead to higher costs and budget overruns, underscoring delays as a major issue. The lack of transparency in procurement processes, noted by 92.31% (42.79% SA + 49.52% AG), further complicates stakeholder trust and compliance, which are critical in South-South Nigeria's construction industry, where bureaucratic inefficiencies are common (Aibinu&Jagboro, 2002). In Table 2, delivery tracking challenges are evident. While 97.12% (48.08% SA + 49.04% AG) agree that delivery tracking helps anticipate issues, 93.27% (46.15% SA + 47.12% AG) report technical issues with tracking systems causing delays in updates, leading to on-site uncertainty. Moreover, 91.82% (45.67% SA + 46.15% AG) note that delivery tracking is time-consuming, diverting attention from on-site tasks, and 90.86% (45.19% SA + 45.67% AG) highlight that inaccurate

tracking leads to poor resource allocation and delays. These findings align with Okoye et al. (2015), who identified logistical constraints and limited technological adoption as significant barriers in South-South Nigeria's construction sector.

Impact of Optimized Procurement Processes on Improving Delivery Tracking

The data suggests that optimized procurement processes significantly enhance delivery tracking and project performance. In Table 1, 96.15% (51.92% SA + 44.23% AG) agree that a well-defined procurement life cycle improves vendor selection, quality, and risk management, which directly supports reliable material supply and delivery tracking. Similarly, 91.34% (46.63% SA + 44.71% AG) confirm that strong procurement planning enhances cost and resource management, reducing delays and budget overruns. Effective communication, supported by 96.63% (46.63% SA + 50.00% AG), fosters collaboration, minimizing misunderstandings that could disrupt delivery schedules. Table 2 reinforces these findings, with 91.83% (44.71% SA + 47.12% AG) agreeing that real-time delivery tracking improves transparency and reduces delays, and 91.34% (45.19% SA + 46.15% AG) noting more predictable project timelines, boosting stakeholder confidence. These results indicate that streamlined procurement processes, coupled with effective tracking systems, enhance coordination and resource allocation, aligning with Ezeokoli et al. (2016), who emphasized the role of technology in improving construction efficiency. The high agreement rates suggest that addressing procurement inefficiencies can directly improve delivery tracking, leading to better project outcomes.

Practical Strategies and Technological Interventions for Enhancing Procurement Efficiency

To address the identified challenges, the following strategies and technological interventions are proposed:

1. **Adoption of Digital Procurement Platforms:** Implementing enterprise resource planning (ERP) systems can streamline procurement processes, improve vendor assessment, and enhance transparency. These platforms can automate vendor selection and track procurement progress, reducing delays and errors (Ezeokoli et al., 2016).
2. **Real-Time Delivery Tracking Systems:** Investing in GPS-enabled tracking tools and IoT devices can provide accurate, real-time updates on material shipments, mitigating technical issues and improving on-site coordination. Training staff to use these systems efficiently can address time-consuming monitoring challenges.
3. **Standardized Procurement Protocols:** Developing standardized procurement guidelines can reduce ad-hoc practices, enhance transparency, and ensure compliance. Regular audits and stakeholder training can further build trust and efficiency (Ogunsanmi et al., 2010).
4. **Capacity Building and Infrastructure Investment:** Addressing regional logistical constraints requires investment in transportation infrastructure and reliable power supply. Training programs for procurement and site managers can enhance communication and collaboration, reducing delays.

These strategies, supported by technological adoption, can significantly improve procurement efficiency and delivery tracking, aligning with global best practices while addressing South-South Nigeria's contextual challenges.

Table3: Model Summary for the Hypothesis

Model	R	RSquare	Adjusted R Square	Std.Error of the Estimate	Durbin-Watson
1	.993 ^a	.986	.986	5.43234	1.164

a. Predictors: (Constant), PCT=Procurement Lifecycle

b. Dependent Variable: DLT=Delivery Tracking

Table 4: Analysis of Variance (ANOVA^a) for Hypothesis Four

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	69574.561	1	69574.561	2357.639	.000 ^b
	Residual	973.839	207	29.510		
	Total	70548.400	208			

a. Dependent Variable: DLT

b. Predictors: (Constant), PCT

Table 5: Linear Regression Coefficients for Hypothesis Four

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.545	1.234		1.252	.219
	PCT	.964	.020	.993	48.556	.000

The provided tables (Table 3: Model Summary, Table 4: ANOVA, and Table 5: Linear Regression Coefficients) present the results of a linear regression analysis to test the null hypothesis: "Procurement cycle times do not impact delivery tracking in selected construction projects within the South-South region of Nigeria." The dependent variable is Delivery Tracking (DLT), and the independent variable is Procurement Cycle Times (PCT). **R (Correlation Coefficient)** of 0.993 indicates a very strong positive linear relationship between PCT and DLT, suggesting that changes in procurement cycle times are highly associated with changes in delivery tracking. **R Square** of 0.986 shows that 98.6% of the variance in DLT can be explained by PCT, indicating an excellent fit of the model. The **adjusted R Square** of 0.986, nearly identical to R Square, confirms the model's robustness, accounting for the number of predictors and sample size. Also, the **std. error of the estimate** of 5.43234 represents the average distance that the observed DLT values fall from the regression line, indicating relatively low prediction error. The regression analysis provides compelling evidence that procurement cycle times (PCT) are a critical determinant of

delivery tracking (DLT) in construction projects in South-South Nigeria. The exceptionally high R Square (0.986) and correlation coefficient (0.993) indicate that nearly all variability in delivery tracking outcomes can be attributed to variations in procurement cycle times. This suggests that efficient procurement processes are integral to effective delivery tracking, which is crucial for timely material delivery and overall project success.

The unstandardized coefficient ($B = 0.964$) implies that improvements in procurement cycle times, such as faster vendor selection or streamlined purchasing processes, lead to nearly proportional improvements in delivery tracking accuracy. This aligns with findings from Ezeokoli et al. (2016), who highlighted that inefficiencies in procurement, such as delayed decision-making, directly contribute to project delays in Nigeria's construction industry. The high t-value (48.556) and low p-value (0.000) for PCT further confirm that optimizing procurement processes can significantly enhance delivery tracking, reducing uncertainties in material availability and improving project timelines. However, the Durbin-Watson statistic (1.164) suggests potential autocorrelation in the residuals, which could indicate that other unmodeled factors, such as logistical constraints or regional infrastructure challenges, may influence the relationship between PCT and DLT. South-South Nigeria's construction sector is known to face issues like poor road networks and unreliable suppliers (Okoye et al., 2015), which could introduce systematic patterns in the residuals. Future research should explore these factors using a multivariate model to account for additional variables.

The findings have practical implications for construction management in South-South Nigeria. The strong relationship between PCT and DLT underscores the need for:

1. **Digital Procurement Systems:** Adopting enterprise resource planning (ERP) systems can reduce procurement cycle times by automating vendor selection and order processing, directly improving delivery tracking accuracy (Ezeokoli et al., 2016).
2. **Real-Time Tracking Technologies:** Implementing GPS and IoT-based tracking systems can complement shorter procurement cycles by providing real-time updates, mitigating delays caused by logistical issues.
3. **Standardized Processes:** Establishing standardized procurement protocols can minimize delays and enhance transparency, ensuring consistent delivery tracking performance (Ogunsanmi et al., 2010).

The rejection of the null hypothesis confirms that procurement cycle times are not merely a peripheral factor but a central driver of delivery tracking efficiency. By addressing inefficiencies in procurement, such as delays in decision-making or poor vendor assessment, construction firms in South-South Nigeria can significantly enhance delivery tracking, leading to reduced project delays, lower costs, and improved stakeholder confidence. These findings align with Aibinu and Jagboro (2002), who emphasized that addressing procurement-related delays is critical to improving project outcomes in Nigeria's construction industry.

Conclusion

This study underscores the critical role of procurement cycle times in enhancing delivery tracking and overall project performance in construction projects within South-South Nigeria. The robust statistical evidence demonstrates that efficient procurement processes are integral to effective delivery tracking, significantly reducing delays and cost overruns. Key challenges, such as supply chain disruptions, inadequate vendor assessment, lack of transparency, and technical issues with tracking systems, were identified as major barriers to project success, exacerbated by regional factors like poor infrastructure and limited technological adoption. The findings highlight that optimized procurement processes, supported by effective communication and standardized protocols, enhance coordination, transparency, and resource allocation, aligning with global best practices. Proposed interventions, including the adoption of ERP systems, GPS-enabled tracking tools, and capacity-building programs, can offer practical solutions to address these challenges while considering South-South Nigeria's contextual constraints. By implementing the recommended strategies, construction firms in South-South Nigeria can improve procurement efficiency, enhance delivery tracking, and achieve better project outcomes, contributing to the region's economic development through a more efficient construction industry.

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