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IMPACT OF LOGISTICS FACTORS ON PROCUREMENT OF CONSTRUCTION MATERIALS IN LOKOJA, KOGI STATE

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ABSTRACT

This study investigates the influence of logistics factors on the procurement of construction materials in Lokoja, Kogi State, aiming to identify and rank the critical elements affecting material procurement in building projects. A total of 250 questionnaires were distributed across nineteen neighborhoods in Lokoja using a random sampling technique. Data were analyzed using descriptive statistics, while the T-test assessed the significance of identified logistics factors. The findings revealed that seventeen logistics factors influence material procurement, with seven factors emerging as the most significant: on-time delivery, transportation challenges, material misdelivery, delivery inaccuracies, order processing, storage capacity limitations, and ineffective information flow. These factors were ranked by their impact on procurement processes, with hypothesis testing confirming a statistically significant relationship between logistics factors and material procurement efficiency. The study concludes that effective management of key logistics factors is essential to avoid cost overruns, delays, and material wastage. It recommends that project managers prioritize better coordination among stakeholders to address logistics-related challenges, ensuring materials are delivered efficiently and on time.

Keywords: Logistics factor; Procurements; On time delivery; Information flows; Lokoja

1. INTRODUCTION

The construction sector plays a vital role in the global economy, employing over 100 million people and contributing significantly to the gross domestic product (GDP) of many nations. According to the Global Construction Market Prospect (2021), the industry accounts for approximately 15% of the world's GDP, with industrialized nations contributing 5% and developing countries contributing 8%. In Nigeria, a developing economy, the construction sector has seen notable growth in its GDP share. The National Bureau of Statistics (NBS, 2022) reports that the construction sector contributes 10% to Nigeria's GDP. Additionally, the industry recorded growth rates of 1.31% in Q4 2019, 3.18% in Q1 2019, and 1.69% in Q1 2020.

Despite this significant contribution, inefficiencies such as material waste, poor logistics systems, and supply chain delays continue to hinder the construction sector's overall productivity, particularly in developing countries like Nigeria. Addressing these issues through improved procurement and logistics systems is essential for enhancing overall productivity and efficiency.

Over time, researchers have highlighted numerous internal and external factors that influence construction projects, particularly in building construction. These factors include inadequate planning, material shortages, limited on-site availability, and insufficient participation in decision-making processes (Alaghbari et al., 2019; Momade & Hainin, 2018; Bekr, 2017).

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In recent studies, greater attention has been directed toward the role of logistics in construction project performance. Scholars such as Ohida et al. (2022), Umar (2022), Kabir (2023), Tarun et al. (2016), Chen et al. (2014), Fei et al. (2014), and Spillane et al. (2011) have examined how challenges like material storage, transportation delays, on-site handling inefficiencies, material misdelivery, and late deliveries adversely impact project outcomes.

Material procurement, which involves the selection, ordering, invoicing, payment, and delivery of construction materials, is a fundamental aspect of construction projects. Logistics, within the procurement process, ensures that materials are delivered on time, in good condition, and in a cost-effective manner. The logistics process ensures that materials are delivered efficiently on time, and in good condition, while minimizing costs and delays. Eze et al. (2020) emphasize that inefficient procurement processes are a primary cause of material waste and project delays, findings that align with earlier research by Aibinu and Odeyinka (2006).

Several logistics-related challenges affect material procurement efficiency. Key issues include vendor selection, transportation delays, poor material quality, slow decision-making processes, inaccurate forecasting, and communication gaps between contractors and suppliers. Additional barriers, such as limited road infrastructure and inadequate supply chain expertise, further exacerbate inefficiencies (Tunji-Olayeni et al., 2017; Simon-Eigbe et al., 2022; Kiromo, 2015; Shakantu et al., 2003; Almohsen & Ruwanpur, 2011; Fei et al., 2014; Susanne & Walther, 2017; Gunsanmi, 2013).

Lokoja, the capital of Kogi State, provides a pertinent case for exploring these challenges. The city's construction sector faces a variety of logistical obstacles, including fragmented communication, inconsistent material quality, order processing inefficiencies, and transportation delays. As a central hub connecting Nigeria's northern and southern regions, Lokoja's strategic importance is undermined by its insufficient transportation infrastructure, creating bottlenecks in material supply chains.

To address these concerns, effective management and coordination of logistics factors are essential for improving procurement efficiency and overall productivity in Lokoja's construction sector. A Empirical studies, including those by Tunji-Olayeni et al. (2017), demonstrate that challenges such as material quality issues, extended wait times, and transportation delays are significant contributors to procurement inefficiencies. Addressing these constraints can unlock greater project efficiency. Against this backdrop, this study employs a survey-based approach to analyze how logistics factors impact the procurement of construction materials in Lokoja, identifying key areas for improvement.

2. LITERATURE REVIEWS

2.1. Theoretical Review

To effectively understand the impact of logistics issues on the procurement of construction materials, it is essential to apply relevant management theories. One of the most widely accepted theories in this context is the Theory of Constraints (TOC). Introduced by Goldratt and Cox (1984), TOC suggests that any manageable system is constrained by a small set of limiting factors that restrict its ability to achieve intended goals. In the procurement context, these constraints often hinder the efficiency and effectiveness of material procurement processes.

According to TOC, a constraint refers to any factor that obstructs a system's ability to meet its objectives. Within the construction industry, such constraints include issues that disrupt the procurement system's efficiency. Empirical studies, including those by Tunji-Olayeni et al. (2017), demonstrate that challenges such as material quality issues, extended wait times, and

transportation delays are significant contributors to procurement inefficiencies. Addressing these constraints can unlock greater project efficiency.

Another valuable theoretical framework is the Transaction Cost Economic (TCE) theory, originally proposed by Coase (1937). TCE posits that the total cost of completing a project includes all related transaction costs, such as ordering, planning, procurement, tendering, and addressing delays. In the construction sector, these transaction costs encompass not only direct material expenses but also indirect costs, such as warehousing inefficiencies or late deliveries. Recent studies, such as Abdullateef et al. (2022), highlight how challenges in warehousing and transportation systems drive up procurement costs and delay project timelines.

The Contingency Theory, introduced by Fiedler in 1967, further underpins the study. This theory argues that there is no universally optimal way to manage organizations or processes. Instead, the effectiveness of any approach depends on specific internal and external conditions. In the procurement process, internal factors like budget constraints and quality standards interact with external factors such as supplier reliability and delivery efficiency, directly influencing procurement decisions.

Another framework frequently applied in project management research is Agency Theory, originally introduced by Berle and Means (1932). This theory examines conflicts of interest that arise when one party (the "agent") acts on behalf of another party (the "principal"). In construction projects, the site owner assumes the role of the principal, while the contractor functions as the agent tasked with executing the project. Conflicts occur when the agent's actions do not align with the principal's objectives, leading to inefficiencies. For example, Eze et al. (2020) report that misalignment in resource use often leads to delays and increased costs in construction projects.

2.2. Empirical Review

2.2.1. Assessing the Impact of Logistics Factors on Construction Project Performance

Chen et al. (2014) define the construction logistics process as involving several activities, including the supply of labor, machinery, and equipment, as well as plan control, data processing, material management on-site, infrastructure development, site arrangement, physical distribution, and information exchange. Empirical studies have demonstrated that improved logistics management reduces indirect costs associated with material handling and delivery, while also minimizing system inefficiencies caused by low productivity (Kabir, 2023; Ohida et al., 2022).

Extensive research highlights the significant impact of logistics factors on construction project performance. For instance, Simon-Eigbe et al. (2022) investigated building construction in Abuja and identified key challenges, including design changes, rising material costs, contract variations, slow decision-making, delayed variation orders, resource shortages, lack of skilled personnel, and inadequate coordination. These factors were found to be the primary contributors to project delays and inefficiencies.

In a study focusing on Canadian construction, Almohsen and Ruwanpur (2011) explored the role of modern technologies, particularly mobile applications, in logistics management. The study received strong positive feedback from industry professionals, who reported improved communication among stakeholders and enhanced efficiency in managing logistics. Similarly, Chen et al. (2014) analyzed logistical practices in U.S. engineering projects and emphasized the need for specialized distribution management teams. Their findings also identified research gaps, including insufficient exploration of procurement administration, order processing, transportation challenges, and information flows.

Rabiu (2023) examined the influence of logistics activities on construction project delivery in Nasarawa State. The study identified critical logistics activities, such as planning and risk assessment, sourcing and procurement, warehousing, and transportation management, as significant contributors to project success. High transportation costs emerged as a major obstacle to efficient logistics operations in the Nasarawa construction sector.

2.2.2. Influence of Material Procurement on Construction Project Performance

Material procurement plays a pivotal role in construction logistics, involving the strategic selection of suppliers to ensure that materials are delivered at the right price, time, quality, quantity, and source (Umar, 2022). Timely delivery of procured materials is a vital indicator of supply chain efficiency, contributing to client satisfaction and overall project success. As noted by Dalin and Kaptzan (2021), clients often evaluate procurement success based on delivery timeliness.

Delays in material delivery can have serious consequences. Emeka (2016) emphasizes that late deliveries disrupt project activities, leading to potential delays in overall project completion. Similarly, Van der Rhee et al. (2009) highlight that timely material delivery is a key factor in supplier selection, playing a critical role in ensuring construction project efficiency.

Olugbenga et al. (2013) compared various procurement methods in Nigeria and observed that traditional approaches remain the most commonly used, despite being less efficient than modern systems, such as construction management frameworks. Sung-Hoon and Umuhoza (2023) reached a similar conclusion in their study on Rwandan building projects, highlighting the positive influence of construction management systems on project quality and scope.

Anyanwu et al. (2021) investigated effective procurement tools for construction projects in Imo State, Nigeria. Their findings emphasized the importance of procurement specialists in ensuring high project delivery quality. Effective estimation and tendering practices were identified as critical factors for successful outcomes.

Muhammad (2022) explored material procurement risks in Abuja's construction industry. The study revealed that rigid design specifications, frequent order changes, inflation, and bad debt were major risks adversely affecting project cost, time, and quality performance.

2.2.3. Logistics Factors Influencing Building Materials Procurement

Several logistics-related factors significantly affect material procurement for construction projects. Transportation is particularly critical, as most construction materials are sourced externally rather than produced on-site. Transportation costs can account for 4-10% of the product's selling price and 39-58% of total logistics costs (Coyle et al., 1996). However, detailed cost breakdowns are rarely provided (Shakantu, 2003).

Material handling equipment also plays a significant role by ensuring the smooth movement of materials, minimizing manual labor, and improving construction site productivity.

Tunji-Olayeni et al. (2017) identified key logistics challenges in Nigeria, including low-quality materials, extended waiting times, inaccurate activity forecasting, inefficient transportation, and delayed material deliveries, all of which negatively affect construction site productivity.

In Nairobi’s construction industry, Kiromo (2015) found that transportation challenges such as road accessibility, depot distances, and site location were major barriers to material delivery, impacting supplier performance. Similarly, Tarun et al. (2016) categorized logistics factors into planning, conducting, administering, and closing procurement processes, identifying 38 parameters that influence procurement decisions.

Using Abuja's construction industry as a case study, Abdullateef et al. (2022) emphasized that transportation inefficiencies, warehousing problems, delivery inaccuracies, and poor forecasting were the most significant logistics issues affecting material procurement.

2.3. Theoretical Framework

This investigation is grounded in the concept of constraints, particularly in understanding how logistics factors influence the procurement of construction materials. The study hypothesizes that procurement processes are affected by multiple logistics factors, including order processing, transportation issues, delivery inaccuracies, and poor information flow. Each factor serves as a potential bottleneck, reducing the procurement system's ability to source, manage, and deliver materials efficiently. Inefficient procurement practices can result in cost overruns, project delays, and, in extreme cases, project abandonment.

3. RESEARCH METHOD

The data collection process took place over two days in each of the nineteen neighborhoods of Lokoja. With the help of three field assistants, data was collected to investigate how logistics components influence material procurement processes in construction projects.

The study population consists of construction professionals in Lokoja, Kogi State, including site managers, laborers, civil engineers, architects, surveyors, builders, contractors, project managers, and supervisors. To ensure fair representation, a simple random sampling method was adopted, distributing 250 questionnaires across the nineteen neighborhoods of Lokoja.

The questionnaire was structured into two sections. The first section gathered socioeconomic and demographic details about construction professionals, while the second focused on seventeen variables related to the influence of logistics components on material procurement. A five-point Likert scale was used to measure responses, where 1 represented "strongly disagree" and 5 represented "strongly agree." This scale provided a simple yet effective approach to capturing the perceptions and experiences of construction professionals in Lokoja.

To validate the internal consistency of the questionnaire, a pilot survey was conducted, where 10% of the total questionnaires were distributed. Respondents rated their level of agreement on logistics components influencing material procurement. Cronbach's alpha testing was performed in SPSS using a two-tailed hypothesis approach, ensuring the reliability of the instrument. Table 1 presents the pilot survey results, with Cronbach's alpha values ranging from 0.75 to 0.88. These values confirm strong internal consistency, as values between 0.70 and 0.80 are considered acceptable, while values above 0.80 demonstrate high reliability, according to Cho (2016).

Table 1 Cronbach Alpha Results

Variable	Cronbach's Alpha	Interpretation
On-time delivery	0.87	Good
Transportation challenges	0.83	Good
Delivering material to wrong location	0.78	Acceptable
Delivery inaccuracy	0.80	Good
Order processing	0.82	Good
Adequate storages for procured materials	0.84	Good
Information flows	0.86	Good
Quality of the procured material	0.85	Good
Variation in material	0.75	Acceptable
Poor coordination of logistics activities	0.77	Acceptable

Variable	Cronbach's Alpha	Interpretation
Effective estimation and tendering process	0.88	Good
Distance constraint from the suppliers to site	0.79	Acceptable
Longer time for procured materials received	0.81	Good
Difficulties in transporting small quantities	0.76	Acceptable
Inconsistency in order place	0.78	Acceptable
Poor administration of the procurements	0.83	Good
Forecasting construction activity period	0.85	Good

Source: Authors' Survey (2023)

Due to the high internal consistency demonstrated in the pilot survey, the selected research variables were used to finalize the questionnaire, which was then distributed among construction professionals in Lokoja.

Descriptive statistical tools such as frequency distributions, percentages, mean index scores, and ranking were employed to analyze the gathered survey data. Principal Component Factor Analysis was applied to reduce the seventeen logistics factors influencing material procurement into seven key components. These components were then subjected to hypothesis testing using T-test statistics to determine their significance in influencing procurement efficiency.

Lokoja, the capital of Kogi State, served as the study area. The city is located at coordinates 7.8023° N latitude and 6.7333° E longitude, spanning a total land area of 3,180 km² with a population of 195,261, according to the 2006 census (NPC). Lokoja is home to various ethnic groups, including the Oworo, Bassa Nge, Ebira, Igala, and Nupe, as well as minority groups like the Kupa-Nupe, Hausa, Igbo, Edo, and Tiv. The city's tropical wet and dry savanna climate is particularly favorable for construction activities, as high temperatures accelerate the drying of cement mortar, enhancing on-site productivity.

Lokoja's economy is bolstered by major markets, including the Kpata market, the old market, and the international market, as well as prominent institutions like the Federal University Lokoja and Kogi State Polytechnic. The combination of growing economic opportunities and the presence of higher education institutions has driven migration to Lokoja, increasing the demand for residential and commercial construction projects. Figure 1 illustrates the map of Kogi State, highlighting Lokoja as the study area.

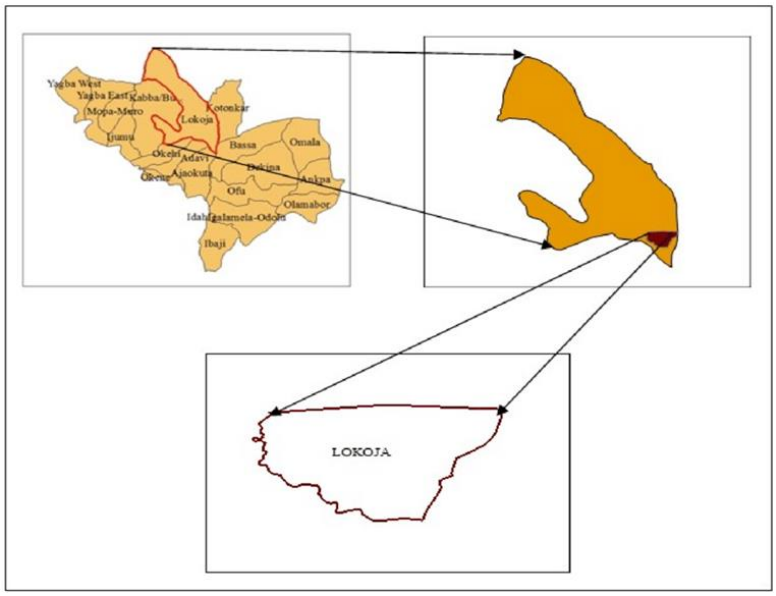

Figure 1 Map of Kogi State Showing Lokoja (Adopted from Thomas et al. 2019)

4. RESULTS AND DISCUSSION

4.1. Analysis of the Socioeconomic & Demographic Features

The analysis of Table 2 highlights the demographic characteristics of construction professionals surveyed. The majority of respondents (62.7%) were male, while females accounted for 37.3%. Over half of the participants (52.3%) are married, with 42.3% single and 5.4% divorced. In terms of age distribution, the largest group (29.9%) is aged 31-40 years, followed by those aged 20-30 (23.3%). Only 17.8% are under 20 years old. Participants aged 41-50 (11.6%), 51-60 (10.4%), and above 61 (7.0%) accounted for smaller proportions.

Table 2 Socioeconomic and Demographic Variables

S/n	Socioeconomic & Demographic Factor		Frequency	Percentages
1	Gender	Male	151	62.7
		Female	90	37.3
		N	241	100.0
2	Marital Status	Married	126	52.3
		Single	102	42.3
		Divorce	13	5.4
		N	241	100.0
3	Age of the Respondent (in years)	below 20	43	17.8
		20-30	56	23.3
		31-40	72	29.9
		41-50	28	11.6
		51-60	25	10.4
		Above 61	17	7.0
		N	241	100.0
4	Monthly Incomes Earned (in Naira)	Below 30,000	67	27.8
		30,000-90,000	39	16.2
		91,000-150,000	46	19.1
		152,000-211,000	55	22.8
		Above 212,000	34	14.1
		N	241	100.0
5	Educational Qualifications	No formal education	36	14.9
		Primary school Cert	21	8.7
		WAEC	48	19.9
		NCA/ND	49	20.3
		BSc/HND	59	24.5
		Postgraduate Cert	28	11.5
		N	241	100.0
6	Profession at the Site	Labourer	37	15.4
		Site manager	29	12.0
		Civil engineer	41	17.0
		Architects	25	10.4
		Surveyors	19	7.9
		Project manager	23	9.5
		Supervisor	15	6.2
		Contractor	32	13.3
		Builder	22	8.3
		N	241	100.0

S/n	Socioeconomic & Demographic Factor		Frequency	Percentages
7	Years of Experiences	1-5	24	9.9
		6-11	55	22.8
		11-16	52	21.6
		16-21	77	31.9
		Over 22	33	13.6
		N	241	100.0
8	No of Sites Work in the Past	1-10	44	18.3
		11-20	82	34.0
		20-30	61	25.3
		Above 31	54	22.4
		N	241	100.0

Source: Authors Field Survey (2023)

Table 2 further illustrates the income distribution of the surveyed construction professionals. The data show that 27.8% of the professionals earn less than N30,000 per month, while 22.8% earn between N152,000 and N211,000. Additionally, 19.1% of respondents earn between N91,000 and N152,000, while 16.2% earn between N30,000 and N90,000 per month. Only 14.1% of the professionals earn more than N212,000 monthly.

In terms of educational qualifications, the majority of professionals hold a Bachelor of Science (BSc) degree or Higher National Diploma (HND). Around 20.3% possess a National Certificate of Education (NCE) or National Diploma (ND), 19.9% have a West African Examination Council (WAEC) qualification, 14.9% reported having no formal education, 11.5% hold a Postgraduate Certificate, and 8.7% possess only a primary school certificate. This indicates that a substantial proportion of the respondents have attained higher educational qualifications.

Additionally, Table 2 shows the occupational breakdown of the participants: 17.0% are civil engineers, 15.4% are laborers, 13.3% are contractors, 12.0% are site managers, 10.4% are architects, 9.5% are project managers, 8.3% are builders, 7.9% are surveyors, and 6.2% are supervisors.

Regarding experience, 31.9% of professionals have between 16 and 21 years of experience in the construction industry, 22.8% have between 6 and 11 years, and 21.6% have between 11 and 16 years of experience. Meanwhile, 13.6% have more than 22 years of experience, while 9.9% have 1 to 5 years of experience.

In terms of the number of construction sites worked on, Table 2 reveals that most professionals (34.0%) have worked on between 11 and 20 sites, while 25.3% have worked on 20 to 30 sites. About 22.4% have worked on more than 31 sites, and 18.3% have worked on fewer than 10 sites.

4.2. Analysis of the Influence of Logistics Factor on Procurement of Building Construction Materials

The analysis of logistics factors influencing the procurement of building construction materials in Lokoja reveals that on-time delivery ranks as the most important factor. Ensuring timely delivery of materials is critical for reducing delays by 20-30%, thereby enhancing efficiency on construction sites (Bramble and Michael, 2000).

Following this, transportation challenges were ranked second. Transportation plays a vital role in moving procured materials from suppliers to construction sites. Chen et al. (2014) emphasize that efficient transportation is crucial for maintaining project schedules and minimizing disruptions.

However, issues such as incorrect deliveries, which may arise due to poor site descriptions, can significantly increase building project costs.

Delivering materials to the wrong location was ranked third, while delivery inaccuracies were ranked fourth. Both issues can lead to delays, additional costs, and inefficiencies in construction activities. Additionally, the ordering process was ranked fifth. A smooth and effective ordering process—where all required items are delivered on time and correctly—helps prevent disagreements and disruptions, ensuring that project timelines remain on track. Adequate storage for procured materials was ranked sixth. Poor storage facilities can adversely impact construction materials, particularly in environments with fluctuating temperatures, which may cause material degradation.

Finally, information flow and the quality of procured materials were ranked seventh and eighth, respectively. Effective information flow is essential for coordinating procurement activities, ensuring that materials are delivered from suppliers to the construction site on time and as specified. Meanwhile, maintaining material quality ensures consistency, minimizing wastage and rework during construction projects.

Table 3 Influence of Logistics Factor on Material Procurement

S/n	Criterion	Mean Index Score	Rank
1	Poor Order Processing	3.624	5th
2	Transportation Challenges	3.733	2nd
3	Delivering Material to Wrong Location	3.647	3rd
4	On Time Delivery	3.815	1st
5	Adequate Storages for Procured Materials	3.534	6th
6	Quality of the Procured Material	3.412	8th
7	Information Flows	5.510	7th
8	Delivery Inaccuracy	3.703	4th
9	Variation in Material	2.561	10th
10	Poor Coordination of Logistics activities	2.659	9th
11	Effective Estimation and Tendering Process	2.370	12th
12	Distance Constraint from the Suppliers to Site	2.358	13th
13	Longer Time for Procured Materials Received	1.283	16th
14	Difficulties in Transporting Small Quantities	2.418	11th
15	Inconsistency in Order Place	2.371	14th
16	Poor Administration of the Procurement	1.518	15th
17	Forecasting Construction Activity Period	1.280	17th

extraction method: principal component analysis
Source: Authors Contribution (2023)

In addition to the findings in Table 3, poor coordination of logistics activities was ranked ninth. Effective coordination of logistics operations is crucial in construction projects as it involves managing various tasks such as transporting materials from suppliers to construction sites and ensuring that project contract requirements are successfully fulfilled.

Other significant factors include variation in materials (ranked 10th), difficulties in transporting small quantities (ranked 11th), effective estimation and tendering processes (ranked 12th), and distance constraints from suppliers to the site (ranked 13th). These factors contribute to additional costs, time overruns, reduced productivity, and wasted resources, all of which can significantly hinder the success of construction projects.

Moreover, the analysis in Table 3 shows that inconsistency in order placement was ranked 14th, while poor administration of procurement processes was ranked 15th. Delays in receiving

procured materials ranked 16th, while forecasting construction activity periods was ranked 17th. These logistical challenges exacerbate project delays, increase costs, and introduce inefficiencies, highlighting the need for effective management strategies to address logistics-related issues in material procurement.

In conclusion, the Risk Vulnerability Index (RVI) analysis across both tables underscores significant risks related to both project roles and scope performance. Key areas such as end-user value, corporate leadership, and project monitoring/control have emerged as high-risk factors, necessitating focused attention from stakeholders to enhance overall project outcomes, particularly in mass housing infrastructure projects in Northern Nigeria.

4.3. Analysis of the Component Factor Analysis (CPFA)

The CFA analysis initially considered seventeen variables related to logistics challenges affecting material procurement, but only eight variables were extracted based on their statistical significance. These variables include on-time delivery with an eigenvalue of 9.625, transportation challenges at 7.232, delivering materials to the wrong location at 5.171, delivery inaccuracies at 4.994, order processing at 2.963, adequate storage for procured materials at 2.861, and information flows at 1.731. Each of these variables demonstrated a total explained variance greater than the threshold eigenvalue of 1, affirming their relative importance in the analysis. The cumulative variance explained by these factors is 79.8%, indicating that these logistics variables collectively account for a substantial proportion of the challenges associated with material procurement in building projects. The remaining variables, including variation in material, poor coordination of logistics activities, effective estimation and tendering processes, and distance constraints, did not meet the eigenvalue threshold and were excluded from further analysis. Table 4 details the Initial Eigenvalues and the Extraction Sums of Squared Loadings for each component.

Table 4 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
On time delivery	9.625	30.206	30.206	9.625	30.206	30.206
Transportation Challenges	7.232	10.263	40.469	7.232	10.263	40.469
Delivering material to wrong location	5.171	9.756	50.226	5.171	9.756	50.226
Delivery inaccuracy	4.994	8.285	58.510	4.994	8.8285	58.510
Order processing	2.963	8.024	66.534	2.963	8.024	66.534
Adequate storages for procured materials	2.861	7.173	73.707	2.861	7.173	73.707
Information flows	1.731	6.094	79.801	1.731	6.094	79.801
Quality of the procured material	.622	3.183	82.984			
Variation in material	.553	2.610	85.594			
Poor coordination of logistics activities	.486	2.053	87.647			
Effective estimation and tendering process	.437	2.642	90.289			
Distance constraint from the suppliers to site	.325	2.710	92.999			

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Longer time for procured materials received	.311	2.311	95.310			
Difficulties in transporting small quantities	.285	1.719	97.029			
Inconsistency in order place	.214	1.321	98.350			
Poor administration of the procurements	.189	1.211	99.561			
Forecasting construction activity period	.104	.439	100.000			

Extraction Method: Principal Component Analysis
Sources: Authors Contribution (2023)

4.4. Test of Hypothesis

The hypothesis of this study states: H_0: There is no statistically significant impact of the seven key logistics factors on the procurement of building materials in Lokoja. The results, as presented in Table 5, reveal that all seven logistics factors exhibit statistically significant T-values and P-values well below the 0.05 confidence level, indicating a strong influence on the procurement process. On-time delivery recorded the highest T-value of 45.326 with a P-value of 0.000, confirming its significant contribution to procurement efficiency. Similarly, transportation challenges had a T-value of 29.168 and a P-value of 0.000, reflecting its critical role in ensuring timely material movement to construction sites. The variable delivery inaccuracies was characterized by a T-value of 20.219 and a P-value of 0.000, showing the disruptive effects of incorrect deliveries on project timelines and costs.

For order processing, the analysis revealed a T-value of 18.543 and a P-value of 0.000, further emphasizing the importance of maintaining smooth and accurate ordering systems to prevent procurement delays. Additionally, adequate storage for procured materials showed a T-value of 10.992 and a P-value of 0.000, highlighting the need for proper storage facilities to preserve material quality and minimize wastage. Lastly, information flows yielded a T-value of 6.512 with a P-value of 0.000, demonstrating the essential role of effective communication in coordinating procurement activities and ensuring timely delivery of materials.

Table 5 T-test

	Test Value = 0					
	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
On time delivery	45.326	238	.000	3..571	3.985	3.443
Transportation challenges	29.168	238	.000	3.324	3.761	3.144
Delivering material to wrong location	24.181	238	.000	3.476	3.321	3.774
Delivery inaccuracy	20.219	238	.000	3.176	2.527	3.569
Order processing	18.543	238	.000	3.238	2.886	3.462
Adequate storages for procured materials	10.992	238	.000	3.286	3.384	3.973
Infromation flows	6.512	238	.000	3.352	3.210	3.380

Source: Authors Survey (2023

5. CONCLUSION

This study examined the impact of logistics factors on the procurement of building construction materials in Lokoja, Kogi State. Eight key factors were identified: on-time delivery, transportation challenges, incorrect delivery locations, delivery inaccuracies, order processing, adequate storage, and information flows. Hypothesis testing revealed a statistically significant relationship between these factors and material procurement efficiency, aligning with previous studies by Abdullateef et al. (2022), Tarun et al. (2016), Tunji-Olayeni et al. (2017), and Kiromo (2015), which similarly highlighted transportation issues, delays, and delivery inaccuracies as significant procurement challenges.

In conclusion, addressing these logistics factors is critical to minimizing cost overruns, reducing waste, and ensuring timely project delivery. To achieve this, project managers should implement a centralized procurement system supported by project management software with real-time tracking, which can streamline processes and reduce delays. Vendors must be provided with accurate delivery instructions using digital maps and GPS, with a system for confirming delivery locations through mobile platforms to avoid errors. Contractors with adequate financial resources should consider owning or leasing transportation vehicles to reduce dependency on third-party logistics providers; this should be complemented by staff training on vehicle operations and management. Furthermore, establishing effective communication channels through tools such as video conferencing, instant messaging, and shared platforms can minimize miscommunication and ensure accurate order processing. Finally, construction companies should invest in temporary storage solutions near project sites, such as weather-resistant and secure units, to protect materials from environmental damage and theft while ensuring easier accessibility during construction activities. By addressing these logistics challenges through targeted strategies, construction firms can significantly improve procurement efficiency, reduce project delays, and achieve successful project outcomes.

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