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ROAD TRANSPORT MANAGEMENT AND PROCUREMENT PERFORMANCE OF DANGOTE CEMENT COMPANY PLC GBOKO, BENUE STATE, NIGERIA

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ABSTRACT

This study examined the effect of road transport management procurement performance of Dangote Cement Plc, Gboko Benue State. Specifically, the study examined the effect of vehicle scheduling, route planning, vehicle tracking, vehicle disposal, and vehicle maintenance on procurement performance of Dangote Cement Plc, Gboko. The study adopted a case study research design. The population of the study was 164 staff drawn from management staff, unit heads, transport/logistic and procurement departments of the company. Census technique was adopted and data was collected through structured questionnaires. Data collected were analyzed using descriptive statistics and presented in form of tables, frequencies, simple percentage, means and standard deviation. Regression analysis was used to determine the effect of each transport management variable on procurement performance. Findings revealed that all the five road transport management dimensions had significant effect on procurement performance, with vehicle maintenance emerging as the most critical determinant (β= 0.606, t = 13.774, p = 0.000). Route planning follows in significance (β = 0.421, t = 9.648, p = 0.000), indicating that optimized travel routes enhance procurement efficiency. Vehicle scheduling also proves highly effective (β = 0.333, t = 7.635, p < 0.001), confirming the role of structured transport allocation in reducing delays. Vehicle tracking is found to be a significant but relatively weaker predictor (β = 0.184, t = 4.184, p = 0.002), highlighting the need for active utilization of tracking data beyond passive monitoring. Vehicle disposal, while the least influential, remains a significant factor (β = 0.109, t = 2.498, p = 0.014), suggesting that timely fleet renewal contributes to procurement efficiency over time. The study concluded that transport management has a significant positive effect on the procurement performance in Dangote Cement Plc, Gboko It is recommended that Dangote Cement Plc, Gboko, should institutionalize predictive vehicle maintenance systems, adopt AI-driven route optimization tools, streamline scheduling with transport management software, enhance tracking with automated analytics, and implement structured vehicle disposal policies.

KEY WORDS: Vehicle Scheduling, Route Planning, Vehicle Tracking, Vehicle Disposal, Vehicle Maintenance, Timely Delivery

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1.0 INTRODUCTION

1.1 Background of the Study

Organizations across the globe have overtime continuously acknowledge that performance remains the core focus for their establishment. In meeting with their set goals and targets, it is paramount of them to put in place all measures and machinery aimed at achieving performance especially procurement performance of manufacturing companies. More importantly, the manufacturing industry has at its core, procuring of almost all its resources from start to finish of the production process. Thus, transportation is key in the movement of inputs to the production site and in conveying finished products to the final consumers. One critical strategy in actualizing their procurement performance is road transport management (Kanyepe, 2023).

In developed economies such as the United States and across Europe, road transport management systems have been in use for several decades, allowing companies to manage procurement more efficiently (Smith, 2021; Johnson and Taylor, 2022). Asia, especially countries like Japan and China, have adopted transport management solutions more aggressively in recent decades. The rise of major manufacturing hubs in this region has driven the need for efficient transport systems (Nakamura, 2020; Chen and Wang, 2023). These measures directly enhance procurement outcomes, allowing manufacturers to be more responsive to market fluctuations and customer demands. In Africa, and specifically Nigeria, the adoption of transport management systems in the manufacturing industry is gradually gaining momentum and manufacturing companies are increasingly leveraging on it to ensure that goods are delivered in a timely manner, despite the country's often unreliable transport infrastructure (Adeyemi, 2023).

Road transport management largely encompasses the strategic coordination of all road transport-related activities, targeting to achieve efficient movement of goods from suppliers to the manufacturing firm, and from the factory to the final consumer (Jiang and Wu, 2023). Vehicle scheduling, route planning, tracking, disposal, and maintenance are central to effective transport management (Chiparo *et al*., 2022; Munuhuwa *et al*., 2020; Musau *et al*., 2017). It is argued that each of these elements contributes to the smooth functioning of transport systems within manufacturing supply chains, leading to a smoother procurement performance (Abdelrahman and Hassan, 2023). All these activities are strategically coordinated to achieve efficient movement of goods while aligning with procurement performance goals such as timely delivery, flexibility, and responsiveness.

Procurement performance is the effectiveness of the procurement function in achieving its key objectives, specifically through the evaluation of timely delivery in the procurement process. In the context of this study, it is measured through timely delivery (Kanyepe, 2023). Timely delivery refers to the ability of the procurement function to ensure that goods are delivered when they are needed, without delays (Ailawadi *et al*., 2022). This provides a specific view of procurement performance and highlights the potential that transport management could possibly play a key role in achieving this outcome.

The perception of road transport management and its impact on procurement performance varies across regions. In developed nations like the United States and Europe, transport management is seen as an integral part of the overall supply chain strategy, with companies investing heavily in the latest technologies and processes to enhance efficiency (Sela and Shacham, 2023; Novak and Pavlović, 2023; O'Connor and Byrne, 2022). The results have been overwhelmingly positive, with many manufacturers reporting significant improvements in procurement performance as a direct result of effective transport management practices (Smith, 2021). In contrast, in regions like Africa, including Nigeria, the adoption of transport management solutions has been slower due to infrastructural challenges and limited access to cutting-edge technologies. However, where transport management has been implemented, there have been notable improvements in procurement performance. In Nigeria, for example, companies that have adopted vehicle tracking systems have reported improvements in delivery timelines and responsiveness to customer demands (Adeyemi, 2023).

In Dangote Cement Company Plc Gboko, procurement activities are not effectively done without relying on road transport systems. This demonstrates the critical role of road transport in accomplishing the procurement function in Dngote Cement Company Plc Gboko. Moreover, the increasingly competitive and dynamic nature of cement production in Nigeria has compelled the company to key into comprehensive and innovative road transport management strategies such as vehicle scheduling, route planning, vehicle tracking, vehicle disposal, and vehicle maintenance.

However, despite previous studies on transport management and its role in improving supply chain efficiency (such as Ncube and Moyo, 2022; Novak and Pavlovic, 2023), there are still gaps in understanding its specific effect on procurement performance in the manufacturing sector in Nigeria particularly in Dangote Cement Company Plc Gboko. While much of the existing literature focuses on general supply chain performance, this study aims to narrow the focus to procurement performance, providing a clearer understanding of how road transport management can enhance this critical aspect of manufacturing operations. Furthermore, the rapid evolution of transport management technologies, such as AI-driven route optimization and predictive maintenance, necessitates a fresh examination of their effect on procurement performance in the current business environment. It is against this background that this study therefore, seeks to provide new insights into the effect of road transport management on procurement performance, with a specific focus on Dangote Cement Company Plc Gboko, Nigeria.

1.2 Statement of the Problem

The manufacturing industry in Nigeria faces persistent procurement challenges that significantly affect its performance, particularly in terms of timely delivery. In Dangote Cement Company Plc, Gboko in particular, poor road networks dilapidated state of Nigerian roads and high cost of fuel have often resulted to delays in the delivery of raw materials and finished goods, leading to missed production deadlines, stockouts, and an overall reduction in procurement performance ratings.

In developed economies, transport management practices have been instrumental in resolving similar procurement issues. Despite the adoption of similar road transport management practices by Dangote Cement Company plc Gboko, the problem of poor procurement performance persists. The company's vehicle scheduling and route planning systems are marred by infrastructural limitations, such as poor road networks and traffic congestion which continue to hinder their effectiveness. Furthermore, tracking systems, though available, are often underutilized or inefficient due to unreliable internet connectivity and a lack of technological integration. As a result, the company still faces significant challenges in achieving timely deliveries in their procurement operations, and responding promptly to supply chain disruptions despite adopting similar transport

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management practices. This gap between the ideal and actual situation highlights the need for a more in-depth analysis of road transport management practices in the Nigeria context. Moreover, unlike the established research in the developed economies such as Smith (2021), Johnson and Taylor (2022), little has been researched on this phenomenon especially in Dangote Cement Company Plc Gboko. Therefore, this study seeks to fill these gaps by examining how vehicle scheduling, route planning, tracking, disposal, and maintenance can be optimized to improve procurement performance in Dangote Cement Company Plc, Gboko.

1.3 Objective of the Study

The broad objective of this study is to examine the effect of road transport management on procurement performance of Dangote Cement Company Plc Gboko Benue State, Nigeria. The specific objectives of the study are to:

i. determine the effect of vehicle scheduling on procurement performance of Dangote Cement Company Plc Gboko, Benue State;
ii. examine the effect of route planning on procurement performance of Dangote Cement Company Plc Gboko, Benue State;
iii. ascertain the effect of vehicle tracking on procurement performance of Dangote Cement Company Plc Gboko, Benue State;
iv. assess the effect of vehicle disposal on procurement performance of Dangote Cement Company Plc Gboko Benue State;
v. examine the effect of vehicle maintenance on procurement performance of Dangote Cement Company Plc Gboko, Benue State.

1.4 Hypotheses

Ho_1: Vehicle scheduling has no significant effect on procurement performance of Dangote Cement Company Plc Gboko Benue State.

Ho_2: Route planning has no significant effect on procurement performance of Dangote Cement Company Plc Gboko Benue State.

Ho_3: Vehicle tracking has no significant effect on procurement performance of Dangote Cement Company Plc Gboko Benue State.

Ho_4: Vehicle disposal has no significant effect on procurement performance of Dangote Cement Company Plc Gboko Benue State.

Ho_5: Vehicle maintenance has no significant effect on procurement performance of Dangote Cement Company Plc Gboko Benue State.

2.0 LITERATURE REVIEW

This section of the study focused on discussing the theoretical framework of the study, the conceptual framework, and review of related empirical studies.

2.1 Theoretical Framework

This study is anchored on three theoretical perspectives, namely: Transaction Cost Economics (TCE) Theory by Oliver Williamson (1985), Systems Theory by Ludwig von Bertalanffy (1946), and the Resource-Based View (RBV) Theory by Wernerfelt (1984) and Barney (1991). Collectively, these dimensions embody the internal capabilities that underpin procurement performance, particularly in achieving timely delivery. The RBV thus aligns with the overall aim of this study by emphasizing that Dangote Cement Plc's procurement success depends not only on minimizing costs or coordinating system components but also on harnessing and optimizing its unique internal transport-related resources.

TCE is highly relevant to this study, as it offers insights into how road transport management influences procurement performance in the manufacturing sector. The dimensions of road transport management, including vehicle scheduling, route planning, vehicle tracking, vehicle maintenance, and vehicle disposal, can all be examined through the lens of transaction cost minimization. For example, efficient vehicle scheduling reduces uncertainty by ensuring that transportation needs are met in a timely manner, thus minimizing transaction costs associated with delayed deliveries. Similarly, route planning can reduce fuel consumption and improve delivery times, cutting costs in procurement and increasing responsiveness. Vehicle tracking allows firms to monitor and control transport activities in real-time, reducing the need for costly oversight and improving flexibility in delivery schedules. Vehicle maintenance ensures that vehicles operate efficiently, avoiding breakdowns and delays that could increase transaction costs, while vehicle disposal strategies help reduce long-term costs associated with managing an aging fleet. Through these dimensions, TCE helps explain how procurement performance can be improved by reducing transaction costs in road transport management.

The assumption of systems theory that best support this study is the holistic view and interdependence. By applying these assumptions, the study can investigate how the interplay of vehicle scheduling, route planning, tracking, and maintenance collectively impacts procurement performance in Dangote Cement Company Plc. For instance, understanding that a delay in vehicle maintenance can disrupt delivery schedules emphasizes the need for integrated transport management practices to improve timely delivery.

The RBV provides a robust foundation for understanding how road transport management influences procurement performance within Dangote Cement Company Plc, Gboko. Each dimension of road transport management (vehicle scheduling, route planning, vehicle tracking, vehicle maintenance, and vehicle disposal) represents a strategic resource that contributes to procurement efficiency when effectively managed. Vehicle scheduling ensures the optimal allocation of fleet resources, reducing delays and operational bottlenecks, which makes it a valuable capability. Route planning supported by technology and expertise offers a rare and inimitable advantage by enhancing delivery reliability and minimizing transportation costs. Vehicle tracking systems function as valuable and difficult-to-replicate digital assets that promote real-time decision-making, flexibility, and accountability. Vehicle maintenance reflects a non-substitutable organizational capability that prevents downtime, enhances asset lifespan, and ensures timely deliveries. Vehicle disposal, though often underestimated, signifies efficient asset lifecycle management, supporting cost control and the sustainability of operations.

2.2 Conceptual Framework

Figure 1 illustrates the conceptual framework of the study, which explains the presumed relationship between road transport management as the independent variable and procurement performance as the dependent variable. The framework posits that procurement performance—measured through timely delivery depends largely on how effectively road transport activities are managed.

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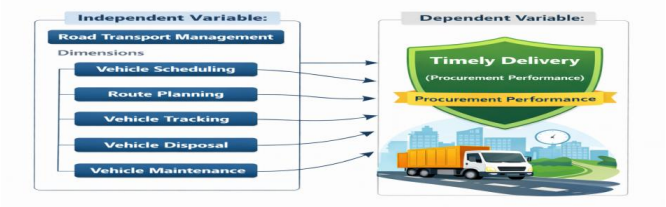

Source: Authors' Conceptualization, 2025

Figure 1: Conceptual Framework Showing Independent and Dependent Variables

2.3 Review of Related Empirical Studies

Tanaka and Widstrom (2024) examined transport management practices and procurement adaptability in Malaysia's cement manufacturing industry, focusing on vehicle scheduling, route planning, and vehicle maintenance. Using a cross-sectional survey of 275 logistics and procurement officers from five major cement firms in Selangor State, data were collected through structured questionnaires and analyzed using regression in SPSS version 27. The findings showed that vehicle maintenance had the strongest influence on procurement performance, followed by route planning and vehicle scheduling, establishing that maintenance efficiency enhances procurement responsiveness and operational flexibility. However, the study excluded vehicle disposal and tracking, indicating the need for broader transport management frameworks in emerging industrial economies.

Kowalczyk and Havelka (2024) investigated transport management efficiency and procurement delivery reliability in Poland's chemical manufacturing sector using a correlational design. Data were collected from 192 logistics professionals across eight large manufacturing plants through stratified random sampling and analyzed using multiple regression. The results revealed that vehicle tracking and route optimization significantly improved on-time delivery, while vehicle disposal contributed moderately to procurement reliability. The study concluded that real-time monitoring systems enhance procurement coordination and reduce transport delays, but its exclusion of maintenance and scheduling limited the depth of its procurement performance insights.

Ferreira and Monteiro (2024) explored the influence of road transport logistics on procurement efficiency among agro-processing firms in São Paulo State, Brazil. The study examined vehicle scheduling, tracking, maintenance, and disposal using a quantitative survey of 300 logistics and supply chain managers, with 260 valid responses analyzed through structural equation modeling. Results indicated a strong cumulative effect of transport management on procurement performance, with vehicle tracking and maintenance emerging as the strongest predictors. The study concluded that integrating digital tracking with preventive maintenance improves procurement reliability, though it did not account for regulatory and infrastructure constraints common in developing economies.

Jeong and Morikawa (2024) analyzed transport management strategies and procurement effectiveness in heavy manufacturing firms in Incheon, South Korea. Using a descriptive-correlational design, data were collected from 310 transport and procurement officers across 20 firms via structured questionnaires and analyzed using multiple regression. Findings showed that route planning had the greatest impact on procurement outcomes, followed by vehicle scheduling, while vehicle tracking had a moderate effect. The study emphasized the role of route optimization and scheduling in reducing lead time but excluded vehicle disposal and maintenance, limiting construct comprehensiveness.

Kanyepe (2023) assessed the effect of transport management practices on the performance of diamond mining companies in Zimbabwe. The study covered four authorized mining firms and surveyed 92 respondents from logistics, procurement, and finance departments using stratified random sampling. Data collected through a 5-point Likert-scale questionnaire were analyzed using regression analysis. Findings indicated that vehicle scheduling, route planning, vehicle tracking, and fuel management positively influenced organizational performance. However, the Zimbabwean context differs from Nigeria, leaving room for country-specific investigations.

Adebayo and Yusuf (2023) examined transport management and supply chain efficiency in Nigeria's pharmaceutical manufacturing industry, focusing on vehicle scheduling and vehicle tracking. Employing a descriptive survey design and census sampling of 112 logistics managers, data were collected via structured questionnaires and analyzed using multiple regression. The findings showed that vehicle scheduling improved inventory turnover, while vehicle tracking enhanced delivery accuracy. The study, however, did not include vehicle disposal, limiting its coverage of sustainable transport management practices.

Johnson and Kumar (2021) investigated the effect of vehicle scheduling on procurement performance in India's manufacturing sector using a descriptive survey design. The study involved 56 logistics managers from 20 manufacturing firms in Mumbai, with census sampling applied. Data collected through structured questionnaires were analyzed using regression analysis. Results showed that efficient vehicle scheduling reduced procurement lead time and improved responsiveness and flexibility. Nonetheless, the study did not consider other transport management dimensions such as maintenance and disposal, creating scope for broader analysis.

Ahmed and Ali (2023) studied the relationship between transport management and procurement performance in Iraq's manufacturing sector, with a specific focus on vehicle maintenance. Using a descriptive survey design, data were collected from 200 logistics managers selected through simple random sampling from a population of 1,000. Regression analysis revealed that effective vehicle maintenance significantly reduced delays and improved procurement reliability. However, the study's narrow focus on maintenance and reliance on survey data limited its ability to capture broader transport management dynamics.

Zhang et al. (2023) examined the effect of vehicle maintenance on procurement performance in China's electronics manufacturing sector. The cross-sectional survey involved 400 logistics managers drawn from 1,500 manufacturing firms using simple random sampling. Data collected through structured questionnaires were analyzed using regression analysis. Findings showed that regular vehicle maintenance reduced procurement delays and enhanced operational efficiency. The study's focus on maintenance alone and its emphasis on large firms limited generalizability and the holistic understanding of transport management.

Mthethwa and Dlamini (2022) explored how vehicle maintenance influences procurement performance in South Africa's automotive manufacturing sector. Using a mixed-methods design, the study surveyed 350 respondents selected from a population of 2,000 procurement and transport employees, supplemented with focus group discussions. Regression and factor analyses showed that effective maintenance reduced breakdowns, improved delivery timelines, and enhanced procurement flexibility. However, the study was sector-specific and did not consider vehicle disposal, limiting broader applicability.

Ben-Ari and Raanan (2023) investigated the impact of route

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planning on procurement performance in Israel's construction industry using a quantitative cross-sectional design. Data were collected from 200 logistics managers across construction firms using structured questionnaires and analyzed through regression analysis. The findings showed that efficient route planning reduced procurement costs and improved delivery timelines. However, the study excluded maintenance and tracking variables and was limited to the construction sector, restricting generalization to manufacturing contexts.

Wang and Zhang (2023) analyzed the effect of route planning on procurement performance in China's pharmaceutical industry. The study used a cross-sectional design and surveyed 250 logistics managers selected from 1,200 firms. Data were analyzed using Pearson product moment correlation analysis. Results indicated that effective route planning reduced transportation costs and improved delivery accuracy. The exclusion of other transport management practices limited the depth of the analysis.

O'Connor and Byrne (2022) examined transport management, sustainability, and performance in Ireland's agricultural sector, focusing on eco-friendly route optimization and vehicle disposal. A mixed-methods approach was used, combining surveys and interviews with 200 transport managers selected through convenience sampling. Findings showed that sustainable transport practices reduced fuel consumption and enhanced company reputation. However, the study emphasized sustainability rather than procurement outcomes and excluded tracking and maintenance dimensions.

Chia et al. (2023) studied vehicle scheduling and route optimization in Malaysia's food processing industry using a descriptive survey design. A sample of 250 respondents was drawn from a population of 800 employees through stratified random sampling. Data collected via structured questionnaires were analyzed using regression analysis. The findings revealed that vehicle scheduling improved delivery performance, while route optimization enhanced operational efficiency. Nonetheless, the Malaysian context limits generalizability to Nigeria's manufacturing sector.

3.0 METHODOLOGY

3.1 Study Design

The study adopted a case study research design to examine the effect of road transport management on procurement performance in Dangote Cement Company Plc, Gboko, Benue State. The case study design was considered appropriate because it permits an in-depth, contextual, and comprehensive examination of real-life organizational practices within a specific organizational setting. This design enabled the study to systematically investigate how the dimensions of road transport management (vehicle scheduling, route planning, vehicle tracking, vehicle disposal, and vehicle maintenance) affect procurement performance, measured in terms of timely delivery. The design is particularly suitable because it facilitates a holistic understanding of the interaction between operational transport practices and procurement outcomes within their natural environment, without external manipulation. In addition, the case study approach supports the integration of quantitative data obtained through structured questionnaires, thereby ensuring analytical rigor and empirical depth appropriate for organizational and management research.

3.2 Population of the Study

The population of the study comprised 162 staff of Dangote Cement Company Plc, Gboko, Benue State, drawn from employees directly involved in transport and procurement-related activities. These included management staff, unit heads, transport/logistics personnel, and procurement officers. The selection of these categories of staff was based on their operational responsibilities, technical knowledge, and decision-making roles relevant to the study variables. The population distribution is presented in Table 1.

Table 1: Population Breakdown

Department	Number of staff	Percentage (%)
Management staff	12	07.00 %
Unit Heads	16	10.00 %,
Transport/Logistics	121	75.00 %
Procurement	13	08,00
Total	**162**	**100 %**

Source: Human Resource Department of Dagote Cement Company Plc, 2026.

3.3 Sample and Sampling Technique

The study adopted a census approach, whereby all 162 members of the population were included as respondents. This approach was justified by the relatively small and manageable size of the population, which made it feasible to obtain data from all relevant staff without sampling bias. Employing a census approach enhanced the validity and generalizability of the findings by ensuring that all key stakeholders involved in road transport management and procurement activities were adequately represented.

3.4 Instrument for Data Collection

The primary instrument for data collection was a structured questionnaire, selected for its ability to generate standardized, quantifiable, and comparable responses from a relatively large number of respondents. The questionnaire was designed in line with the study objectives and consisted of items measuring the dimensions of road transport management and procurement performance. A five-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (5), was adopted. This scale was considered appropriate because it effectively captures varying degrees of respondents' perceptions while facilitating statistical analysis. The use of the Likert scale also enabled the transformation of qualitative opinions into quantitative data suitable for correlation and regression analysis.

3.5 Validity and Reliability of the Instrument

The validity of the research instrument was ensured through face and content validation conducted by the procurement and logistics experts and a panel of assessors, who confirmed that the questionnaire items were relevant, clear, and aligned with the objectives of the study. Construct validity was further established using the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. The KMO value of 0.793 exceeded the minimum acceptable threshold of 0.70, indicating that the data were adequate for factor analysis. According to Kaiser's classification, values between 0.70 and 0.80 are considered good, suggesting sufficient shared variance among the items. Bartlett's Test of Sphericity as presented in Table 2 yielded a chi-square value of 726.530 with 15 degrees of freedom and a significance level of 0.000, confirming the presence of significant correlations among the variables and the suitability of the data for multivariate analysis. Principal Component Analysis (PCA) extracted three components with eigenvalues greater than one, jointly explaining 66.70% of the total variance, which exceeds the

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commonly accepted benchmark of 60 percent for construct validity.

Table 2 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.793
Bartlett's Test of Sphericity	Approx. Chi-Square	726.530
	Df	15
	Sig.	.000
Eigen values Greater than 1		
	Factor 1	3.124 (31.24 %)
	Factor 2	2.076 (20.76 %)
	Factor 3	1.470 (14.70 %)
	TVE	66.70 %

Source: Researcher's Computation from SPSS, 2026.

Reliability of the instrument was assessed using Cronbach's Alpha through a pilot study conducted on 54 respondents (one-third of the sample size) drawn from Pure Biotech Company Limited, Makurdi, a manufacturing firm with similar operational characteristics. The Cronbach's Alpha coefficients for all constructs as presented in Table 3 ranged between 0.866 and 0.894, exceeding the minimum acceptable threshold of 0.70 and indicating strong internal consistency. This confirms that the instrument is stable, reliable, and capable of consistently measuring the study variables.

Table 3: Cronbach's Alpha

S/N	Constructs	Cronbach's Alpha	N. of Items
1	Vehicle scheduling	0.894	4
2	Route planning	0.882	4
3	Vehicle tracking	0.875	4
4	Vehicle disposal	0.891	4
5	Vehicle maintenance	0.866	4
6	Procurement performance	0.870	6
Average Reliability		**0.880**	

Source: Researcher's Test, 2026.

3.6 Method of Data Collection

Data were collected through the direct administration of questionnaires to respondents within Dangote Cement Company Plc, Gboko. With the assistance of an internal liaison officer, questionnaires were distributed and retrieved from the target departments. This approach enhanced accessibility, coordination, and response rate. Confidentiality and voluntary participation were assured, and respondents were encouraged to provide honest and objective responses.

3.7 Variable and Model Specification

The study comprised two main variables:

Dependent Variable: Procurement Performance (PP), measured by Timely Delivery (TD).

Independent Variable: Road Transport Management (RTM), measured by Vehicle Scheduling (VS), Route Planning (RP), Vehicle Tracking (VT), Vehicle Disposal (VD), and Vehicle Maintenance (VM).

Procurement performance was specified as a function of road transport management. The implicit and explicit forms of the model are expressed as follows:

$PP = f(RTM)$

$PP = f\ (VS, RP, VT, VD, VM)$

The econometric model is stated as:

$$PP = \alpha + \beta_1 VS + \beta_2 RP + \beta_3 VT + \beta_4 VD + \beta_5 VM + \varepsilon$$

Where: PP = Procurement Performance, VS = Vehicle Scheduling, RP = Route Planning, VT = Vehicle Tracking, VD = Vehicle Disposal, VM = Vehicle Maintenance, α = Constant term, β_1–β_5 = Regression coefficients, ε = Error term

A priori expectation: $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5 > 0$.

3.8 Data Analysis Techniques

Data were analyzed using both descriptive and inferential statistics. Descriptive statistics such as frequencies, percentages, and mean scores were used to summarize respondents' characteristics and responses. Inferential analysis was conducted using multiple regression analysis to examine the effect of road transport management dimensions on procurement performance. The decision rule was that the null hypothesis was rejected if the calculated t-value exceeded 1.96 at the 5% significance level and the p-value was less than 0.05; otherwise, the null hypothesis was accepted.

4.0 RESULTS AND INTERPRETATIONS

4.1 Questionnaire Response Rate

Table 4 presents the questionnaire response rate for the study, showing that out of 162 questionnaires distributed across Management, Unit Heads, Transport/Logistics, and Procurement departments, 143 were successfully retrieved, representing an overall response rate of 87.2%, while 12.8% were not returned. The Transport/Logistics department recorded the highest number of responses due to its larger staff strength, followed by Unit Heads, Management staff, and the Procurement department, all of which demonstrated high levels of participation relative to their sizes. The strong overall response rate indicates active engagement of respondents and suggests that the data obtained are reliable and adequately representative of the target population. The relatively low non-response rate falls within acceptable limits for survey research and is unlikely to pose a significant threat to the validity or generalizability of the study's findings.

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Table 4: Questionnaire Response Rate

Category	Number issued out	Number returned	Number missing	Percentage (%)
Management staff	12	11	1	07.00 %
Unit Heads	16	14	2	10.00 %,
Transport/Logistics	121	107	14	75.00 %
Procurement	13	11	2	08,00
Total	**162**	**143**	**19**	**100 %**
Overall Percentage	**100 %**	**87.2 %**	**12.8 %**	

Source: Field Survey, 2026

4.2 Demographic Attributes of Respondents

Table 5 shows the demographic profile of the 143 respondents based on age, education, and work experience. The majority of respondents (42.0%) are aged 28–37 years, followed by 38–47 years (31.0%), 48–60 years (19.0%), and 18–27 years (8.0%), indicating a workforce dominated by young to middle-aged professionals with substantial industry involvement. Most respondents hold HND/Degree qualifications (33.6%), followed by SSCE (26.6%), OND/NCE (23.8%), and postgraduate degrees (16.0%), reflecting a well-educated group capable of providing informed insights. Regarding experience, 45.5% have 11–20 years, 23.8% have 21–30 years, 18.1% have 1–10 years, and 12.6% have over 31 years, showing that the majority possess extensive practical knowledge. Overall, this demographic composition suggests that responses are informed, reliable, and reflective of both operational and strategic perspectives within the organization.

Table 5: Demographic Attributes of Respondents (n=143)

Attributes	Frequency	Percentage (%)
Age		
18-27 years	12	8.0
28-37 years	60	42.0
38-47 years	44	31.0
48 – 60 years	27	19.0
Total	**143**	**100**
Educational Attainment		
SSCE	38	26.6
OND/NCE	34	23.8
HND/Degree	48	33.6
Postgraduate Degrees	23	16.0
Total	**143**	**100**
Experience		
1-10 years	26	18.1
11-20 years	65	45.5
21-30 years	34	23.8
31 years & above	18	12.6
Total	**143**	**100**

Source: Field Survey, 2026.

4.3 Inferential Statistics

Prior to regression analysis, diagnostic tests were conducted to validate model assumptions. Normality was tested using the Shapiro–Wilk test, multicollinearity using Variance Inflation Factor (VIF) and Tolerance values, and heteroscedasticity using the Breusch–Pagan test. All analyses were performed using SPSS version 25.0 to ensure that the assumptions underlying the Ordinary Least Squares (OLS) regression technique were satisfied.

4.3.1Test of Normality

As part of the preliminary data diagnostics, the normality of the study variables was assessed using the Shapiro–Wilk test, which is appropriate for moderate sample sizes. The level of significance for the study was set at 5 percent (p = 0.05). A p-value greater than or equal to 0.05 indicates that the data are normally distributed, while a p-value less than 0.05 suggests deviation from normality. The Shapiro–Wilk test results in Table 12 indicate that none of the variables exhibits a statistically significant deviation from normality at the 5 percent level. For vehicle scheduling (W = 0.818, p = 0.113), route planning (W = 0.856, p = 0.213), vehicle tracking (W = 0.943, p = 0.390), vehicle disposal (W = 0.926, p = 0.570), vehicle maintenance (W = 0.872, p = 0.236), and procurement performance (W = 0.879, p = 0.482), all p-values exceed 0.05. Consequently, the null hypothesis of normality is not rejected for any of the variables. Satisfying the normality assumption is essential for the validity of OLS regression estimates and the associated t- and F-tests. The results confirm that the distributions of both the independent variables (road transport management dimensions) and the dependent variable (procurement performance) approximate normality. This ensures that the regression coefficients, standard errors, confidence intervals, and hypothesis tests used in the study are reliable and statistically sound.

Table 6: Test of Normality

Variables	Shapiro-Wilk		
	Statistic	**Df**	**Sig.**
Vehicle scheduling	.818	142	.113
Route planning	.856	142	.213
Vehicle tracking	.943	142	.390
Vehicle disposal	.926	142	.570
Vehicle maintenance	.872	142	.236
Procurement Performance	.879	142	.482

Source: Field Survey, 2026

4.3.2Test for Multicollinearity

To examine the presence of multicollinearity among the independent variables, Tolerance values and Variance Inflation Factors (VIF) were computed. Multicollinearity becomes problematic when tolerance values fall below 0.10 or when VIF values exceed 10 (or more conservatively, 5). The results of the multicollinearity test as presented in Table 7 show that tolerance values for all independent variables range from 0.681 to 0.812, which are well above the minimum threshold of 0.10. Similarly, the VIF values range from

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1.231 to 1.469, far below the critical value of 10 and even the more conservative benchmark of 5. These results indicate that multicollinearity is not a concern in the model. The absence of multicollinearity implies that each dimension of road transport management—vehicle scheduling, route planning, vehicle tracking, vehicle disposal, and vehicle maintenance—contributes uniquely to explaining variations in procurement performance. Although these transport management practices are conceptually related, the statistical evidence confirms that they are sufficiently distinct. Consequently, the regression coefficients are stable, the standard errors are not inflated, and the individual effects of the predictors can be interpreted with confidence.

Table 7: Test for Multicollinearity

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Vehicle scheduling	0.742	1.348
	Route panning	0.681	1.469
	Vehicle tracking	0.796	1.257
	Vehicle disposal	0.812	1.231
	Vehicle maintenance	0.703	1.423

Source: SPSS Output of Researcher's Computations, 2026.

4.3.3Heteroscedasticity Test

Heteroscedasticity occurs when the variance of the error terms is not constant across observations, which can lead to inefficient estimates and biased standard errors. In this study, heteroscedasticity was tested using the Breusch–Pagan/Cook–Weisberg test. The null hypothesis of this test states that the error variances are constant (homoscedasticity), while the alternative hypothesis indicates the presence of heteroscedasticity. Homoscedasticity is assumed when the probability value (Prob > Chi²) exceeds 0.05. As shown in Table 8, the Breusch–Pagan/Cook–Weisberg test produced a Chi-square value of 20.83 with a probability value of 0.181. Since the p-value is greater than 0.05, the null hypothesis of homoscedasticity is not rejected. This indicates that the variance of the residuals is constant across observations and that heteroscedasticity is not present in the model. The absence of heteroscedasticity confirms that the regression model satisfies another key OLS assumption. As a result, the estimated standard errors, t-statistics, and p-values are reliable, and the inferences drawn from the regression analysis are valid. This further strengthens the robustness of the study's empirical findings and supports the credibility of the conclusions and recommendations.

Table 8: Test for Heteroscedasticity

Ho	**Variables**	**Chi^2**	**Prob.>Chi^2**
Constant Variable	VS,RP,VT, VD, VM	20.83	.181

Source: Field Survey, 2026

4.3.4Regression Analysis Results

Multiple regression analysis was employed to examine the effect of road transport management dimensions on procurement performance in Dangote Cement Company Plc, Gboko, Benue State. The results are presented under the model summary, analysis of variance (ANOVA), and regression coefficients.

Table 9: Model Summary

Model	R	R Square	R square adjusted	Std. error of the estimate	Durbin Watson statistic
1	.860[a]	0.740	0.731	4.707	1.944

a. Predictors: (Constant), Vehicle Maintenance, Vehicle Disposal, Vehicle Tracking, Route Planning, Vehicle Scheduling

b. Dependent Variable: Procurement performance

Source: Author's Computations using SPSS 2026.

The model summary in Table 9 shows a multiple correlation coefficient (R) of 0.860, indicating a very strong positive relationship between road transport management dimensions and procurement performance. The R² value of 0.740 implies that 74.0 percent of the variation in procurement performance is explained by vehicle scheduling, route planning, vehicle tracking, vehicle disposal, and vehicle maintenance. The adjusted R² of 0.731 confirms that the model remains highly explanatory after adjusting for the number of predictors, indicating good model generalizability. The standard error of the estimate (4.707) suggests that the model's predictions closely approximate actual procurement performance values. The Durbin–Watson statistic of 1.944 indicates the absence of autocorrelation in the residuals, confirming the independence of error terms and the overall statistical adequacy of the model.

Table 10: Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8652.109	5	1730.422	78.111	.000[b]
	Residual	3034.998	137	22.153		
	Total	11687.107	142			

a. Dependent Variable: Procurement performance

b. Predictors: (Constant), Vehicle Maintenance, Vehicle Disposal, Vehicle Tracking, Route Planning, Vehicle Scheduling

Source: Author's Computations using SPSS 2026.

The ANOVA results in Table 10 show an F-statistic of 78.111 with a p-value of 0.000, indicating that the regression model is statistically significant. This confirms that the independent variables jointly have a significant effect on procurement performance. The high regression sum of squares relative to the residual sum of squares further demonstrates that a substantial proportion of the variability in procurement performance is explained by the model.

Table 11: Regression Coefficients

Model		**Unstandardized coefficients (B)**	**Standardized coefficients (Beta)**	**t**	**P-Value**
1	(Constant)	0.069		0.016	.988
	Vehicle scheduling	0.318	0.333	7.635	0.001
	Route planning	0.365	0.421	9.648	0.000
	Vehicle tracking	0.191	0.184	4.184	0.002

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	Vehicle disposal	0.098	0.109	2.498	0.014
	Vehicle maintenance	0.529	0.606	13.774	0.000

a. Dependent Variable: Procurement performance

Source: Author's Computations using SPSS 2026.

Table 11 presents the regression coefficients showing the individual effects of each road transport management dimension on procurement performance in Dangote Cement Company Plc, Gboko, Benue State. The standardized beta (β) coefficients indicate the relative strength of each predictor, while the t-values and associated p-values establish the statistical significance of their effects. Vehicle scheduling has a positive and statistically significant effect on procurement performance, with a standardized beta coefficient (β = 0.333), a t-value of 7.635, and a p-value of 0.001. This indicates that improvements in vehicle scheduling significantly enhance procurement performance by reducing delivery delays and improving fleet utilization. The magnitude of the beta coefficient suggests that vehicle scheduling is a strong predictor relative to several other variables in the model.

Route planning also exerts a strong positive influence on procurement performance, as evidenced by a standardized beta coefficient of β = 0.421, a t-value of 9.648, and a p-value of 0.000. The relatively high beta value indicates that route planning contributes substantially to explaining variations in procurement performance. The high t-statistic and very low p-value further confirm that this effect is statistically significant at the 5 percent level. Vehicle tracking shows a positive and significant relationship with procurement performance, with a standardized beta coefficient of β = 0.184, a t-value of 4.184, and a p-value of 0.002. Although its effect is weaker compared to vehicle scheduling and route planning, the statistical significance of the coefficient indicates that real-time monitoring and tracking of vehicles contribute meaningfully to procurement efficiency by improving visibility and control over transport operations.

Vehicle disposal has the smallest standardized beta coefficient (β = 0.109), indicating a relatively weaker effect on procurement performance. However, the t-value of 2.498 and p-value of 0.014 show that the effect is statistically significant. This suggests that structured vehicle disposal practices, while less influential in the short term, still play an important role in maintaining an efficient and reliable transport fleet, which indirectly supports procurement performance. Vehicle maintenance emerges as the most influential predictor of procurement performance in the model, with the highest standardized beta coefficient (β = 0.606), a t-value of 13.774, and a p-value of 0.000. The large beta value indicates that vehicle maintenance contributes more to procurement performance than any other transport management dimension. The very high t-statistic and highly significant p-value confirm the robustness of this effect, highlighting that well-maintained vehicles reduce breakdowns, ensure timely deliveries, and enhance overall procurement efficiency.

4.4 Test of Hypotheses and Discussion of Findings

The decision rule for hypothesis testing is based on the p-values and t-values obtained from the regression coefficients in Table 17: If the p-value is less than 0.05 ($p < 0.05$), and the t-value is greater than 1.96, the null hypothesis (H_0) is rejected, indicating that the independent variable has a significant effect on procurement performance. Otherwise we accept the null hypothesis, indicating that the independent variable has no significant on procurement performance.

4.4.1Hypothesis one

The first hypothesis of the study states that vehicle scheduling has no significant effect on procurement performance in Dangote Cement Plc, Gboko. To test this hypothesis, regression analysis was conducted on data collected from Dangote Cement Plc, Gboko. The result showed that vehicle scheduling has a t-value of 7.635, and a p-value of <0.001. Since the p-value is less than 0.05 and the t-value is greater than 1.96, we reject the null hypothesis (H_{01}) and conclude that vehicle scheduling has a significant positive effect on procurement performance in Dangote Cement Plc, Gboko. This finding suggests that efficient vehicle scheduling in the company enhances procurement performance by ensuring timely deliveries. Empirical evidence from previous studies supports this result. Kanyepe (2023) found that vehicle scheduling significantly improved procurement efficiency in Zimbabwe's diamond mining industry. Similarly, Adebayo and Yusuf (2023) established that proper scheduling in Nigeria's pharmaceutical sector led to improved inventory turnover. Additionally, Johnson and Kumar (2021) found that effective vehicle scheduling in India's manufacturing industry improved procurement timelines. These findings reinforce the conclusion that vehicle scheduling is a critical determinant of procurement performance. The study's a priori expectation, which anticipated that vehicle scheduling would positively affect procurement performance, is confirmed by this finding.

4.4.2Hypothesis two

The second hypothesis of this study proposes that route planning has no significant effect on procurement performance in Dangote Cement Plc, Gboko. To test the hypothesis, regression analysis was conducted on data obtained from Dangote Cement Plc, Gboko. The result showed that route planning has a t-value of 9.648, and a p-value of 0.000. Since the p-value is less than 0.05 and the t-value is greater than 1.96, we reject the null hypothesis (H_{02}) and conclude that route planning has a significant positive effect on procurement performance in Dangote Cement Plc, Gboko. This finding indicates that strategic route planning in the company minimizes delivery delays, optimizes travel paths, and reduces transportation costs. The empirical literature strongly supports the findings of this study regarding the influence of route planning on procurement performance. Tanaka and Widstrom (2024), in their investigation of cement manufacturing firms in Malaysia, established that effective route planning significantly enhances procurement responsiveness and operational flexibility by reducing delivery delays and improving coordination between logistics and procurement functions. Similarly, Ben-Ari and Raanan (2023) found that efficient route planning in Israel's construction industry reduced procurement costs and improved delivery timelines, demonstrating that well-designed routes play a critical role in achieving timely and cost-effective procurement outcomes. In the Chinese pharmaceutical sector, Wang and Zhang (2023) also reported that effective route planning positively influenced procurement performance by lowering transportation costs and improving delivery accuracy.

4.4.3Hypothesis three

The third hypothesis of this study avers that vehicle tracking has no significant effect on procurement performance in Dangote Cement Plc, Gboko. To test this hypothesis, regression analysis was conducted using data from Dangote Cement Plc, Gboko. The result showed that vehicle tracking has a t-value of 4.184, and a p-value of 0.002. Since the p-value is less than 0.05 and the t-value is greater

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than 1.96, we reject the null hypothesis (H_{03}) and conclude that vehicle tracking has a significant positive effect on procurement performance in Dangote Cement Plc, Gboko. This implies that real-time vehicle monitoring in the company enhances route adherence, improves accountability, and contributes to better timely deliveries. Empirical evidence from previous studies supports the positive effect of vehicle tracking on procurement performance. Kowalczyk and Havelka (2024) found that vehicle tracking significantly improves procurement delivery reliability in Poland's chemical manufacturing sector by enhancing coordination between logistics and procurement units and reducing transport-related disruptions. Similarly, Ferreira and Monteiro (2024) reported that the adoption of digital vehicle tracking systems in Brazil's agro-processing industries improved procurement efficiency by increasing visibility over fleet movements and enabling quicker responses to transport deviations. In the same vein, Jeong and Morikawa (2024) observed that vehicle tracking positively influences procurement effectiveness among heavy manufacturing firms in South Korea by improving monitoring accuracy, reducing lead-time uncertainty, and strengthening overall control of transport-dependent procurement activities.

4.4.4Hypothesis four

The fourth hypothesis of the study states that vehicle disposal has no significant effect on procurement performance in Dangote Cement Plc, Gboko. To test this hypothesis, regression analysis was conducted based on data from Dangote Cement Plc, Gboko. The result showed that vehicle disposal has a t-value of 2.498, and a p-value of 0.014. Since the p-value is less than 0.05 and the t-value is greater than 1.96, we reject the null hypothesis (H_{04}) and conclude that vehicle disposal has a significant positive effect on procurement performance in Dangote Cement Plc, Gboko. This suggests that removing outdated vehicles reduces maintenance costs, enhances fleet reliability, and supports procurement performance through timely delivery. Empirical studies also lend support to the finding that vehicle disposal practices influence performance-related outcomes. O'Connor and Byrne (2022), in their study of the agricultural sector in Ireland, found that effective transport management practices, including vehicle disposal, contributed to cost efficiency and improved organizational performance by reducing fuel consumption and operational inefficiencies. Although their study focused more on sustainability outcomes than procurement-specific indicators, the findings suggest that timely replacement of obsolete vehicles enhances operational reliability, which is critical for procurement-dependent activities. In a related context, Chia et al. (2023) reported that efficient transport management practices in Malaysia's food processing industry improved delivery performance and operational efficiency, highlighting the importance of maintaining a functional and reliable vehicle fleet. While their study did not explicitly examine vehicle disposal, the omission itself underscores the relevance of disposal decisions, as failure to retire inefficient vehicles can undermine the gains from scheduling and route optimization.

4.4.5Hypothesis five

The fifth and last hypothesis of this study says that vehicle maintenance has no significant effect on procurement performance in Dangote Cement Plc, Gboko. To test this hypothesis, regression analysis was conducted using data collected from Dangote Cement Plc, Gboko. The result showed that vehicle maintenance has a t-value of 13.774, and a p-value of 0.000. Since the p-value is less than 0.05 and the t-value is greater than 1.96, we reject the null hypothesis (H_{05}) and conclude that vehicle maintenance has a significant positive effect on procurement performance in Dangote Cement Plc, Gboko. This finding underscores the importance of regular vehicle maintenance in minimizing breakdowns, reducing transport delays, and improving timely deliveries. Empirical evidence from past studies supports the positive influence of vehicle maintenance on procurement performance. Ahmed and Ali (2023), in a study of manufacturing firms in Iraq, found that effective vehicle maintenance practices significantly reduced transport-related delays and improved the reliability of procurement operations, thereby enhancing overall procurement performance. Similarly, Zhang et al. (2023) reported that in China's electronics manufacturing sector, regular and well-structured vehicle maintenance reduced procurement delays and improved operational efficiency by minimizing vehicle breakdowns and unplanned downtime. In South Africa, Mthethwa and Dlamini (2022) also established that both preventive and corrective maintenance strategies improved procurement outcomes in the automotive manufacturing sector by ensuring timely delivery and greater flexibility in handling procurement orders.

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study examined the effect of vehicle scheduling, route planning, vehicle tracking, vehicle disposal, and vehicle maintenance on procurement performance at Dangote Cement Plc, Gboko. The regression analysis provided statistical evidence confirming that all five transport management variables significantly influence procurement performance thus the study concludes that transport management plays a pivotal role in shaping procurement performance at Dangote Cement Plc, Gboko. Well-maintained vehicles, strategic route planning, and optimized scheduling emerge as the strongest drivers of procurement efficiency, ensuring that deliveries are timely, costs are minimized, and supply chain disruptions are reduced. The significance of vehicle tracking reinforces the need for real-time fleet monitoring and accountability measures, while the impact of vehicle disposal highlights the long-term benefits of structured asset renewal policies. These findings validate the study's a priori expectations and align with past empirical research, reinforcing the importance of an integrated transport management strategy in procurement optimization. The results also emphasized the need for continuous investment in fleet maintenance, data-driven scheduling, and technology-driven tracking solutions to sustain procurement efficiency. This study therefore concludes that transport management has a significant positive effect on the procurement performance in Dangote Cement Plc, Gboko. The study further concludes that vehicle maintenance has the strongest effect of procurement performance in Dangote Cement Plc, Gboko, followed closely by route planning and then vehicle scheduling respectively while tracking has low effect, disposal has the weakest but still significant positive effect.

5.2 Recommendations

To enhance procurement performance through transport management, this study made the following recommendations:

i. Management of Dangote Cement Plc, Gboko should institutionalizes a predictive vehicle maintenance system, ensuring that fleet servicing is proactive rather than reactive.
ii. Route planning should be optimized through the integration of advanced Geographic Information System (GIS) technology and AI-driven route optimization tools..

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iii. Vehicle scheduling should be streamlined by developing a transport resource planning model that assigns vehicles based on delivery priority and demand forecasting.
iv. Vehicle tracking systems should be restructured to incorporate real-time alerts and automated performance analytics.
v. Vehicle disposal policies should be revised to ensure a balance between cost-saving and fleet renewal.

5.3 Limitations of the Study

One limitation of the study was the use of a single case study (Dangote Cement Plc, Gboko) which limits the generalizability of the findings. Although this approach provided in-depth insights, its applicability to other cement manufacturers or different industries may require further validation. To address this, the study ensured methodological rigor by using a robust sample size (143 respondents), statistical tests for significance, and theoretical frameworks that are broadly applicable across industries. Another limitation was the potential for response bias in the survey data, as some respondents may have overstated or understated the efficiency of their transport management practices. This challenge was mitigated by assuring the respondents of the anonymity of their responses thereby urging them to provide true reponses to the items on the instrument. Again, the study was conducted within the constraints of IPESS the university's academic calendar, which could have limited the depth and breadth of the research. However, this limitation was effectively managed through careful planning, early commencement of the research process, and adherence to a structured timeline by prioritizing tasks, delegated where appropriate, and utilized available time efficiently to meet key milestones without compromising the quality or integrity of the study.

5.4 Suggestions for Further Studies

Future research could explore the role of macroeconomic and external regulatory factors such as fuel pricing policies, government transport regulations, and road infrastructure investments on procurement performance in the cement industry. Since this study focused on internal transport management practices, future research can examine how external economic and policy factors interact with organizational transport strategies to influence procurement efficiency. A longitudinal study could be conducted to assess the long-term impact of transport management practices on procurement performance over multiple years. This would provide a more dynamic understanding of trends, allowing researchers to track how transport investments, policy changes, and technological advancements influence procurement outcomes over time. Another area for future research is the comparative analysis of transport management and procurement performance across multiple cement manufacturing firms in Nigeria. While this study focused on Dangote Cement Plc, Gboko, a broader multi-company study would allow for cross-sector comparisons and the identification of industry-wide best practices in road transport and procurement integration.

REFERENCES

1. Abdelrahman, H., and Hassan, N. (2023). The effects of transport management on supply chain efficiency in the Egyptian manufacturing sector. *Magna Scientia Advanced Research and Reviews*, **10**(02), 060–069.
2. Adebayo, O., and Yusuf, A. (2023). Transport management and its effect on supply chain efficiency in Nigeria's pharmaceutical manufacturing industry. *International Journal of Applied Research in Social Sciences*, **5**(5), 954-977.
3. Adeyemi, T. (2023). Transport management in Nigeria: Overcoming infrastructural challenges. *International Journal of Applied Research in Social Sciences*, **5**(6), 1158-1168.
4. Ahmed, H., and Ali, S. (2023). Vehicle maintenance and procurement performance in Iraq's manufacturing sector. *Middle Eastern Logistics and Procurement Review*, **7**(1), 66-79.
5. Ailawadi, K. L., Farris, P. W., and Shames, T. (2022). Retail supply chain management: Strategies and performance. J *Open Journal of Business and Management*, 10, 3485-3499.
6. Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 7(1), 99–120.
7. Ben-Ari, J., and Raanan, Y. (2023). Route planning and procurement performance in Israel's construction industry. *International Journal of Social Science and Humanities Research*, **1**(1), 20–29.
8. Chen, W., and Wang, Y. (2023). The impact of AI on transport management in Chinese manufacturing. *International Journal of Supply Chain Management*, **12**(3), 107-110..
9. Chia, S., Abdullah, N., and Lee, T. (2023). Vehicle scheduling and route optimization in the food processing industry in Malaysia. *International Journal of Production Economics*, **7**(5), 96-108.
10. Chiparo, A., Munuhuwa, F., and Ochieng, J. (2022). Comprehensive road transport management practices: An analysis of vehicle scheduling, tracking, and disposal. *Strategic Journal of Business and Change Management*, **9**(3), 821– 839
11. Ferreira, J., & Monteiro, D. (2024). Road transport logistics and procurement efficiency among agro-processing industries in Brazil. Journal of Supply Chain Management, **16**(1), 77–92.
12. Jeong, S., and Morikawa, K. (2024). Transport management strategies and procurement effectiveness in South Korea's heavy manufacturing sector. *International Journal of Production Economics*, 26, 122–137.
13. Jiang, H., and Wu, Q. (2023). Integrating transport management into supply chain operations: Challenges and opportunities. *Operations and Supply Chain Perspectives*, **9**(2), 133-151.
14. Johnson, L., and Taylor, M. (2022). Innovations in vehicle maintenance and procurement performance. *Journal of Supply Chain Innovation*, 8(1), 67-83.
15. Johnson, P., and Kumar, V. (2021). The effect of vehicle scheduling on procurement performance in the manufacturing sector in India. *Resources, Conservation and Recycling*, 128, 284-305.
16. Kanyepe, J. (2023) Transport management practices and performance of diamond mining companies in Zimbabwe, *Cogent Business and Management*, 10:2, 2216429,
17. Kowalczyk, A., and Havelka, P. (2024). Transport management efficiency and procurement outcomes in the Polish chemical manufacturing sector. *European Journal of Business and Management Research*, **9**(2), 115–127.
18. Mthethwa, M., and Dlamini, T. (2022). The influence of vehicle maintenance on procurement performance in the

DOI: 10.5281/zenodo.20093015

automotive manufacturing sector. *International Journal of Logistics Research and Applications*, *27*(3), 181-199

19. Munuhuwa, F., Nyamwange, N., and Ochieng, J. (2020). Road transport management and its impact on operational efficiency: A lifecycle approach. *East and Central African Journal of Pharmaceutical sciences*, 1*2*(1-3), 3-12.
20. Musau, E. G., Namusonge, G., Elizabeth Nambuswa Makokha, E. N. and Ngeno, Y. (2017). The Effect of Transport Management on Organizational Performance Among Textile Manufacturing Firms in Kenya. *International Journal of Trade, Economics and Finance*, *8*(1), 88-103.
21. Nakamura, S. (2020). Vehicle maintenance practices and their role in Japan's manufacturing success. *Journal of Cleaner Production, 133*, 119190.
22. Ncube, M., and Moyo, S. (2022). Transport management and supply chain performance in the manufacturing sector in South Africa. *International Review of Management and Business Research, 3*(3), 7-14.
23. Novak, T., and Pavlović, I. (2023). Real-time transport management systems and customer satisfaction in Serbia's logistics industry. *International Journal of Production Economics*, *8(6)*, 98-110.
24. O'Connor, R., and Byrne, K. (2022). Transport management for sustainability in the agricultural sector in Ireland. *Journal of Industrial and Business Management;* 3 (2); 23-31.
25. Sela, A., and Shacham, M. (2023). Vehicle tracking and procurement performance in Israel's food processing industry. *International Journal of Production Economics*, 8(4), 48-58.
26. Smith, R. (2021). Advancing transport management in Europe: A focus on procurement performance. *European Journal of Logistics*, 15(1), 54-71.
27. Tanaka, H., and Widstrom, L. (2024). Transport management practices and procurement adaptability in the Malaysian cement industry. *International Journal of Operations & Production Management*, **11**(2), 89–103.
28. Von Bertalanffy, L. (1946). *General System Theory: Foundations, Development, Applications*. George Braziller.
29. Wang, H., and Zhang, F. (2023). Route planning and procurement performance in China's pharmaceutical industry. *International Journal of Economics and Management Engineering*, 10(4), 1-9.
30. Williamson, O. E. (1985). Transaction cost economics: How it works and how it matters. *Journal of the Academic Marketing Science*, *6*(1), 1 - 22.
31. Zhang, F., Wang, H., and Xu, J. (2023). Vehicle maintenance and procurement performance in China's electronics manufacturing sector. *Advance Research Journal of Multi – Disciplinary Discoveries*, 3(1), 48 – 60.

DOI: 10.5281/zenodo.20093015