

**TRANSPORT MANAGEMENT SYSTEMS AND OPERATIONAL PERFORMANCE OF OIL SERVICING FIRMS IN RIVERS STATE**

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**Abstract**

This study investigated the relationship between transport management systems (TMS) and operational performance of oil and gas servicing firms in Rivers State. TMS was used as the predictor variable and was treated as unidimensional. Operational performance was used as the criterion variable and was proxied by operational flexibility, delivery reliability, and cost reduction. The study adopted cross-sectional survey research design. The population of the study comprised 33 registered oil and gas servicing firms. A census was taken. 3 copies of research instrument were sent to each of the 33 oil and gas servicing firms. The respondents include transportation manager, warehouse managers, and fleet supervisors. Thus, a total of 99 respondents took part in the study. Spearman Rank Order Correlation was used to test the hypotheses. The findings showed that TMS has a very strong positive and statistically significant relationship with operational performance. Based on these findings, we conclude that TMS predicts operational performance of oil and gas servicing firms in Rivers State, and recommends that oil and gas servicing companies in Rivers State should design and implement appropriate TMS if they seek to enhance their operational performance.

**Keywords:** Cost reduction, delivery reliability, operational flexibility, transport management systems

**Introduction**

Operational performance has become a strategic imperative for firms seeking sustainable competitiveness in today's business environment (Alam, 2024) that is bedeviled by operational challenges like disruption, service delivery delay and cost overruns (Okoro, 2024) which are sometimes the results of inadequate transport systems. For oil and gas servicing firms in Rivers State, the operating environment is unstable; and this instability undermines logistics systems and consequently, operational performance.

Oil and gas servicing firms in Rivers State also face weak transport infrastructure, dependence on third-party vendors, supply-chain bottlenecks, and security issues such as pipeline vandalism and theft (Ezirim et al., 2024). These challenges result in limited supply visibility, frequent delivery delays, long lead times, and high operating costs. According to Akintokunbo and Ali (2021), inefficient transport systems often result in stock-outs, excess inventory, missed deadlines, and overall inefficiencies that degrade operational performance.

Therefore, these firms need to adopt robust transport management systems (TMS) to optimize the movement of personnel and equipment and strengthen logistics coordination and enhance operational efficiency (Christopher, 2020). TMS are profoundly important across industries due to their potential to streamline supply chain processes, optimize freight movements, and improve service delivery reliability; but they assume increased relevance in the oil and gas sector where logistics efficiency directly influence operational performance (Rushton et al., 2017).

Though several studies (Nurmasari et al., 2025; Ngesa & Namusonge, 2023; Olaleke, 2023) attest that TMS enhance operational performance, there is still a noticeable gap in knowledge because existing literature does not show evidence of studies conducted on the relationship between TMS and operational performance in the context of oil and gas servicing firms in Rivers State. This study as conceptualized in fig. 1 therefore, sought to examine that relationship.

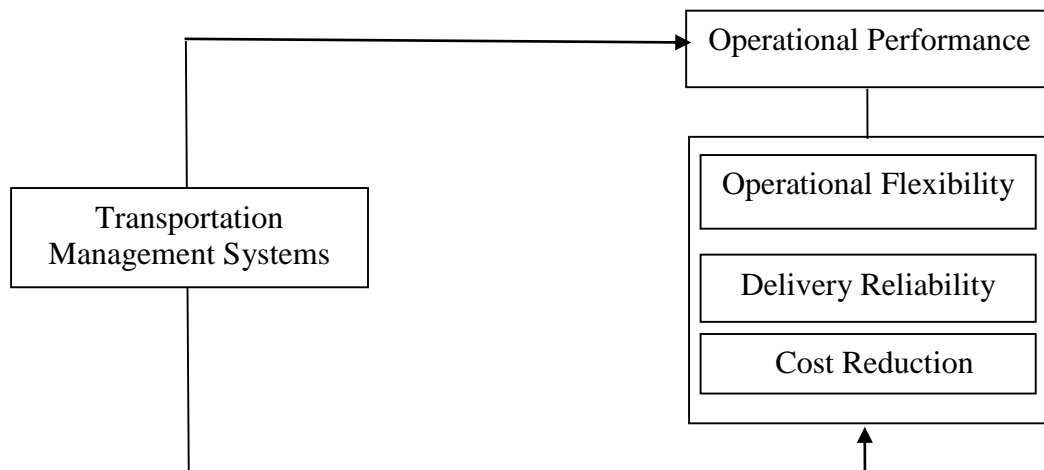


Fig. 1: Conceptual framework of relationship between transport management systems and operational performance.

### Theoretical Foundation: Resource-Based View (RBV)

RBV provides a strategic perspective on how firms achieve and sustain competitive advantage through effective management of internal resources. Originally introduced by Wernerfelt (1984) and later refined by Barney (1991), RBV posits that a firm's tangible and intangible resources are the primary drivers of its performance and success. These resources include not just physical assets, but also organizational capabilities, processes and knowledge that competitors cannot easily replicate (Mailani et al., 2024). For a resource to confer sustained competitive advantage however, it must be valuable, rare, inimitable, and non-substitutable (VRIN).

RBV provides a powerful explanatory lens for this study by framing transportation management systems as strategic internal resources that significantly influence operational performance. Consistent with RBV assumptions, oil and gas servicing firms that invest in developing transportation management system capabilities can outperform competitors by offering superior service quality, being responsive, and operating efficiently (Wernerfelt, 1984; Peteraf, 1993).

Therefore, RBV is adopted as theoretical foundation of this study. This is because RBV highlights the strategic imperative for firms to continuously strengthen their transportation infrastructure, treat transport management systems not merely as supportive tools, but as indispensable assets for achieving operational excellence and competitive advantage.

### Concept of Transport Management Systems

TMS have increasingly become indispensable in modern logistics and supply chain operations (Matuga et al., 2020; Abdul et al., 2019). As organisations strive for greater visibility and efficiency in their transportation activities, TMS emerge as a critical technological enabler. McDermott (2022) highlights that TMS serves as a central hub that integrates the planning, execution and monitoring of transport-related tasks to significantly improve logistics operations. Given the complexities of today's supply chains, rising freight costs, and capacity challenges, TMS has shifted from being an option to a necessity (Wahyu et al., 2025).

TMS is broadly defined as a software solution that assists transport and logistics companies in handling the full range of their operational activities. Coyle et al. (2003) it as information technologies used to optimize freight flows, track goods in transit, and manage freight payments. Similarly, McDermott (2022) defined TMS as a software system that provide firms with tools for

planning, executing and monitoring transport activities aimed at improving efficiency and increasing supply chain visibility (Daithankar & Pandit, 2014).

TMS has evolved into vital tools for managing complex transportation networks. The importance of TMS is profound across industries, where logistics efficiency directly influence operational performance. TMS enable firms to streamline supply chain processes, optimize freight movements and improve service delivery reliability (Rushton et al. 2017). Modern TMS are increasingly predictive, automated and real-time, allowing for superior inventory tracking, informed decision-making, and responsive transportation adjustments.

### **Concept of Operational Performance**

Operational performance has increasingly been recognised as a strategic asset that provide firms with sustainable competitive advantage. Sahoo (2020) described it as a key driver of competitiveness across industries, while Salem (2003, as cited in Chavez et al., 2015) emphasized operational performance as the backbone of organisational success. Sharma et al. (2020) further noted that operational performance is the foundation upon which quality management practices and overall organisational excellence are built.

According to Fugate et al. (2010), performance reflects the ability of an entity to achieve specific outcomes relative to established benchmarks, often expressed in measurable, positive terms. Oyerogba et al. (2014) clarify that operational performance is typically measured in terms of efficiency, quality, delivery dependability and flexibility. Wang et al. (2010) further explain that operational performance embodies competitive priorities embedded in a firm's operations strategy.

In sum, operational performance is a critical organisational capability that translates strategic intentions into measurable operational outcomes. It embodies a set of standards, principles, and practices focused on cost control, quality improvement, flexibility enhancement, and superior delivery performance (Schroeder et al., 2011; Zhang et al., 2013).

### **Operational flexibility**

In today's volatile and complex business environment, operational flexibility has become an essential strategic capability that enables organisations to cope with rapid market changes and environmental instability (Chahal et al., 2018). Companies are increasingly seeking mechanisms that allow them to respond effectively and efficiently to dynamic market demands, with operational flexibility emerging as a critical factor in sustaining performance and competitiveness (Onyokoko et al., 2021). Operational flexibility enable firms manage fluctuations in product demand, adjust production processes, introduce new designs, and reconfigure resources to maintain stability and achieve performance goals (Yu et al., 2015).

Stevenson et al. (2007) describe operational flexibility as an organisation's ability to deal with unpredictability through proactive and reactive measures, adapting processes, volumes, and products as necessary. Volberda (1997), as cited by Onyokoko et al. (2021), conceptualizes operational flexibility as the variety of alternative systems and plans that allow businesses to adjust operations without significant performance losses. Suarez et al. (1996) and Oke (2005) extend this definition to new product flexibility, stressing the firm's capacity to introduce and modify products in response to shifting consumer needs.

### **Delivery reliability**

Delivery reliability is a crucial indicator of operational performance and a critical success factor in modern supply chain management (Dwivedi et al. 2021). The uncertainties in supplier lead times and fluctuating customer demand, has made reliable delivery a core strategic concern for

businesses (Kogan et al., 2018). Companies increasingly recognise that dependable delivery performance enhances their ability to maintain inventory stability, reduce stockouts, and meet market expectations (Pinto et al., 2013). As delivery reliability often defines the service level experienced by customers, it also shapes the external perception of an organisation's dependability (Bachri et al., 2020; Dewi, 2018).

Several scholars have provided definitions of delivery reliability, reflecting its centrality in supply chain performance management. Delivery reliability is broadly described as the ability of a supply chain to fulfill promised delivery times accurately and consistently, encompassing the entire network from suppliers to end customers (Bachri et al., 2020). According to Maulana (2022), it involves the immediate and reliable completion of service commitments to achieve customer satisfaction. Utami and Lestari (2020) emphasize that delivery reliability not only refers to meeting deadlines but also delivering goods defect-free and at the correct destination, thereby ensuring service quality.

Cost reduction has emerged as a strategic necessity for organisations striving to maintain profitability. The complexities of globalisation, shorter product life cycles, technological advancements, increased competition and changing customer expectations have made cost management critical for business success (Adegbe & Fadere, 2020). Firms are increasingly aware that efficient use of resources, coupled with the ability to curtail unnecessary expenses, determines their ability to remain competitive and achieve goals (Akeem, 2017).

Cost reduction has been defined by scholars as a systematic process aimed at minimising unnecessary expenditure without compromising product quality or service delivery. Parker (2018) defines cost reduction as the application of appropriate accounting techniques to analyse historical and projected economic data to guide management in achieving reasonable economic objectives. Similarly, Wilson (2016) highlights that cost reduction provides managers with timely and accurate information to support decision-making and resource optimisation. According to Ezejiofor et al. (2015), cost reduction practices involve the evaluation of alternative actions to choose the most cost-effective business decisions, thereby facilitating efficient control over corporate resources.

### **Transport Management Systems and Operational Performance**

Nurmasari et al. (2025) examined the impact of TMS and supply chain integration on business performance in Indonesia's automotive industry, emphasizing how strong integration enhances operational efficiency and competitiveness. They found that TMS has positive and significant impact on business performance of automotive companies' performance in Indonesia. Likewise, Ngesa and Namusonge (2023) evaluated effect of transport management on the performance of logistics firms, Nairobi County. Target population was popular top ten logistics services companies in Nairobi County, and revealed that transport management has a positive significant effect on performance of logistics firms in Nairobi County.

Relatedly, Olaleke (2023) examined the effect of transport management on economic performance in selected textile firms in Lagos State. The findings show that transport management has an appreciable effect on economic performance. Also, Godson and Oparanma (2023) examined the relationship between transportation and sustainability of ports in Nigeria. The study found that transportation connects cities and accommodates human activities coupling the social, economic and environmental systems with the urbanization and population social orientation.

Based on the reports of the empirical studies reviewed, the following hypotheses were formulated:

Ho<sub>1</sub>: There is no significant correlation between TMS and operational flexibility of oil and gas servicing firms in Rivers State.

Ho<sub>2</sub>: There is no significant correlation between TMS and delivery reliability of oil and gas servicing firms in Rivers State.

Ho<sub>3</sub>: There is no significant correlation between TMS and cost reduction of oil and gas servicing firms in Rivers State

### Methodology

This study investigated the nexus between TMS and operational performance of oil and gas servicing firms in Rivers State. The study adopted a cross-sectional survey research design with a correlational method of investigation. The population of the study comprised 33 oil and gas servicing firms operating in Rivers State, as enlisted in Finelib.com Nigeria Directory and Search Engine (2024). A census was taken. 3 respondents were drawn from each of the 33 oil and gas servicing companies, making a total of 99 respondents. The categories of respondents were logistics manager, warehouse manager, and fleet supervisor. The study utilized primary data obtained from respondents through structured questionnaire. The instrument was duly validated by experts to ascertain its authenticity in testing what it is supposed to measure. In addition, Cronbach's alpha test of internal consistency was employed to ascertain its reliability. The results indicated a reliability score exceeding 0.75 for each construct, ensuring the instrument's reliability as shown in Table 1. Descriptive statistics were used to describe the dataset; while Spearman's Rank Order Correlation statistic was used to test the formulated hypotheses, with the aid of the Statistical Package for Social Sciences (SPSS) version 25.0.

**Table 1: Test of Reliability**

S/N	Dimension	No of Items	Reliability
1.	Transport management System	5	0.993
2.	Operational Reliability	5	0.992
3.	Delivery Reliability	5	0.993
4.	Cost Reduction	5	0.995

Source: SPSS Output 2025

### Analysis and Result

**Table 2: Descriptive Statistics on Transport management Systems**

S/N	Transport management Systems	Mean	SD	Lower	Upper
Q1	Transport management system adopted by our firm enhances operational efficiency.	4.20	.529	1	5
Q2	Transport management system has an impact on the business performance of our organization.	4.06	.488	1	5
Q3	Transport management system has a significant effect on logistics performance	4.13	.521	1	5
Q4	Transport management systems have an appreciable effect on the operational performance of our firm	4.13	.499	1	5
Q5	Transport management system enhances our firms' performance	4.02	.454	1	5
	Grand Mean	20.56	2.491	5	25

Source: SPSS Output 2025

From Table 2 we see the mean rating of respondents over TMS. The result shows that respondents to a very high extent stated TMS adopted by firm enhances operational efficiency. The grand mean of 20.54 and standard deviation of .2.491 indicates that respondents rated TMS above the criterion mean score of 3.0 on a 5-point scale.

**Table 3: Measure-based descriptive statistics on Operational Performance**

Statistics	Operational Flexibility	Delivery Reliability	Cost Reduction
Mean (X)	20.34	20.47	20.18
St. Deviation	2.202	2.368	2.071
Minimum	15	15	15
Maximum	25	25	25

Source: SPSS Output 2025.

The result in Table 3 show the measure-based descriptive statistics on operational performance. The respondent - logistics manager, warehouse manager, and fleet supervisor of oil and gas servicing firms in Nigeria, Rivers State - are nearly in consensus that operational flexibility which has to do with the firm's ability to adapt swiftly to project demands; delivery reliability which involves consistent on-time delivery of materials and services. Has a mean score of 20.34 and a standard deviation of 2.202 indicating that to a large extent, respondent see operational flexibility as a key measure of operational performance in oil and gas servicing firms.

Similarly, respondents are in near consensus that delivery reliability which refers to as the ability of a supply chain to fulfil promised delivery times accurately and consistently, encompassing the entire network from suppliers to end customers has a mean of 20.47 and a standard deviation of 2.368. This implies that respondents agree that delivery reliability is a very important measure for operational performance. Also, respondents are in near consensus that cost reduction which implies a systematically minimizing unnecessary expenditure without compromising product quality or service delivery. Has a mean of 20.18 and a standard deviation of 2.071, indicating that to a large extent, respondent are in agreement that cost reduction is also another key measure for operational performance.

**Table 4: Correlation between transport management system and operational flexibility**

			Transport management Systems	Operational Flexibility
Spearman's rho	Transport management Systems	Correlation Coefficient	1.000	.917**
		Sig. (2-tailed)	.	.000
		N	88	88
	Operational Flexibility	Correlation Coefficient	.917**	1.000
		Sig. (2-tailed)	.000	.
		N	88	88

\*\*. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Output 2025.

Table 4 illustrates the Spearman Rank Order Correlation result generated by the statistical package for social science (SPSS) version 25. The attendant p-value of the relationship between TMS and operational flexibility is revealed to be significant (where  $p = .000$ ) which is less than 0.05 as stated in our decision rule. The result from the Spearman rho correlation is .917\*\* from this result we see that TMS has a very strong relationship with operational flexibility. Based on this result, we reject the null hypothesis.

**Table 5: Correlation between transport management system and delivery reliability**

			Transport Management Systems	Delivery Reliability
Spearman's rho	Transport Management Systems	Correlation Coefficient	1.000	.944**
		Sig. (2-tailed)	.	.000
		N	88	88
	Delivery Reliability	Correlation Coefficient	.944**	1.000
		Sig. (2-tailed)	.000	.
		N	88	88

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Output 2025.

Table 5 illustrates the Spearman Rank Order Correlation result generated by the statistical package for social science (SPSS) version 25. The attendant p-value of the relationship between transport management system and delivery reliability is revealed to be significant (where  $p = .000$ ) which is less than 0.05 as stated in our decision rule. The result from the Spearman rho correlation is .944\*\* from this result we see that transport management system has a very strong relationship with deliver reliability. Based on this result we therefore reject the null hypothesis.

**Table 6: Correlation between transport management system and cost reduction**

			Transport management Systems	Cost Reduction
Spearman's rho	Transport management Systems	Correlation Coefficient	1.000	.858**
		Sig. (2-tailed)	.	.000
		N	88	88
	Cost Reduction	Correlation Coefficient	.858**	1.000
		Sig. (2-tailed)	.000	.
		N	88	88

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Output 2025.

Table 6 illustrates the Spearman Rank Order Correlation result generated by the statistical package for social science (SPSS) version 25. The attendant p-value of the relationship between transport management system and cost reduction is revealed to be significant (where  $p = .000$ ) which is less than 0.05 as stated in our decision rule. The result from the Spearman rho correlation is .858\*\* from this result we see that transport management system has a very strong relationship with cost reduction. Thus, we therefore reject the null hypothesis.

### Discussion of Findings

The findings of this study revealed that TMS has a very strong relationship with operational performance through operational flexibility, delivery reliability and cost reduction. These findings of corroborate the findings of similar empirical studies. For instance, Nurmasari et al. (2025) found that TMS has a positive and significant impact on business performance of automotive companies' performance in Indonesia. Also, Ngesa and Namusonge (2023) found that transport management has a positive significant effect on performance of logistics firms in Nairobi County. In addition, Olaleke (2023) found that transport management has an appreciable effect on economic performance. Furthermore, Godson and Oparanma (2023) found that transportation connect cities and accommodate human activities coupling the social, economic and environmental systems with the urbanization and population social orientation.

### Conclusion and Recommendations

This study investigated the relationship between TMS and operational performance of oil and gas servicing firms in Rivers State. Based on the statistical findings from our study, we conclude that TMS has a very strong correlation with operational performance among the oil and gas servicing firms in Rivers State. In line with the findings and conclusion of this study, we recommend that Oil and gas companies in Rivers State should design an appropriate TMS as it was found to enhance operational performance.

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