

SUPPLY CHAIN SPEED AND OPERATIONAL EFFICIENCY OF CEMENT DISTRIBUTION COMPANIES IN RIVERS STATE

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Abstract

This study examined the correlation between supply chain speed and operational efficiency. Supply chain speed was used as the explanatory variable and was treated as a single unit variable. Operational efficiency was used as the explained variable with cost reduction and waste reduction as its measures. The study was anchored on the resource dependency theory. The study adopted an explanatory design. The population of the study comprised 13 cement distribution companies in Rivers State. The study adopts administered 5 copies of the research instrument on to each of the 13 cement distribution companies. The respondents include managing director, procurement manager, operations managers, and supervisor. Pearson Moment Correlation was used to test the hypotheses. The findings revealed that there is a significant and very strong correlation between supply chain speed and cost reduction and waste reduction. The study therefore concludes that supply chain speed has significant correlation with operational efficiency; and recommends that management of cement distribution companies should focus on supply chain speed if they seek operational efficiency.

Keywords: cost reduction, operational efficiency, supply chain speed, waste reduction

Introduction

Production is not complete until the product gets to the consumers through distribution that enables consumers get access to products. The evolution of physical distribution to logistics, and then to supply chain management is a transition in which individually managed and product-flow related activities change became integrated set of processes managed across multiple echelons in the value creation and delivery process (Hou et al., 2017).

Today, supply chains are challenged to respond swiftly to diverse internal and external changes; if they must achieve competitive edge in what has become an interconnected global marketplace (Hohenstein et al., 2015; Asamoah et al., 2020b). According to Al-Hawajreh et al. (2014), the speed with which an organization's supply chain adjusts and executes new programmes in reaction to changes in the market is a precursor to thriving and achieving objectives.

Supply chain speed describes the extent to which the framework of activities and operations captured as a firm's supply chain, is at pace with trends in its market (Hafiani et al., 2021). Rajesh (2015) describes supply chain speed as the extent to which the supply chain is able to factor in all related considerations of its processes and operations and meet estimated deadlines or time-based targets.

Supply chain speed facilitates a firm's capacity to match market demand, through the development and reinforcement of partnerships and technology that allow for prompt actions and immediate decisions. Kumar and Singh (2017) posited that with the heightened level of competition in global industries and most local industries, and the pace of technological evolution in the business context, speed has become imperative for supply chains today.

Also, Holweg (2005) aver that supply chain speed is a determinant of the change capacity of the supply chain as it underpins the concerns of manpower functionality and competence,

infrastructure, learning and also technology. Furthermore, supply chain speed builds on an acknowledgement of dynamism and hence, the contingency of strategies or plans in operations.

This means supply chains that are focused on developing and enhancing their speed tend to create options or alternatives in their operational approaches, ensuring operational consistency in the case of disruptions or unfavourable change of events. To the best of our knowledge there is a dearth of studies on the relationship between supply chain speed and operational efficiency in cement distribution companies in Rivers State. Thus, this study sought to complement literature by examining the correlation between supply chain speed and operational efficiency in cement distribution companies in Rivers State.

Study variable.

The variables for this study are supply chain speed (independent variable) and operational efficiency (dependent variable). The dependent variable was measured using cost reduction, and waste reduction.

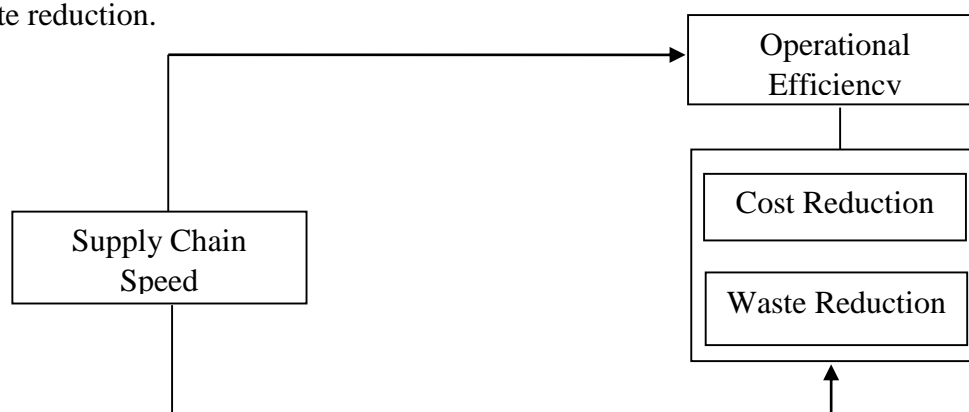


Fig. 1: Conceptual Framework of relationship between supply chain speed and operational efficiency in cement distribution companies in Rivers State

Theoretical Foundation

This study is anchored on resource dependency theory. Resource dependency theory (Pfeffer and Salancik, 1978) explains power-seeking behaviour of firms in a supply channel according to how buyers and suppliers behave and interact within their environment. Within these buyer-seller relationships, the main focus is on resources provided by relationship partners who offer external resources, which ensure the firm's long-term survival Roemer (2004b as cited in Donato, 2016).

Firms survive or succeed if they can exploit their dependence on other firms or other firms' dependence on them to attain necessary resources (Hofer et al., 2012). This theory is applied in this study in the sense that resource dependency theory explains why firms must manage external dependencies to maintain supply chain responsiveness. By reducing over-reliance on specific resources or suppliers and fostering collaborative network, firms can enhance the ability to respond dynamically to supply chain challenges

Concept of Supply Chain Speed

Several descriptions have been proffered by scholars in the past to explain the concept of supply chain speed. Christopher (2016) define supply chain speed as the ability of a supply chain to move materials, components, and finished goods rapidly from suppliers to customers. The focus of this definition is on the capacity of the supply chain to quickly move both materials and finished goods from the suppliers to the customers. The description pitched supply chain speed in terms of distribution/delivery.

On their part, Chpra et al. (2019) describe supply chain speed to indicate the time compression across supply chain activities, where faster operations lead to reduced cycle times, improved service levels, and enhanced competitive advantage. Thus, supply chain speed within the context of the Nigerian Cement industry, could therefore be considered an imperative. Other concepts related and often considered synonymous with speed are supply chain flexibility and agility, however, despite all three being dimensions of supply chain responsiveness, these differ substantially from the concept of speed.

Operational Efficiency

The word ‘operations’ means transforming resource into desired goods, services or results that create and deliver value to customers (Aderemi et al., 2015). Efficiency on the hand, describes approaches to operations that stress optimal utilization of resources, and ensuring that estimated budgetary plans or goals are strictly adhered to and achieved (Zhang et al., 2016; Yan et al., 2019).

In business operations, efficiency represent favourable outcome of assessment between inputs employed and outputs obtained; and it is demonstrated in a firms’ ability to generate maximum outputs with minimal resources (Ateke et al., 2025). In this view, efficiency focuses on maintaining high level of productivity and providing consistent quality of service while incurring less cost, minimizing resource consumption and reducing wastes (Nwulu et al., 2022).

While operational efficiency may dwell on financial and budgetary factors, its concerns also cover the period or window allocated to carrying out, managing and completing a task, as well as the number of mediums, personnel, stages and channels involved in the process or operations (Bastas et al., 2018).

Operational efficiency has several indices by which it can be measured. Sodhi et al. (2009, as cited in Nwulu et al., 2022) identify cost reduction, reduced order-cycle time, and wastes reductions. Ateke et al. (2025) added optimal resource utilization and energy conservation. In this study however, cost reduction and waste reduction were adopted.

Cost reduction

The ability of an organization to effectively manage cost has tremulous effect on its profitability since cost has to be kept to the barest minimum in order to achieve profit maximization. Consequently, the capacity to withstand competition and survive, an organization ought to find ways to reduce cost while maximizing profit.

According to Sharma (2017), cost reduction refers to a genuine and long-lasting decrease in the price per unit of products produced or services provided without lowering the quality. By lowering cost per unit and raising productivity, the goal of cost reduction will be accomplished. The primary objective of majority of organizations is to maximize profits since management is more interested in profitability as one method of assessing organizational success.

According to Egbide et al. (2019) in order to gain more customer patronage, manufacturers and distributors seek for ways to manufacture and distribute their goods to the customers at a very low cost. Nwanyanwu et al. (2023) aver that cost reductions are very essential to any enterprise because they help to regulate and reduce expenses that are not wanted, which results in an increase in market demand for the firm’s product. It is a fact that cost reduction influences profit maximization because any organization that successfully reduces costs can sell its goods and services at a lower rate than its competitors without reducing quality

Waste reduction

Waste is a central term in classical lean literature (Dennis, 2016; Parry et al., 2010; Victor et al., 2014; Douglas et al., 2015). Suarez-Barraza et al. (2016) aver that from the perspective of the customer we can separate operational activities into two: those activities that add value and those activities that does not add value which is also called waste. Scholars like (Parry et al., 2010; Victor et al., 2014; Douglas et al., 2015), have highlighted the seven major types of wastes as identified by Toyota. These wastes are overproduction, waiting, unnecessary transport, incorrect processing, excess inventory, unnecessary movement and defects.

According to Ugwu et al. (2021), various service industries were hesitating to adopt such practices, because of the unique characteristics of service processes. But it is a statement of fact that service industries are not immune against the challenges of globalization and competition. Thus, experts like (Kosuge et al., 2010; Douglas et al., 2015) stressed the need and applicability of waste reduction practices to services, since organizations are a collection of processes and waste reduction systems are designed to address processes rather than products.

Supply Chain Speed and Operational Efficiency

Kawaiswara et al. (2023) conducted a study on the effect of supply chain speed, responsiveness, flexibility, and competence on the profitability of PT. Bank Negara Indonesia. The study's results indicate a positive and significant effect between supply chain speed, flexibility, and competence on the profitability of PT. Bank Negara Indonesia. While supply chain responsiveness has no effect on the profitability of PT. Bank Negara Indonesia.

Kaneberg et al. (2020) affirmed that speed is crucial in ensuring that the supply chain is able to operate in ways that assure of its capacity for timely, and quality output that match the expectations of its markets or partners. Ali et al. (2019) conducted a study on the influence of supply chain speed on profitability. The result indicated that speed is an important variable in the banking industry because bank employees need to get potential customers quickly, process data, and use resources effectively according to bank needs. Any delays that occur can reduce the value of the company's productivity, which will reduce profitability.

Sodhi et al. (2017) conducted a study on supply chain built for speed and customization. The purpose of the study was to examine how supply chain speed affect customization of product or services in order to fulfil customer's demand. The findings revealed that e-supply chain could improve their existing business but also what new businesses and business models benefitting local economies such a supply chain would enable. Further, Bidhandi et al. (2017) conducted a study on the effect of supply chain speed on profitability and found that that supply chain speed affect profitability of organizations.

Based on evidence in literature, following hypotheses stated in the null form were formulated and tested in the study:

H₀₁: There is no significant relationship between supply chain speed and cost reduction of cement distribution companies in Rivers State.

H₀₂: There is no significant relationship between supply chain speed and waste reduction of cement distribution companies in Rivers State.

Methodology

The study adopted the explanatory design. The population of the study comprised 13 cement distribution companies in Rivers State. Given that the study population is a small, a census was taken. 5 copies of the research instrument were sent to each of the 13 cement distribution

companies. The respondents include managing director, procurement manager, operations managers, and supervisor. Retrieval of the instrument followed afterwards, the details of the questionnaire administration and collection rate during the field work are shown in table 1, the table shows the total number of copies of questionnaire distributed and the response rate. The data was analysed using descriptive statistics, while the Pearson Product Moment Correlation (PPMC) was used to test the hypotheses. The decision rule that guided the test was: reject the null hypothesis (H_0) if $PV < 0.05$ for 2-tailed test and conclude that significant relationship exists.

Table 1: Questionnaire Distribution and Retrieval

Number	Questionnaire Sent out	Questionnaire Returned useful	Percentage Returned
Male	40	31	47%
Female	25	21	38%
Total	65	52	85%

Source: SPSS output of data analysis on supply chain responsiveness and operational efficiency of cement distribution companies in Rivers State (2025).

Table 1 shows the total number of copies of questionnaire distributed and the response rate. 40 copies of the research instrument were distributed to the male respondents out of which only 31 were returned useful this represents (47%) of the total questionnaire sent out. Also, 25 copies of the research instrument were distributed to female representing out of which 21 were returned useful this represents. (38%) of total questionnaire distributed. The percentage that was returned is 85%. This is adequate to conduct the study.

Demographic Analyses

Table 2: Gender Distribution of Respondents

Gender	Frequency	Percentage (%)
Male	31	59
Female	21	41
Total	52	100

Source: SPSS output of data analysis on supply chain responsiveness and operational efficiency of cement distribution companies in Rivers State (2025).

From Table 2 above, the distribution of male participants is 31, representing 59% of the total population. The female participants were 21, representing 41% of the total population. This spread implies that there are more male than females in the cement distribution industry.

Table 3: Gender of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	31	59.6	59.6	59.6
	Female	21	40.4	40.4	100.0
	Total	52	100.0	100.0	

Source: SPSS output of data analysis on supply chain responsiveness and operational efficiency of cement distribution companies in Rivers State (2025).

Table 3 shows the distribution on the gender of the respondents. 31 respondents representing 59.6% of the total population were male. 21 respondents representing 40.6% of the total population were female. This indicates that there are more male in the cement distribution business than there is female in Rivers State.

Table 4: Ages of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	35-40 years	12	23.1	23.1	23.1
	41-45 years	13	25.0	25.0	48.1
	45-50 years	16	30.8	30.8	78.8
	Above 50 years	11	21.2	21.2	100.0
	Total	52	100.0	100.0	

Source: SPSS output of data analysis on supply chain responsiveness and operational efficiency of cement distribution companies in Rivers State (2025).

Table 5 Rank of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Managing Director	10	19.2	19.2	19.2
	Procurement Manager	17	32.7	32.7	51.9
	Operations Manager	13	25.0	25.0	76.9
	Supervisor	12	23.1	23.1	100.0
	Total	52	100.0	100.0	

Source: SPSS output of data analysis on supply chain responsiveness and operational efficiency of cement distribution companies in Rivers State (2025).

Table 5 shows the distribution of the ranks of the respondents. 10 respondents representing (19.2 %) of the total population were managing directors. 17 respondents representing (32.7%) of the total population are procurement managers. 13 respondents representing (25%) of the total population are operations managers. 12 respondents representing (23.1%) of the total population are supervisors. It can be observed from the spread that there are more procurement managers participating in the survey than others. Suggesting that the procurement managers are adept to the subject matter.

Table 7: Analysis of Relationship between Supply Chain Speed and Cost Reduction

		Supply Chain Speed	Cost Reduction
Supply Chain Speed	Pearson Correlation	1	.986**
	Sig. (2-tailed)		.000
	N	52	52
Cost Reduction	Pearson Correlation	.986**	1
	Sig. (2-tailed)	.000	
	N	52	52

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

Source: SPSS output of data analysis on supply chain responsiveness and operational efficiency of cement distribution companies in Rivers State (2025).

Table 7 illustrates the Pearson Moment Correlation result generated by the statistical package for social science (SPSS) version 27. The attendant p-value of the relationship between supply chain speed 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 Pearson r correlation is .986. From this result we realize that supply chain speed has a very strong relationship with cost reduction. Also, we observe the sign to be positive indicating a very strong and positive relationship exist between supply chain speed and cost reduction in cement distribution companies in Rivers State. Based on this, result we reject the null hypothesis.

Table 8 Analysis of Relationship between Supply Chain Speed and Waste Reduction

			Supply Chain Speed	Waste Reduction
Spearman's rho	Supply Chain Speed	Correlation Coefficient	1.000	.933**
		Sig. (2-tailed)	.	.000
		N	52	52
	Waste Reduction	Correlation Coefficient	.933**	1.000
		Sig. (2-tailed)	.000	.
		N	52	52

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

Source: SPSS output of data analysis on supply chain responsiveness and operational efficiency of cement distribution companies in Rivers State (2025).

Table 8 illustrates the Correlation result generated by the statistical package for social science (SPSS) version 27. The attendant p-value of the relationship between supply chain speed and waste 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 Pearson (r) correlation is .933. From this result we realize that supply chain speed has a very strong relationship with waste reduction. Also, we observe the sign to be positive indicating that a very strong and positive relationship exist between supply chain speed and waste reduction in cement distribution companies in Rivers State. Based on this result, we reject the null hypothesis.

Discussion of Findings

The result from revealed that supply chain speed has very strong correlation with operational efficiency through cost reduction and waste reduction. These findings are in line with Kawaiswara et al. (2023) whose study reported that there is a positive and significant effect of supply chain speed on profitability of PT banks in Negera Indonesia. This implies that the speed of the bank supply chain resulted in cost reduction which in turn translated in an increase in the profit outlay of the banks.

Our position is further strengthened from the report of Kaneberg et al (2020) affirmed that speed is crucial in ensuring that the supply chain is able to operate in ways that assure of its capacity for timely, and quality output that match the expectations of its markets or partners. The result indicated that speed is an important variable in the banking industry because bank employees need to get potential customers quickly, process data, and use resources effectively according to bank needs. Any delays that occur can reduce the value of the company's productivity, which will affect profitability. We align with this report as it goes to show that speed of supply chain of cement distribution companies ensures that the cement distribution companies are able to get current customers quickly, process request order, and deliver effectively.

Our findings also aligns with the report of Sarkis et al. (2020) that by minimizing waste in the form of excess inventory, redundant activities, or delays, firms streamline operations, reduce costs, and enhance overall performance. Enhancing operational performance implies ensuring that the supply chain is not bogged down with excess inventory, and redundant activities.

More so, Bidhandi et al. (2017) reported that supply chain speed is a key factor that affect the profitability of organizations. It is on this note that Adeyemi et al. (2021) averred that waste reduction is a participatory approach to continuous improvement that emphasize employee involvement in identifying and implementing waste reduction initiatives.

Meanwhile, the report of Filimonau et al. (2020) assert that good waste management practices have a significance on a company's operational performance because they increase service

delivery efficiency, lower operational costs through effective operations, shorten the time it takes to provide services, improve service quality, and increase productivity.

Conclusion and Recommendations

The study concludes that supply chain speed has a very strong and positive relationship with operational efficiency in cement distribution companies in Rivers State. Based on the findings, the following recommendation was made:

- 1) Cement distribution companies should devote more effort to supply chain speed as it was found to have the highest relationship with cost reduction as an antecedent of supply chain performance.
- 2) Management of cement distribution companies should ensure that the supply chain is not bogged down with excess inventory, and redundant activities.
- 3) that management of cement distribution companies continue to devote more effort to supply chain speed as it was found to have a very high influence on operational efficiency.

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