

COOPERATIVE ENGAGEMENT AND SUPPLY CHAIN RESILIENCE OF QUOTED OIL AND GAS COMPANIES IN NIGERIA

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Abstract

This study empirically examined the relationship between cooperative engagement and supply chain resilience of quoted oil and gas companies in Nigeria. Cooperative engagement as a unidimensional construct was the predictor variable while supply chain resilience as the criterion variable was measured with situation awareness and adaptive capacity of quoted oil and gas firms in Nigeria. The study adopted a cross-sectional research design to study a population of 10 quoted oil and gas companies as enlisted in the official website of the Nigerian Exchange Group. Sample size of the study was the same as the study population given the small sample size however, the study adopted a census method to administer 5 copies of the questionnaire to key procurement staff of each of the 10 quoted consumer goods companies bringing the sample elements to 50 respondents in total. However, 44 respondents provided data for this study. Both primary & secondary data were adopted during the research of the study. The generated data were analyzed at three levels: the Univariate, Bivariate and Multivariate levels. At the primary level, the study adopted the univariate descriptive statistical tool such as mean, standard deviation, frequency tables, bar charts, scatter plots and simple percentages to present the data that were generated while bivariate inferential statistic of Pearson's Product Moment Correlation was used at the secondary level of analysis, to test the proposed hypotheses. At the tertiary level of analysis, the study used Partial Correlation to test the impact of the moderating variable (level of influence) on the relationship between supplier relationship management and supply chain resilience of quoted oil and gas companies in Nigeria. All the statistical analyses were performed using the Statistical Package for Social Sciences (SPSS, version 25.0). The data analysis uncovered noteworthy outcomes.: Cooperative engagement exhibited significant relationship with situation awareness and adaptive capacity. Considering these findings, the study concludes that there is a significant and positive relationship between Cooperative engagement and supply chain resilience of quoted oil and gas companies in Nigeria. Engage in collaborative efforts with suppliers to achieve mutually beneficial goals; build trust, credibility, reliability, and confidence in them in relationships with suppliers for effective supply chain resilience.

Keywords: Adaptive capacity, cooperative engagement, situation awareness, supply chain resilience,

Introduction

The oil and gas industry is one of the most vital sectors of Nigeria's economy, contributing significantly to national revenue and global energy supplies. However, the industry is fraught with challenges ranging from fluctuating oil price, infrastructural deficit and external disruptions (NEITI, 2021). These challenges demand that firms within this sector build resilient supply chains that are capable of anticipating, withstanding and recovering from disruptions (Adiele & Didia, 2021; Ateke & Nwulu, 2018).

Supply chain resilience is increasingly recognized as a key factor in maintaining operational continuity, especially in industries that face uncertainties (Mulaessa & Lin, 2021). Cooperative engagement - collaboration between firms and their partners - has been identified as an essential strategy for improving supply chain resilience (Adiele & Didia, 2021). Cooperative engagement emphasizes mutual trust, shared objectives and long-term commitment, which are critical to enhancing firms' awareness of potential disruptions and capacity to adapt to change.

The extent to which cooperative engagement correlates with specific aspects of supply chain resilience - particularly situation awareness and adaptive capacity - has not been fully explored, in Nigeria's oil and gas industry. This gap in knowledge hinders the ability of firms to effectively leverage cooperative relationships in building resilient supply chains. Thus, this study empirically examined the correlation between cooperative engagement and supply chain resilience among quoted oil and gas companies in Nigeria, using situation awareness and adaptive capacity as indices of supply chain resilience.

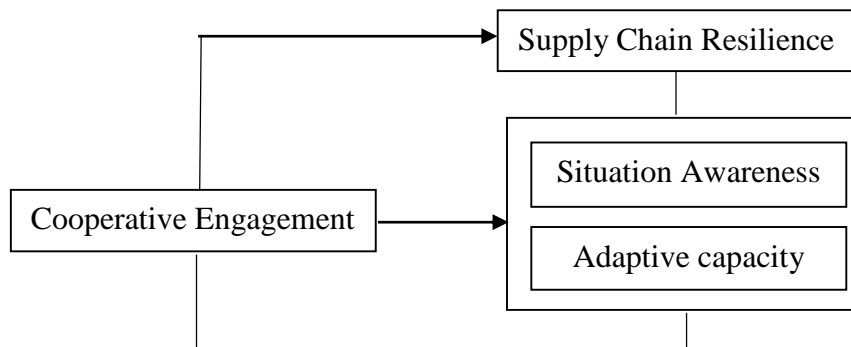


Fig. 1: Conceptual Framework of relationship between cooperative engagement and supply chain resilience of quoted oil and gas companies in Nigeria

Baseline Theory

This study is premised on institutional theory (Meyer & Rowan, 1977), which posits that organizations are not merely economic actors but are also embedded in a larger social, political, and cultural framework that shape their behaviours and decisions. The theory emphasizes that organizations conform to rules, norms and regulations of their institutional environments to gain legitimacy, stability and survival. In industries like oil and gas, companies operate under strict regulatory oversight, environmental scrutiny and stakeholder expectations. To maintain legitimacy, firms in these sectors must engage in practices that align with these institutional pressures, including forming cooperative relationships that enhance operational effectiveness and supply chain resilience.

Institutional theory suggests that firms in highly regulated industries are motivated to adopt resilient practices to meet external expectations (DiMaggio & Powell, 1983). Thus, companies may enter into cooperative engagements with suppliers, government agencies and other stakeholders to comply with environmental regulations or mitigate risks associated with infrastructural instability. These cooperative engagements, when shaped by institutional pressures, enhance situation awareness and adaptive capacity, which are critical to maintaining resilient supply chains (Scott, 2014).

Institutional theory was adopted as a baseline theory for the study because provides a robust explanation of why oil and gas companies engage in cooperative partnerships to bolster their supply chain resilience. By responding to institutional pressures, firms can maintain legitimacy while enhancing their capability to withstand disruptions. This alignment with external expectations strengthens their adaptive capacity and situation awareness, which are essential components of supply chain resilience.

Concept of Cooperative Engagement

Cooperative engagement refers to strategic collaboration between organizations to achieve mutual benefits, especially in dynamic and competitive industries. The concept underscores the importance of trust, communication and joint decision-making that enable organizations share resources and competencies to manage uncertainty and volatility. According to Ashnai et al.

(2019), cooperative engagement foster long-term partnerships that are valuable in industries that are prone to disruptions; and where companies need to work together to mitigate risks and optimize operations.

By aligning objectives and integrating operations, organizations enhance their collective capability to respond to market dynamics and environmental challenges. Cooperative engagement therefore, promotes inter-organizational synergy, allowing firms to leverage complementary strengths to navigate supply chain complexities (Cao & Zhang, 2011).

Adiele and Didia (2021) discuss the critical role of trust in fostering cooperative relationships, especially in the Nigerian context. The oil and gas industry is characterized by significant risks and uncertainties. The industry thus benefits immensely from cooperative engagement, which enhance resilience and foster sustained operational success. Cooperative relationships blossom more, when there is commitment between parties in a relationship, based on the belief that an ongoing relationship valuable enough to warrant efforts to maintain it (Morgan & Hunt, 1994, as cited in Ateke et al., 2016).

The theoretical underpinnings of cooperative engagement draws from several perspectives, including social exchange theory (Homans, 1958), which suggests that organizations engage in cooperation based on mutual benefits and reciprocity, where both parties expect value from their collaboration. In this sense, cooperative engagement becomes a strategic mechanism for ensuring sustained value creation and shared benefits. Also resource dependency theory (Pfeffer & Salancik, 1978), emphasizes that organizations form cooperative relationships to access critical resources, reduce uncertainty, and enhance their strategic positions.

Supply Chain Resilience

Supply chain resilience refers to the ability of a supply chain to anticipate, absorb, adapt to, and recover from disruptions while maintaining or quickly resuming normal operations. Several scholars have proposed various definitions of supply chain resilience, but a common thread is the emphasis on the ability to respond effectively to both internal and external shocks (Ponomarov & Holcomb, 2009).

For industries like oil and gas, supply chain resilience is critical because the sector faces frequent disruptions such as fluctuating commodity prices, geopolitical tensions, and environmental challenges. Two key measures of supply chain resilience—situation awareness and adaptive capacity—are widely recognized in the literature as central to achieving resilience (Ivanov & Dolgui, 2020). These dimensions offer a comprehensive understanding of how organizations can build resilient supply chains by focusing on both the anticipation of disruptions and the ability to respond effectively.

Supply chain resilience is increasingly recognized as a critical attribute for organizations facing disruptions. It encompasses the ability to prepare for, respond to, and recover from unforeseen events. The key dimensions of supply chain resilience include situation awareness and adaptive capacity, which are vital for effectively navigating challenges.

Situation awareness

Situation awareness refers to the ability of an organization to perceive, comprehend, and predict changes in its environment. It is a competence that allow firms to anticipate potential disruptions and take proactive measures to mitigate risks. Endsley (1995) defined situation awareness as "the perception of elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future."

In the context of supply chain resilience, situation awareness enable organizations to monitor supply chain activities, identify potential risks, and develop strategies to prevent or mitigate the effects of disruptions. For oil and gas companies, situation awareness is particularly crucial because they operate in a highly volatile environment where even minor disruptions can have significant operational and financial consequences.

Situation awareness is vital for effective supply chain resilience. It involves understanding and interpreting external conditions that may impact operations. Ateke and Nwulu (2018) illustrate the connection between employee competency development and adaptive capacity, which is essential for enhancing situation awareness. By fostering an environment that promotes continuous learning and development, organizations can better anticipate changes in their operational landscape.

Additionally, Hamilton-Ibama and Ogonu (2022) provide insights into the role of customer relationship management in improving brand performance, thereby contributing to resilience in supply chains. Situation awareness is an indispensable component of supply chain resilience. Without the ability to anticipate and comprehend changes in the operating environment, firms would struggle to mitigate risks effectively, leaving their supply chains vulnerable to disruptions. Therefore, enhancing situation awareness should be a strategic priority for organizations aiming to build resilient supply chains.

Adaptive Capacity

Adaptive capacity refers to an organization's ability to modify its processes, structures and strategies in response to disruptions or changing conditions. This dimension of resilience emphasizes flexibility and capacity to adjust to expected and unexpected challenges (Christopher & Peck, 2004). In the oil and gas sector, adaptive capacity is crucial because the industry often experience disruptions that require quick and effective responses.

Companies with high adaptive capacity easily realign resources, shift production processes, or even reconfigure supply chain networks to mitigate the effects of disruptions. Adaptive capacity also involves learning from past disruptions and implementing changes that enhance future resilience (Tukamuhabwa et al., 2015).

Ahiauзу and Jaja (2015) emphasize the importance of innovation processes in fostering organizational resilience, highlighting that companies must be willing to innovate to remain competitive. Marso and Idris (2022) contribute to this discourse by linking customer loyalty to adaptive strategies, which are necessary for firms to navigate changing market conditions. Furthermore, Ateke and Nwulu (2021) explore the impact of dynamic marketing capabilities on adaptability, particularly within hospitality firms, suggesting that the ability to pivot in response to market changes is crucial for sustaining resilience.

Cooperative Engagement and Supply Chain Resilience

The relationship between cooperative engagement and supply chain resilience is well-documented in the literature, with several studies highlighting how strategic collaboration enhances a firm's ability to withstand and recover from disruptions. Cooperative engagement allows organizations to pool resources, share information, and coordinate responses to disruptions, thereby enhancing their resilience (Scholten & Schilder, 2015).

In particular, cooperative engagement fosters situation awareness by enabling organizations to access critical information about potential risks and disruptions from their partners. Furthermore, it enhances adaptive capacity by providing firms with the flexibility to realign resources and processes in response to changing conditions (Wieland & Wallenburg, 2013).

The relationship between cooperative engagement and supply chain resilience is complex and multifaceted. Gladson-Nwokah (2020) provides insights into how internal communication influences market orientation, which can subsequently affect cooperative engagement. Effective communication fosters a collaborative environment where partners can share information and resources that enhance resilience. Akekue-Alex and Kalu (2017) support this notion by examining relationship quality and its role in fostering commitment and resilience in supply chains. Harcourt and Ateke (2018) discussed the importance of employee empowerment in enhancing resilience, particularly in customer-contact situations, where front-line employees play a crucial role in addressing customer needs and navigating challenges.

It is thus evident that cooperative engagement is crucial to building supply chain resilience. By facilitating information sharing and resource pooling, cooperative engagement enhances both situation awareness and adaptive capacity, making organizations more resilient to disruptions. Therefore, firms, especially in high-risk sectors like oil and gas, should prioritize cooperative engagement as a key strategy for improving supply chain resilience.

Zhao et al. (2019) discussed how and when firms can improve their resilience against supply disruptions by leveraging adaptive strategies; while Guo et al. (2021) discussed how manufacturers can achieve green customer cooperative engagement through the theoretical lens of capability-based view. In addition, Mendi et al. (2020) examined past cooperative engagement. These studies show that resilience is a sought-after capacity of firms that operate in highly disruptive contexts.

Bekana, (2020) explored cooperative engagement for innovation and its impact on technological and non-technological innovations in Western Ethiopian manufacturing SMEs. The study found that a portfolio approach to cooperative engagement for innovation enhances innovation performance in traditional manufacturing SMEs. Finally, the findings confirm the complementary nature of technological and non-technological innovations.

The foregoing arguments and reports situate cooperative engagement as a viable precursor to resilience. However, in view of the design of this to undertake statistical tests and interpretation, the following hypotheses are formulated:

- H₀₁:** There is no significant relationship between cooperative engagement and situation awareness of quoted oil and gas firms in Nigeria.
- H₀₂:** There is no significant relationship between cooperative engagement and adaptive capacity of quoted oil and gas firms in Nigeria.

Methodology

This study adopted a survey research design. The population of the study consisted 10 quoted oil and gas companies as enlisted in the official website of the Nigerian Exchange Group. The sample size of the study was the same as the study population. However, the study administered 5 copies of questionnaire to 5 key procurement staff of each of the 10 oil and gas companies. Thus, the study collected primary data from 50. However, 44 respondents provided data for the study. The generated data were analyzed using descriptive (mean, standard deviation, frequencies, and simple percentages) and inferential statistics (Pearson's Product Moment Correlation). All the statistical analyses were performed using the Statistical Package for Social Sciences (SPSS, version 25.0).

Analysis and Result

Table 1: Correlation between Cooperative Engagement and Situation Awareness

		Cooperative Engagement	Situation Awareness
Cooperative Engagement	Pearson Correlation	1	.427**
	Sig. (2-tailed)		.004
	N	44	44
Situation Awareness	Pearson Correlation	.427**	1
	Sig. (2-tailed)	.004	
	N	44	44

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

Source: Field Survey, 2024.

A Pearson Product Moment Correlation was run to assess the relationship between cooperative engagement and situation awareness of quoted oil and gas firms in Nigeria. The strength and direction of relationship between the variables is indicated by the Pearson Correlation Coefficient of .427. Using a sample of 44 managers as respondents, results of the analysis in Table 1 show that, cooperative engagement has moderate and positive relationship with situation awareness. Furthermore, the significance of the relationship between the variables is shown by the probability value [Sig. (2-tailed)] of 0.000 which is less than the critical value (0.01), indicating that the relationship between the variables is significant. In other words, cooperative engagement has a moderate, positive and significant relationship with situation awareness ($r = .427$, $N = 44$, $p = 0.000 < 0.01$). In view of this result, the null hypothesis was rejected.

Table 2: Correlation between Cooperative Engagement and Adaptive Capacity

		Cooperative Engagement	Adaptive Capacity
Cooperative Engagement	Pearson Correlation	1	.716**
	Sig. (2-tailed)		.000
	N	44	44
Adaptive Capacity	Pearson Correlation	.716**	1
	Sig. (2-tailed)	.000	
	N	44	44

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

Source: Field Survey, 2024.

A Pearson Product Moment Correlation was run to assess the relationship between cooperative engagement and adaptive capacity of quoted oil and gas firms in Nigeria. The strength and direction of relationship between the variables is indicated by the Pearson Correlation Coefficient of .716. Using a sample of 44 managers as respondents, results of the analysis in Table 2 showed that, cooperative engagement has strong positive relationship with adaptive capacity. Furthermore, the significance of relationship between the variables is shown by the probability value [Sig. (2-tailed)] of 0.000 which is less than the critical value (0.01), indicating that the relationship between cooperative engagement and adaptive capacity is statistically significant. In other words, cooperative engagement has a strong, positive and significant relationship with adaptive capacity ($r = .716$, $N = 44$, $p = 0.000 < 0.01$). In view of this result, the researcher rejected the null hypothesis which states that there is no significant relationship between cooperative engagement and adaptive capacity of quoted oil and gas firms in Nigeria.

Discussion of Findings

This study investigated cooperative engagement and supply chain resilience of quoted oil and gas companies in Nigeria. The empirical analyses of the study showed that cooperative engagement has positive and statistically significant correlation with supply chain resilience. These findings study agree with findings of most previous studies examined. For instance, the findings align with that of Dubey et al. (2018) who examined supply chain agility, adaptability, and alignment from the Indian auto components industry.

The findings also support the report of Mendi et al. (2020) that a positive relationship exists between past cooperative engagement and licensing, especially cooperative engagement with research institutions; that the likelihood of licensing-in increases with the number of different types of cooperative engagement partners. In addition, the findings agree with the position of Guo et al. (2021) that firms can achieve green customer cooperative engagement through the theoretical lens of capability-based view; and that of Yang et al. (2023) that green cooperative engagement positively affects trust building, which drives resilient capacity.

Conclusion and Recommendations

Based on the findings of this study and the extent to which they support the findings of previous studies examined, the study concludes that there is a significant and positive relationship between cooperative engagement and supply chain resilience of quoted oil and gas companies in Nigeria. The study therefore, recommends that quoted oil and gas companies in Nigeria should continue to engage in collaborative efforts with suppliers to achieve mutually beneficial goals; build trust, credibility, reliability, and confidence in them in relationships with suppliers for effective supply chain resilience.

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