

**SUPPLIER COLLABORATION AND SUPPLY CHAIN PERFORMANCE OF OIL AND GAS FIRMS IN RIVERS STATE**

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This study examined the link between supplier collaboration and supply chain performance of oil and gas firms in Rivers State. Supply chain performance was measured using flexibility and on-time delivery. The study adopted a cross-sectional survey research. The population of study comprised 27 oil and gas firms in Rivers State. The sample size was the same as the population. 5 respondents were drawn from each of the 27 oil and gas firms totalling 135 respondents to whom questionnaire was administered. Analysis was done using Pearson Product Moment Correlation with the aid of statistical packages for social sciences (SPSS) version 25.0 Findings revealed that supplier collaboration has a strong and positive relationship with flexibility and a very strong and positive relationship with on-time delivery. Based on the findings the study concludes that supplier collaboration significantly relate with supply chain Performance of oil and gas firms in Rivers State. The study therefore recommends that oil and gas firms should build and maintain collaborative relationships with suppliers in order to improve their flexibility and delivery lead-time, hence, enhance their overall supply chain performance.

**Keywords:** Supplier collaboration, Supply Chain Performance, Flexibility, On-time delivery.

**Introduction**

The oil and gas industry is considered highly volatile due to circumstances like sudden and abrupt price changes, irregular production and transportation costs and ever changing operating standards associated with the industry. Though various cloistered manufacturing companies have undertaken to cooperate with their suppliers, they have been unsuccessful in ensuring relationship continuity. This has led to stumpy level of retaining suppliers, loss of relationship allegiance, customer displeasure and disappointment in meeting future expectations (Tarigan & Siagian, 2021).

However, the oil and gas sector is critical to the world economy as it is the backbone of many economies. In the international oil and gas sector, people have long recognized the existence and importance of a wider range of stakeholders, but oil companies need to achieve consistent goals, which depend largely on how effective they measure and manage the performance of supply chain. (Abubakar, 2016).

Most organizations in competitive business climates focus on core competencies and outsource non-core products or services. Companies are becoming increasingly dependent on external suppliers for resources and complementary capabilities (Uvet et al., 2020). The levels of supplier capabilities and willingness have a major influence on buying company's competitive advantage (Ni & Sun, 2018). Effective supplier development supports suppliers to improve their capabilities and performance, which in return help buying firms to achieve cost reduction, flexibility, productivity improvement, quality improvement, optimal resource utilization, hence organizational competitiveness (Tarigan et al., 2020).

Supplier collaboration, a widely accepted idea, requires direct involvement of companies with supplier partners to jointly invest in processes or products for sustainable purposes (Tarigan & Siagian, 2021; Tanuwijaya et al., 2021). This collaboration provides better results than companies that move individually, so collaboration provide improvements in creating efficient and productive operations (Nwulu & Nadube, 2022). Companies in China show that collaboration with suppliers can improve operational performance and financial performance (Zhang et al.,

2015; Al-Abdallah et al., 2014). Therefore, companies need to build good partnerships with suppliers to deliver raw materials according to company needs and the quantity and quality of materials needed by the company on an ongoing basis (Huang et al., 2020).

According to Dickinger and Lalicic (2015), the success of a firm “is explained by its performance over a period of time” in a given market operation or as the firm enters a new market or offers a new product. To a large extent, the performance of a firm depends on management strategic choice and its implementation (Ramanathan & Gunasekaran, 2014). In order to achieve supply chain performance, “managers must have adequate information to enhance their planning and resource appropriation to the various markets served, products produced and territories covered by their organizations (Reza, Mohammad & Hossein, 2014).

According to Gordon (2018) for firms to improve supply chain performance “they must have clarity on the strategic intent of all the supply chain investments the firm makes, and align the firm to deliver, and measure the extent to which those objectives are achieved. The current study examined supplier collaboration as a practice of supply chain management and its influence on supply chain performance of oil and gas firms in Rivers State. Supplier collaboration is the predictor variable while supply chain performance, decomposed into flexibility and on-time delivery, is the criterion variable.

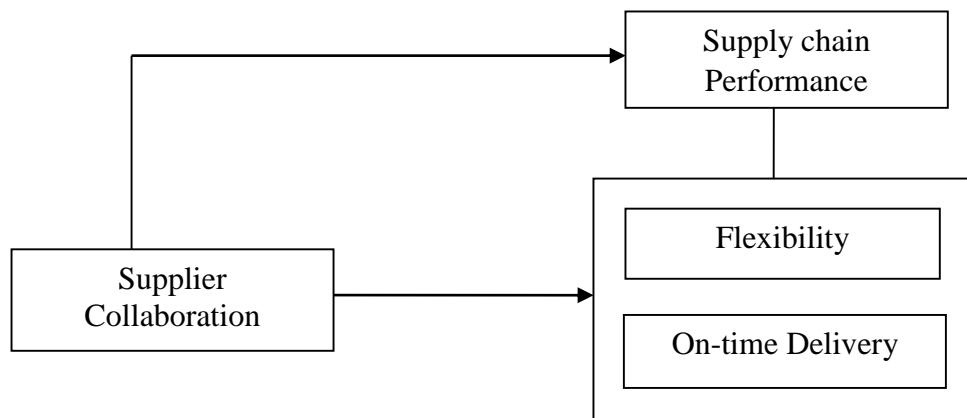


Fig. 1: Conceptual framework of relationship between supplier collaboration and supply chain Performance of oil and gas firms in Rivers State.

### Theoretical Foundation

The theoretical foundation for this study on supplier collaboration and supply chain performance include the social exchange theory developed by Homans (1958) and Thibaut and Kelly (1959) which holds that relationships are based on the exchange of value between two or more parties. Social exchange theory views interpersonal interactions from a cost-benefit perspective, much akin to an economic exchange except that a social exchange deals with the exchange of intangible social costs and benefits (respect, honour, friendship, and caring) and is not governed by explicit rules or agreements.

Homans (1961) define social exchange as exchange of activity, tangible or intangible, and more or less rewarding or costly, between at least two parties. At the intangible level, carrying on a conversation with someone costs you time and energy but can be offset by the rewards gained such as confirmation of your value and development of a relationship. Voluntary actions of individuals are motivated by the returns they are expected to bring and typically do in fact bring from others (Blau 1964).

According to Homans (1974) Social exchange theory is a social psychological and sociological perspective that explains social change and stability as a process of negotiated exchanges between parties. Social exchange theory posits that all relationships are formed by the use of a subjective cost-benefit analysis and the comparison of alternatives. The theory has roots in economics, psychology and sociology. Costs are the elements of relational life that have negative value to a person, such as the effort put into a relationship and the negatives of a partner. Reward are the elements of a relationship that have positive value. Emerson (1981) notes that social exchange involve two parties, each of whom provides some benefits to the other, and contingent upon rewards from the other.

Exchange relationship can be reciprocal or negotiated (Molm, 2003). Reciprocal exchanges occur when people experience a cost while providing a reward for their partners without specifying the exact nature of repayment but usually with an expectation that some form of repayment will happen. Such exchanges are voluntary and typically occur as a result of relationships established by prior successful exchanges (Mitchell et al., 2012). The theory argues that people calculate the overall worth of a particular relationship by subtracting its costs from the rewards it provides. If worth is a positive number, it is positive relationship. On the contrary, negative number indicates a negative relationship (Scholten & Schilder, 2015).

The theory relates well to the unique relationship established by the buyer through supplier development for mutual economic exchanges that is beneficial to both parties. The buyer empowers the supplier via financial support, technical support and supplier training in return for product innovation, reduced risks of non-supply, reduced lead time, increased product safety, improved product quality and competitive pricing for the buyer. The theory and thus be used to explain aspects of supplier partnership and financial support as this are exchange relationship which both parties anticipate some reward arising from the relationship. Social exchange theory assumes that individuals take part in an exchange only when they expect rewards from it to justify the costs of taking part in it (Bailey, 2008).

### **Concept of Supplier Collaboration**

Collaboration describes cooperation between independent but related companies to share resources and capabilities to meet the most extraordinary or dynamically changing customer needs (Ihunwo et al., 2023; Ihunwo & Opara, 2021). Thus, supply chain collaboration represent inter-firm processes and activities built on mutual trust, and risk and reward sharing, and designed to create seamless and synchronized supplies that lead to increased responsiveness and better performance (Ateke et al., 2025; Ho et al., 2020). Collaboration is increasingly being used as a form of mutually supportive relationships among supply chain partners (Huang et al., 2020; Kristianto & Tarigan, 2019).

Simatupang and Sridharan (2021) suggests that collaboration among independent, but related firms to share resources and capabilities helps them meet customers' changing needs. Gunasekaran et al. (2015) referred to supply chain collaboration as relationship developed for a long time between supply chain members with a view to lowering cost and risk as well as improving quality and market value. In a basic supply chain, upstream partners of a company are suppliers and downstream partners are customers.

Buyers to a great extent depend on supplier's resources including advanced know-hows, manufacturing competence, engineering expertise and financial backing (Yan & Dooley, 2014). Simultaneously, suppliers also depend on buyer firms for product knowledge, market needs, customer expectation and so on. So, it becomes imperative for firms to collaborate each other to obtain access and exploit mutual resources to initiate certain practices.

Yan and Dooley (2014) opined that collaboration facilitates knowledge creation through internalizing partner's knowledge. To enhance environmental sustainability partner firms, influence each other's resources and activities to exploit learning and knowledge sharing opportunities (Grekova et al., 2015). Therefore, Supplier Collaboration provides a mechanism for companies to reduce risks associated with supply uncertainty or gain access to resources, enabling them to achieve production and service goals, and ultimately improve firm performance (Green, Ogan & Hamilton-Ibama, 2024).

### **Concept of Supply Chain Performance**

Supply chain performance is the assessment of supply chain based on various variables being cost and capacity optimization (Chang, Tsai and Hsu, 2013). Supply chain performance has been defined as a systematic process of measuring the effectiveness and efficiency of supply chain operations. It is essential for organizations to effectively monitor their performance as it places them on the path of financial stability and service excellence.

Supply chain performance refers to the overall output across the supply chain link which is aligned to the objectives of a firm in terms of profitability, stock turnover, market share, investment expenditure and customer satisfaction (Kamau 2017). To improve their own environmental supply chain performance, organizations need to interact with the government, suppliers, customers, and even competitors. Cooperation with suppliers and customers has become extremely important for organizations to close the supply chain loop (Zhu et al., 2009).

According to Tarafdar and Qrunfleh (2017), Supply chain performance is the degree to which a supply chain satisfies its customers' needs and wants with respect to the product(s)' availability and time of delivery. Supply chain performance depicts how viable a supply chain is in reducing costs, inadequacies, and fulfilling customers' requirements. Alahmad, (2021) as cited in Poi and Moko, (2023), argue that supply chain performance is predicated on some parameters used to ascertain the efficiency and effectiveness of the supply chain system.

Supply chain performance can be measured using output control by using qualitative and quantitative indicators (Loppacher, 2010, as cited in Kiswili & Ismail, 2016). Therefore, for the purpose of this study, flexibility and On-time delivery are adopted as measures of supply chain performance.

### **Flexibility**

Flexibility in supply chains represent a potential source to improve efficiency and performance. Supply chain flexibility encompass flexibility dimensions that directly impact a firm's customers and are the shared responsibility of two or more functions along the supply chain, whether internal (marketing, manufacturing) or external (suppliers, channel members) to the firm. Flexibility thus combine agility and adaptability (Lee, 2004).

According to Al-Haddad and Kotnour (2015), flexibility is adaptability of a system to different environments. Brusset and Teller (2017) indicated that flexibility increase resilience. Swafford et al. (2008) asserted that supply chain flexibility represents operational capabilities within supply chain functions. Studies showed that flexibility drive agility, and higher levels of supply chain flexibility led to higher levels of agility (Chiang et al., 2012; Swafford et al., 2008).

Gilgor (2016) indicated that flexibility is the capability to modify the range of tactics and operations to the extent needed. Shishodia et al. (2019) indicated that investing in flexibility is assumed to be more beneficial than investing in creating redundancies, because flexibility in day-to-day operations help firms mitigate disruptions. Flexibility is a tool by which a firm can respond to changes in the market (Wilson & Ali, 2014). With this tool, companies can improve their

competitive position by accelerating their decision-making processes to adopt and implement new technologies (Al-Haddad & Kotnour, 2015). Flexibility also enable a system to deal with external uncertainties.

A highly flexible supply chain help firms accurately grasp market supply and demand information to reduce risks of being out of stock or overstocking. A flexible system improve efficiency of new product development and delivery reliability, thus ensuring continuity and stability. Similarly, a flexible system can help firms quickly respond to market change, thus improving monitoring and mitigating supply chain risks.

Organizational flexibility is thus a question of expectation and seizing chances or rather initiating breakthroughs by means of innovation. Flexibility is an important strategic strengths that enable organizations react to change and develop their own competitive environment (Tuan, 2016). Flexible organizations possess the ability for them to read and understand the market and respond rapidly to change in the environment (Al-Haddad & Kotnour, 2015).

### **On-time delivery**

On-time delivery (OTD) is a core measure of supply chain efficiency (Poi & Moko, 2023). The purpose is to discover if the organization is meeting its timely delivery goals or not (Patel, 2022). From this standpoint, Dalin-Kaptzan, (2022) sees OTD as a key performance indicator that indicates if a company is fulfilling its supply chain goals and objectives regarding the delivery time specified, which is crucial for determining carrier performance and guaranteeing customer happiness. In agreement with (Dalin-Kaptzan, 2022), Warchał (nd, as cited in Poi & Moko, 2023) opine that evaluating OTD enable business practitioners to assess the delivery performance and efficiency of the entire supply chain.

According to XcelPros, (2018, as cited in Poi & Moko, 2023), OTD depicts the proportion of orders placed by customers that are dispatched on or before the chosen delivery date or the date the customer promised compared to the total number of orders. This can be estimated for multiple measurement periods and is often expressed as a percentage. Timely delivery builds stronger client connections and guarantees their loyalty. Nevertheless, given the unique characteristics of supply chains, a few guiding principles are necessary. These include prioritizing customer service, creating schedules that are appropriate for the capabilities of the business, ensuring accurate forecasting, precise inventory monitoring, and strong supplier relationships.

OTD, also known delivery performance, measures the percentage of customer orders delivered “on time and in full” (Mohammaddust et al., 2017). In other words, OTD is measured when the customer receives the goods on the agreed date and time in full items from the supplier or through a third-party logistics (3PL). Qrunfleh and Tarafdar (2013) argued that OTD is perfect order delivery, through meeting certain criteria such as performing any transportation task based on right quantity, right price and right item number, and perfect receipt. Tenhiala and Ketokivi (2012) also pointed out that OTD and lead-time are key to building effective relationship between suppliers and customers.

### **Supplier collaboration and supply chain performance**

Green et al. (2024) examined the influence of supplier collaboration on operational efficiency of oil and gas firms in Port Harcourt. The study adopted a causal type of investigation and a survey research design in a non-contrived environment on a target population of twenty-four (24) oil and gas firms. Results from the statistical analysis reveals a positive and significant influence, hence, the study concludes that supplier collaboration positively and significantly influences operational efficiency of oil and gas firms in Port Harcourt.

Ihunwo et al. (2023) examined the relationship between supplier collaboration and operational performance of food and beverages firms in Rivers State. The result revealed a significant and positive relationship supplier collaboration and operational performance of food and beverages firms in Rivers State, Nigeria. The study concludes that a positive and significant relationship exists between supplier collaboration and operational performance. The study recommends food and beverages firms should establish, identify and develop joint strategies to create value in supplier relationship.

Ihunwo and Opara (2021) examined the relationship between supply chain collaboration and operational effectiveness in Nigeria firms' food and beverages. The result revealed that there is significant and positive relationship between supply chain collaboration and operational effectiveness of Nigeria food and beverages firms; while innovativeness moderates the impact on supply chain collaboration and operational effectiveness.

In a meta-analysis in 2020, Abdul et al. revealed that supplier collaboration is crucial for a firm to practice GSCM in their operations especially in SMEs. The literature also suggests that trust, dependence, knowledge and information sharing, risk and reward sharing between the firms are the major determinants of mutual collaboration. This study also suggests that collaborating with suppliers help firms practice GSCM which will bring sustainable firm performance.

Muhammad et al. (2018) studied the impact of supply chain collaboration on operational performance of manufacturing firms in Malaysia. Factor analysis and multiple regressions through SPSS was used for data analysis. The finding of this study revealed that two supply chain management approaches information sharing (IS), joint decision making (JDM) had significant effect, while Electronic Data Interchange (EDI) does not have a significant effect on operational performance.

Annie-Kaisa et al. (2017) examined supplier collaboration practices: Implications for focal firm innovation performance. The study adopted a survey research design, with a population of 165 Finnish firms and data was analyzed by means of regression analysis. The results showed the two examined practices are positively related to focal firm innovation performance: systemic purchasing and green and ethical supply management. Interestingly, early supplier involvement and inter-firm learning did not influence innovation performance.

### Methodology

This study adopted a cross-sectional survey research design. The population of the study comprised 27 oil and gas firms in Rivers State as listed in Finelib Nigeria Directory. The study adopted the entire population as the sample size. A structured questionnaire designed in 5-point Likert was used to collect data from respondents. Copies of the questionnaire were given to 5 respondents from each of the 27 oil and gas firms in Rivers State. Hence a total of 135 respondents participated in the study. To determine its reliability, the study instrument was subjected to a pilot study. The study used the Cronbach's Alpha reliability coefficient of 0.7.

**Table 1: Reliability analysis of items of all variables**

S/N	Variables	Number of items	Cronbach's Alpha Coefficient
1	Supplier collaboration	5	0.872
2	Flexibility	5	0.828
3	On-time delivery	5	0.854

Source: SPSS Output (2025).

**Univariate descriptive statistics of study variables**

In this section, descriptive statistics of the individual variables of the study are shown.

**Table 2. Supplier collaboration: a component of supplier relationship management**

	N	Min.	Max.	Mean	Std. Dev.
Our firm work together with suppliers to plan and carry out supply chain operations.	120	1.00	5.00	4.4750	.67317
Our firm share resources and capabilities with suppliers to meet the most extraordinary or dynamically changing customer needs.	120	1.00	5.00	3.9667	.70928
Our firm collaborate and facilitates knowledge creation through internalizing partner's knowledge.	120	1.00	5.00	4.4167	1.11207
Our firm provide mechanism for suppliers to reduce risks associated with supply uncertainty or gain access to resources.	120	1.00	5.00	3.7167	1.04667
We normally involve suppliers in problem solving on aspects related to the procurement process.	120	1.00	5.00	4.0000	.97877
Valid N (listwise)	120				

Source: SPSS output (2025)

Table 2 indicates that item 1 which sought to determine if firms “work together with suppliers to plan and carry out supply chain operations” had the highest mean score of 4.475. However, item 3 which sought to determine if “firms collaborate and facilitate knowledge creation through internalizing partner’s knowledge” has the greatest standard deviation of 1.112, indicating that data are most spread in item 3 than other items on the questionnaire.

**Table 3. Flexibility: A component of supply chain performance**

	N	Min.	Max.	Mean	Std. Dev.
Reduction of manufacturing lead-time	120	1.00	5.00	4.2000	.71714
Improved delivery reliability	120	1.00	5.00	4.3250	.88082
Improve responsiveness to changing market needs	120	1.00	5.00	4.1667	.74848
Rapid adjustment of product/service delivery capacity/capability	120	1.00	5.00	4.1250	.87508
Increased level of customization of product/service	120	1.00	5.00	3.8083	1.03952
Valid N (listwise)	120				

Source: SPSS output (2025)

From the analysis in Table 3, item 2 which sought to ascertain if the surveyed firm achieved improved delivery reliability has the highest mean score of 4.325. Item 5 which to ascertain if the surveyed firm achieved increased level of product customization has the highest standard deviation of 1.039, indicating that data are most spread in question 5 than other items.

**Table 4. On-time delivery: A component of supply chain performance**

	N	Min.	Max.	Mean	Std. Dev.
We strive to fulfil delivery commitment based on agreed time	120	1.00	5.00	4.2833	.79053
We build relationship with our customers and manage them through our collaborative system.	120	1.00	5.00	4.4000	1.07218
We share timely and accurate information with our customers	120	1.00	5.00	3.7417	1.03303
We deliver goods on schedule or ahead of schedule.	120	1.00	5.00	4.0083	.95702
Timely delivery builds stronger client connections and guarantees our customers' loyalty.	120	1.00	5.00	4.2000	.72876
Valid N (listwise)	120				

Source: SPSS output (2025)

The statistics in Table 4 indicates that item 2 which sought to determine if the surveyed firms build relationship with customers and manage them through collaborative system has the highest mean score of 4.490 and standard deviation of 1.072, indicating that data are most spread in question 2 than other items on the questionnaire.

### Test of hypotheses

**Table 5. Relationship between supplier collaboration and flexibility**

		Supplier Collaboration	Flexibility
Supplier Collaboration	Pearson Correlation	1	.661**
	Sig. (2-tailed)		.000
	N	120	120
Flexibility	Pearson Correlation	.661**	1
	Sig. (2-tailed)	.000	
	N	120	120

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

Source: SPSS output (2025)

From the analysis in Table 5, at a significance level of 0.05, the test indicates a correlation coefficient of 0.661 which means that a strong and positive relationship exists between supplier collaboration and flexibility of oil and gas firms in Rivers State. The correlation between the variables is significant because the probability value is less than 0.05. Therefore, the null hypothesis is rejected.

**Table 6. Relationship between supplier collaboration and on-time delivery**

		Supplier Collaboration	On-Time Delivery
Supplier Collaboration	Pearson Correlation	1	.935**
	Sig. (2-tailed)		.000
	N	120	120
On-Time Delivery	Pearson Correlation	.935**	1
	Sig. (2-tailed)	.000	
	N	120	120

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

Source: SPSS output (2025)

From the analysis of Table 6, at a significance level of 0.05, the test indicates a correlation coefficient of 0.935 which means that a very strong positive correlation exists between supplier collaboration and on-time delivery of oil and gas firms in Rivers State. The correlation between supplier collaboration and on-time delivery is significant because the probability value is less than 0.05. Therefore, the null hypothesis is rejected.

### Discussion of Findings

This study assessed the connection between supplier collaboration and supply chain performance of oil and gas firms in Rivers State. The test of hypotheses showed that supplier collaboration has a strong positive correlation with flexibility and a very strong correlation with on-time delivery.

These findings support the report that channel collaboration enhances market presence of fast moving consumer goods distributors in Rivers State (Ateke et al., 2025) and that of Green et al. (2024) that supplier collaboration positively and significantly influence operational efficiency of oil and gas firms in Port Harcourt. The current results also cohere with the report of

Ihunwo et al. (2023) that there is significant positive relationship between supplier collaboration and operational performance of food and beverages firms in Rivers State, as well as the report that there is significant and positive relationship between supply chain collaboration and operational effectiveness of Nigeria food and beverages firms (Ihunwo & Opara, 2021). These reports suggests that supply chain collaboration is necessity for firms that seek to overcome external threats through harmonious relationship among stakeholders.

In addition, the current results amplify the position of Abdul et al. (2020) that supplier collaboration is crucial for firm that want to be eco-compliant in their operations. Eco-compliance leverages trust knowledge and information sharing, and risk and reward sharing between firms in a collaboration. Furthermore, the present findings support that of Muhammad et al. (2018) information sharing and joint decision-making has significant effect on operational performance; and that of Crook et al. (2018) that when independent firms collaborate and share knowledge with others, they achieve advantages beyond what could be achieved in solo operations.

### Conclusion and Recommendations

Based on the findings of this study, the study concludes that supplier collaboration significantly relate to supply chain performance of oil and gas firms in Rivers State. That is, collaboration between supply chain partners ensure efficiency and responsiveness of supply chain. The study therefore recommend that oil and gas firms should build and maintain good collaborative relationships with suppliers in other to enhance overall performance and as a result increase delivery lead-time and flexible supply chain.

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