

**SUPPLIER DEVELOPMENT AND SUPPLY CHAIN PERFORMANCE
OF FERTILIZER MANUFACTURING FIRMS IN NIGERIA**

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ABSTRACT	KEY WORDS
The study aimed at investigating the relationship between supplier development and supply chain performance of fertilizer manufacturing companies in Nigeria. To achieve the study's objectives, two specific goals were established, and corresponding null hypotheses were formulated to address the research questions aligned with these objectives. A correlational research design was employed to ensure the effective collection and analysis of necessary data. Primary data collection methods were utilized, and a census approach was adopted to include the entire target population in the study. The sample comprised five managers from each of the seven fertilizer manufacturing companies operating in Nigeria, totaling 35 respondents. To ensure the reliability of the research instrument, Cronbach's Alpha was employed, with a reliability threshold set at 0.70. The study used the Pearson Product-Moment Correlation to measure the relationship between supplier development and the various metrics of supply chain performance, specifically innovativeness and responsiveness. The Statistical Package for Social Sciences (SPSS) software, version 23.0 was used in conducting the analysis. Findings of the study revealed a positive and significant relationship between supplier development and the supply chain performance of fertilizer manufacturing firms in Nigeria. Consequently, the study concludes that supplier development has a significant impact on the supply chain performance of these companies. Based on these findings, it is recommended that the management of fertilizer manufacturing companies in Nigeria should provide targeted education and training to partner suppliers, equipping them with essential knowledge about the firm's business focus and expectations.	Supplier development, Supply chain performance, Innovativeness, Responsiveness, Relational Exchange.

Introduction

Organisations are facing mounting pressure to discover innovative methods of generating and providing value to their customers through supplier development, as a result of the rapidly evolving global economy and diminishing global market. Establishing cooperative partnerships between companies and their suppliers, which prioritise shared investments, joint improvement initiatives, information exchange, multiple communication channels, initiatives that promote product development, strategies for joint production and scheduling, and collaborative problem-solving, is anticipated in improving the competitive capabilities of all the parties involved (Vanpoucke, Vereecke, & Boyer, 2014; Zimmermann & Foerstl, 2014). A comprehensive comprehension of the supplier connection is crucial for a company's competitiveness (Munyimi & Chari, 2018). Rajasthanendra, Mahajan, and Joshi (2012) contend that supplier development is a crucial mechanism for enhancing the rapport between consumers and suppliers. Rajendra et al. (2012) propose that enterprises should engage in supplier development initiatives in order to enhance their competitive advantage and foster long-term partnerships with suppliers.

Supplier development significantly impacts the competitive performance outcomes of the buyer. Organisations commonly employ supplier development as a means to decrease expenses, enhance quality, and ensure timely delivery of products. It also serves to explore innovative supply methods, introduce new items to the market, and provide suppliers with training on a structured approach for ongoing improvement (Lukhoba & Muturi, 2015). It is commonly known as the practice of enhancing suppliers' technical abilities, quality, delivery, and cost through a lasting collaboration between the manufacturing company and their supplier (Chavhan et al., 2012). The success of every firm in the present day depends not only on effectively managing its client connections, but also considering a broader reference group within the supply chain, which includes its suppliers. In order to fully optimise the procurement function, it is essential for any organisation to establish and nurture connections with a skilled and proficient network of suppliers, and to derive the utmost value from these partnerships. Various research has endeavored to determine the empirical correlation between the development of suppliers and the performance of the supply chain. In their study, Gudda, Keitany, and Ombok (2023) analysed how supplier integration moderate the relationship between supplier development and procurement performance in steel manufacturing firms. Mwangi and Muli (2022) examined the impact that management of supplier relationship has on the performance of food and beverage manufacturing firms. Similarly, Hassana and Cross (2020) investigated how supplier development affect the operational performance of manufacturing firms. However, the main goal of this study was to empirically examine the relationship between supplier development and the competitiveness of the supply chains in fertilizer manufacturing companies in Nigeria. The specific objectives were to examine the extent to which:

- 1) supplier development relates with innovativeness of fertilizer manufacturing firms in Nigeria
- 2) supplier development relates with responsiveness of fertilizer manufacturing firms in Nigeria

The study hypothesized that supplier development does not significantly relate with:

Ho₁: innovativeness of fertilizer manufacturing firms in Nigeria

Ho₂: responsiveness of fertilizer manufacturing firms in Nigeria

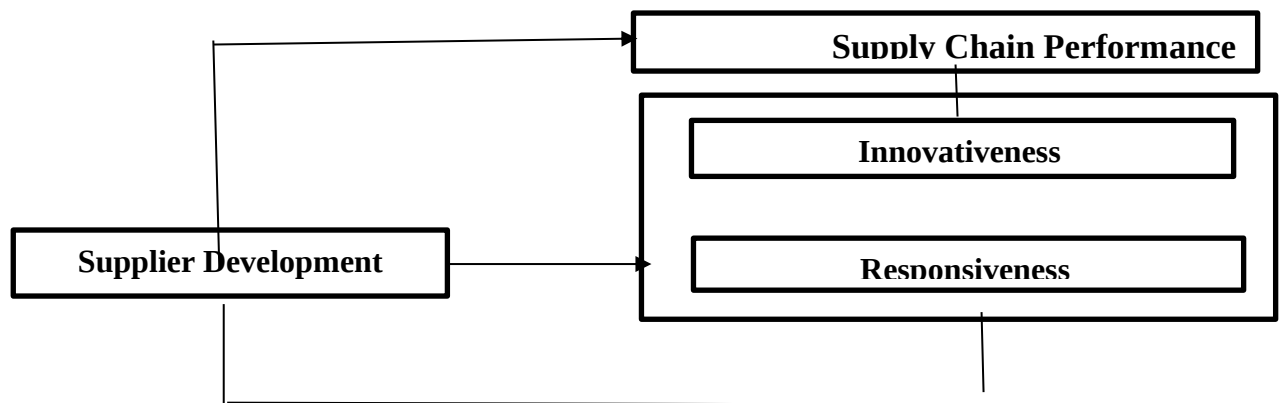


Fig 1. Conceptual Framework.

LITERATURE REVIEW

Theoretical framework

The investigation was grounded on the theory of the social exchange. The social exchange theory main premise is that it perceives socioeconomic life as a sequence of consecutive exchanges between two or more partners (Cropanzano, Anthony, Daniels, & Hall, 2017). The theory of social exchange is a perspective which combines sociology and psychology to explain how social stability and social change occur via the process of parties engaging in negotiations and exchanges. The social exchange hypothesis posits that all commercial transactions are likely to involve exchanges and interactions. The argument of the theory of social exchange is that individuals assess the total value of a certain connection by removing the expenses associated with it from the rewards it offers (Scott, Restubog, & Zagenczyk, 2013). The theory of social exchange emphasises the crucial importance of trust and commitment, collaboration, satisfaction as well as the relational norms in shaping relationships. These factors, which develop organically over time, frequently play a more significant role in regulating relationships than relying exclusively on written contracts (Cropanzano et al., 2017). The buyer's relationship with the supplier is effectively explained by the social exchange theory, which helps to foster mutually beneficial economic transactions through supplier development. Empowerment is provided by the buyer to the supplier through the provision of financially enabled support, technically enabled assistance, and training of the supplier. In return, the supplier is expected to deliver product innovation, minimise the risk of supply shortages, reduce lead times, enhance the safety product, improve quality of the product, and offer prices that are competitive to the buyer. Supplier development is the practice of enhancing performance and capabilities of suppliers by improving the overall quality as well as the supply chain efficiency.

Concept of Supplier Development

Supplier development is the actions performed by a purchasing firm to enhance the abilities and effectiveness of their suppliers, which subsequently affects the performance of the supply chain (Yawar & Seuring 2018; Kumar, Dalvi & Kant 2018). Supplier development refers to manufacturers' endeavours to enhance supplier performance by expanding their supplier base. The term "supplier development" was initially introduced by Leenders (1966) as referenced in Khuram, Ilkka, Elina, and Shpend (2016). It refers to the collaborative efforts between a buying firm and a supplier that is aimed

at improving the capabilities and performance of the supplier, while also taking to account both the short-term and long-term needs of the buying firm (Lopez, Holmen & Boer, 2012). From an organisational standpoint, the objectives of supplier development typically include cost reduction, enhanced quality and delivery times, establishment of new supply channels, introduction of new products to the market, and implementation of a systematic method to drive ongoing improvement. Providing instruction and guidance to the supplier on the procedure (Lukhoba & Muturi, 2015).

Concept Of Supply Chain Performance

Supply chain performance in the extent to which companies gain advantages, such as cost efficiency from increasing sales volumes, enhancements to existing processes or the development of new processes, and improvement in profitability, as a result of their partnerships with other organisations (Subramani, 2014). According to Sundram et al. (2016) performance of the supply chain is the methodical evaluation of the effectiveness and efficiency of supply chain activities inside an organisation. Supply chain performance is the degree to which the supply chain meets the end consumers' needs in terms of product availability, responsiveness, desired variety, capacity utilisation, and on-time delivery of products (Patel & McGaughey, 2004 as quoted in Wachira et al., 2021).

Supplier-oriented operational performance refers to the manufacturer's perspective of how major suppliers provide quality, flexibility, and timely delivery of products. Supply chain performance is a complex notion that encompasses various aspects such as main materials, basic components, subassemblies, and products. Scholars do not agree on the most effective ways to measure supply chain performance (Ibrahim & Ogunyemi, 2012). Supply chain performance measures are a method employed by supply chain managers and practitioners to evaluate and determine the effectiveness of the supply chain system. This is done by utilising a predefined set of performance metrics and indicators (Elgazzar et al., 2019). The performance metrics refer to the basic criteria for measuring the performance of the supply chain, which are established and derived from the target goals and objectives. Consequently, this study employed innovativeness and responsiveness as metrics to evaluate the supply chain performance.

Innovativeness:

Innovativeness is the ability of a company to generate and implement novel and unique ideas. It is a proactive quality that drives organisations to establish a systematic approach for transforming prospects into actual applications. Innovativeness as a concept is crucial in enhancing both the quality and performance of a product or service. It is often used as an indicator of how unique and original an innovation is (Dupeyras & Maccallum, 2013; Ade, Akanbi & Tubosun, 2017). It is a strategic capability of great relevance that may be utilised to achieve success in the ever-changing corporate environment. It suggests a willingness to accept and adapt to change, as well as a readiness to confront new difficulties (Dupeyras & Maccallum, 2013).

Responsiveness

Responsiveness of the supply chain is the ability of the supply chain to effectively and promptly respond to changes in its surrounding environment (Bruque-Camara, Moyano-Fuentes & Maqueira-Marin, 2016). Responsiveness refers to a company's capacity to consistently and promptly meet client demands or adapt to changes in the market in order to maintain its competitive edge. The firm's

responsiveness can be demonstrated by its capacity to promptly meet customers' requests to restocking inventory, as well as by an enhanced level of operational flexibility. Bruque-Camara et al. (2016) described the responsiveness of the supply chain as the capacity of organisations to effectively and promptly respond to both operational and strategic needs.

Supplier development and Supply Chain Performance

Supplier involvement in supplier growth serves the purpose of meeting the buying firm's immediate and future needs. Additionally, this participation is a form of investment that is tailored to enhance the supplier's competitive advantage or performance. In their study, Gudda, Keitany, and Ombok (2023) investigated the moderating role of the link between supplier development and procurement performance among steel manufacturing enterprises in Nairobi city county, Kenya. A census was conducted on a population of 360 employees from ten steel businesses. Findings of the study revealed that supplier development has a beneficial and substantial effect on procurement performance. The research conducted by Mwangi and Muli (2022) investigated the impact of supplier relationship management on the operational effectiveness of food and beverage manufacturing companies in Kenya. The study utilised both census and purposive sampling methods to identify a total of 189 respondents. The study found that the management of supplier relationships has a beneficial effect on food and beverage manufacturing companies' performance in Kiambu county. The study of Hassana and Cross (2020) investigated how supplier development affects the operational performance of manufacturing enterprises in Nigeria, focussing specifically on the Dangote sugar refinery. The study employed the Taro Yamene Formula to determine a sample size was 390. The analysis found that the competitive advantage of Dangote Refinery Plc is statistically and significantly influenced by the development of suppliers. In their study, In the study of Mwesigwa and Nondi (2018), the impact of supplier development on World Food Programme procurement performance in Kenya was examined. The study utilised a descriptive survey research design. The study revealed that implementation of supplier development has a notable and favourable effect on the World Food Programme (WFP) procurement performance in Kenya. It was determined that the particular abilities possessed by suppliers have an impact on the ability of a buying agency to deliver high-quality items, as well as on their innovativeness, efficiency, and capacity. Adedokun, Onikola, and Oke (2017) did a study to examine the influence of supplier development on organisational performance, with a specific focus on manufacturing enterprises located in Ibadan, Oyo State, Nigeria. The study intentionally chose four manufacturing enterprises that are operating in the Ibadan metropolitan. The sample size consisted of 120 respondents and was determined through the basic random sampling technique. The findings of the study indicated that supplier development has a substantial impact on manufacturing organisations operational performance. This impact is observed in terms of reduction in production costs, improvement of product quality, shortening of time to market, and enhancing operational flexibility. In their study, Yegon, Kosgei, and Lagat (2015) examined how supplier development impacts the performance of Sugar milling enterprises in the western area of Kenya. The study utilised the purposive technique of sampling to establish a sample size of 88 senior purchasing and marketing executives. The study results demonstrated that the development of suppliers has a beneficial impact on the performance of buyers. However, there is a lack of research about the link between supplier development and the performance of fertilizer manufacturing enterprises supply chain in Nigeria, despite the available data.

METHODOLOGY

This study employed the hypothesis testing or explanatory research design which is the quantitative phase to answer the interactions between the criterion and predictor variables of the problem under study. The relationship between supplier development and supply chain performance of fertilizer manufacturing firms in Nigeria was investigated. The population for this study comprises the seven (7) fertilizer manufacturing companies operating in Nigeria (International fertilizer development center, 2021; Africa Fertilizer, 2019). Five respondents were drawn from each of the companies based on their portfolio as they possess understanding about the issues discussed in this study. The total respondents for the study were thirty-five (35). The employed the primary source of data collection. The structured questionnaire was utilized as the data collection instrument (Isreal, 2013). The questionnaires were preferred for the study because they enabled data to be collected with investigation ease. Collated data were analyzed and presented using frequencies, tables, and the Pearson Product Moment correlation (PPMC) was used for the purpose of examining the relationship between the predictor variables and the predicted variables.

RESULTS

Univariate Data Analysis

Descriptive tools such as the mode, mean and standard deviation were emphasized in this section and utilized as a basis for providing evidence on dominant views or perceptions of the variables with regard to their manifestations within the context of the fertilizer manufacturing firms in Nigeria.

Table 1 Distribution for supplier development

	Very Extent		Low		Low Extent		Moderate Extent		High Extent		Very High Extent		Total	
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Mode
To what extent do we provide our suppliers with time information	5	14.3%	9	25.7%	0	0.0%	9	25.7%	12	34.3%	35		5.00	
To what extent do we advance our suppliers with necessary training on what is expected of them	4	11.4%	4	11.4%	0	0.0%	17	48.6%	10	28.6%	35		4.00	
To what extent do we equip our suppliers in line with our demands	6	17.1%	2	5.7%	0	0.0%	11	31.4%	16	45.7%	35		5.00	
To what extent do we empower our suppliers to make necessary decisions	1	2.9%	5	14.3%	0	0.0%	12	34.3%	17	48.6%	35		5.00	
To what extent do we collaborate with our suppliers on their functional needs	5	14.3%	11	31.4%	0	0.0%	8	22.9%	11	31.4%	35		2.00	

Source: Research survey, 2024,

Table 1 The distribution for supplier development is such that it is also observed to be mixed. The evidence provides a general position of the nature and form of interaction and relationship between the fertilizer manufacturing firms and their suppliers in the manufacturing industry in Nigeria.

Table 2 Distribution for innovativeness

	Very Low Extent		Low Extent		Moderate Extent		High Extent		Very High Extent		Total	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Mode
To what extent do we try out new ideas in the supply chain context and what frequency?	6	17.1%	17	48.6%	0	0.0%	5	14.3%	7	20.0%	35	2.00
What is the extent to which we seek out new ways to do things in our supply chain	6	17.1%	11	31.4%	0	0.0%	0	0.0%	18	51.4%	35	5.00
What is the extent to which we often introduce new ways of servicing the supply chain	7	20.0%	18	51.4%	1	2.9%	0	0.0%	9	25.7%	35	2.00
To what extent are we creative in the methods of operation in supply chain	2	5.7%	10	28.6%	0	0.0%	7	20.0%	16	45.7%	35	5.00
To what extent do we increasingly introduce new processes in the supply chain	2	5.7%	9	25.7%	0	0.0%	11	31.4%	13	37.1%	35	5.00

Source: Research survey, 2024

Evidence on the distribution for innovativeness shows that responses and perceptions are mixed on the properties for the variable. The results indicate that whereas properties such as the frequency in which new ideas are tried out and the extent to which new ways of servicing supply chains are reflected.

Table 3 Distribution for Responsiveness

	Very Low Extent		Low Extent		Moderate Extent		High Extent		Very High Extent		Total	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Mode
To what extent do we react to changes in the industry	6	17.1%	17	48.6%	0	0.0%	5	14.3%	7	20.0%	35	2.00
To what extent do we consider customers opinions on product and services provided	15	42.9%	6	17.1%	0	0.0%	0	0.0%	14	40.0%	35	1.00

To what extent are we able to know changes in customers' needs in a timely manner	10	28.6%	13	37.1%	0	0.0%	0	0.0%	12	34.3%	35	2.0
												0
To what extent do we adopt customer change request	2	5.7%	11	31.4%	0	0.0%	7	20.0%	15	42.9%	35	5.0
												0
To what extent are we able to reduce development lead time	4	11.4%	8	22.9%	0	0.0%	10	28.6%	13	37.1%	35	5.0
												0

Source: Research survey, 2023

The distribution for responsiveness indicates that there is a high level of mixed views on the aspect of responsiveness of the firms. The evidence indicates that most of the respondents consider their firms as low on the aspect of reaction to changes in the industry ($m = 2$), consideration of customer opinions in product services ($m = 1$), and ability to know changes in customer needs on a timely manner ($m = 2$); however, with regards to items such as adoption of customer requests ($m = 5$), and ability to reduce development lead time ($m = 5$) are observed to have affirmative responses that are very high.

Bivariate Data Analysis

Hypotheses were stated at a 95% confidence interval – hence a 0.05 level of significance. Tests were 2-tailed and as such non-directional – assessing both positive and negative relationships.

Table 4 Result for Relationship between Supplier Development and Supply Chain Performance

		Supplier Development	Innovativeness	Responsiveness
Supplier Development	Pearson Correlation	1	.693**	.637**
	Sig. (2-tailed)		.000	.000
	N	35	35	35
	N	35	35	35
Innovativeness	Pearson Correlation	.693**	1	.801**
	Sig. (2-tailed)	.000		.000
	N	35	35	35
	N	35	35	35
Responsiveness	Pearson Correlation	.637**	.801**	1
	Sig. (2-tailed)	.000	.000	
	N	35	35	35
	N	35	35	35

Source: Research survey, 2024,

The Pearson Correlation analysis in Table 4 indicates a robust positive and statistically significant association between supplier development and innovativeness. This is supported by a correlation coefficient of 0.693 and a probability value of 0.00 ($r = 0.693$, $N = 35$, $p = 0.000 < 0.05$). Based on this outcome, the researcher rejected the null hypothesis, which asserts that supplier development does not significantly correlate with innovativeness in fertilizer manufacturing companies in Nigeria. This suggests that there is a substantial correlation between supplier development and the level of innovativeness exhibited by fertilizer manufacturing companies in Nigeria.

The Pearson Correlation analysis in Table 4 shows a significant and positive relationship between supplier development and responsiveness. The Correlation Coefficient is 0.637, indicating a strong positive relationship. The probability value is 0.000, which is less than the critical value of 0.05 ($r=0.637$, $N=35$, $p=0.000 < 0.05$). Based on this outcome, the researcher has rejected the null hypothesis, which asserts that supplier development does not significantly relate with responsiveness of fertilizer manufacturing companies in Nigeria. This suggests that there is a substantial correlation between supplier development and the ability of fertilizer manufacturing companies in Nigeria to respond effectively.

DISCUSSION OF THE FINDINGS

The statistical analyses performed in the study shows that supplier development and supply chain performance have positive and statistically significant relationship. The evidence identifies supplier development as a substantial predictor of the behavior and capacity of fertilizer manufacturing firms in Nigeria, thus align with that of Gudda et al., (2023) that outline supplier development to have a substantial influence on procurement performance; and that of Mwangi and Muli (2022) that supplier relationship management in terms of the development of suppliers positively impacts food and beverage manufacturing firms' performance in Kiambu county. The current findings of the study also validate the findings of Hassana and Cross (2020) who demonstrated that supplier development has a statistically significant effect on competitive advantage.

The current findings also align with the findings of Mwesigwa and Nondi (2018) that supplier development have positive relationships with procurement performance; and that of Adedokun et al., (2017) that supplier development equips and patterns the characteristics of the suppliers in line with the needs of the firm. The findings also support the reports that supplier development positively affects buyer performance (Yegon et al., 2015).

CONCLUSION

From the findings of this study as well as the findings of previous studies examined, this study concluded that, supplier development positively and significantly relates with performance of fertilizer manufacturing firms supply chain in Nigeria. This indicates that supplier development as a whole enhances and deepens the nature of cooperation between the firm and its suppliers in terms of innovativeness and responsiveness. These actions to a considerable extent are largely essential and impact positively on supply chain performance of fertilizer manufacturing companies. Therefore, it is recommended that with regards to supplier development initiatives by the management of the fertilizer manufacturing firms in Nigeria, more work is required in line with educating and acquainting target partner suppliers with the essential knowledge about the firm business focus and its expectation.

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