

Supply Chain Resilience and Organizational Performance in the Nigerian Manufacturing Industry.

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Abstract

This research sought to evaluate the effect of supply chain resilience on organizational performance with emphasis on supply chain agility, collaboration, and robustness. The research used a survey research approach to obtain primary data from employees. The population of the study consisted of 435 employees. Using the Krejcie and Morgan sampling table, the study established that the sample of the study should consist of 205 respondents. The research used a questionnaire to obtain data from the population, and the findings were used to obtain 200 usable questionnaires for the study. The study used descriptive statistics and regression to obtain findings, with the hypothesis being tested at a 5% level of significance. The findings of the study showed that supply chain agility had a positive and significant effect on organizational performance. This indicates that the ability of a firm to respond to changes in the business environment leads to performance. Supply chain collaboration significantly impacts organizational performance, indicating the importance of supply chain collaboration in improving organizational performance. Supply chain robustness was found to impact organizational performance positively, indicating that supply chain robustness leads to performance. The study concluded that supply chain resilience is a key driver of organizational performance in the manufacturing sector. The study recommended that supply chain agility, supply chain collaboration, and supply chain robustness should be used as tools to drive performance in the manufacturing sector.

Keywords: *Supply Chain Resilience, Supply Chain Agility, Supply Chain Collaboration, Supply Chain Robustness, Agile.*

1. Introduction

Under the conditions of rising uncertainty, global disturbances, and the changing nature of inter-organizational linkages, the challenge to organizations is to reassess the supply chain role within the context of the larger framework of organizational performance. This involves looking past simple supply chain roles in areas related to cost efficiency and starting to understand supply chain roles in areas related to survival and competitive advantage in today's markets. The focus in supply chain strategies has therefore started to shift from looking at supply chains simply from an efficiency-oriented cost center perspective

to understanding supply chain roles in areas related to survival and competitive advantage in today's markets. The concept of supply chain resilience (SCR) can therefore be defined as this ability to predict and deal with potential disruptions in supply chain systems and restore them to a normalized or enhanced level of functionality (Naghshineh & Lotfi, 2019; Ming et al., 2021). The ability to predict and respond to such disruptions in supply chain systems tends to have a significant effect on organizational performance capabilities, based on empirical studies and research that indicate supply chain resilience has an ability to directly and indirectly affect organizational performance capabilities in organizations under crisis conditions (Chowdhury et al., 2019; Liu et al., 2018).

However, the focus on supply chain resilience has dramatically changed over the past two decades. Initially, the concept of supply chain resilience entailed the speed and ability of the supply chain to recover from disruptions (Gu & Huo, 2017; Mackay, Munoz, & Pepper, 2020). However, over the years, the concept has broadened to include the adaptability, transformation, integration, and collaboration roles of supply chain resilience (Shashi, et al. 2020; Chunsheng, et al. 2020). More in-depth analyses, such as systematic reviews, also tend to reveal that there has been considerable convergence in the field that organizations, which make strategic efforts to build supply chain resilience, are more likely to outperform their less resilient competitors in financial, operational, and market-based performance metrics (Li, et al. 2023). However, apart from maximizing on the numbers, current research indicates that resilience can be translated to functional performance through the nature and functioning of an organization and the surrounding environment.

For example, effective relational capabilities and enhanced supply chain integration are crucial as they will allow resilience to maximize overall performance through enhanced information exchange, trust, and joint responses to events that may impair an organization (Chowdhury et al., 2019; Zighan et al., 2023). Organizational human resource management and continuous organizational learnings enhance favorable skills and decision-making skills that eventually impact overall superior operational performance (Gu et al., 2023; Eryarsoy et al., 2022). Experience and evidence from various industries such as shipping, energy, manufacturing, and textile industries demonstrate that having flexibility, increased visibility, and integrated systems as forms of resilience can work as positivity catalysts and, apart from that, resilience mechanisms as defensive tools as well (Munir et al., 2023; Munir et al., 2023).

Regardless of the mounting body of research, the resilience-performance relationship is quite situation-specific, especially within developing nations such as Nigeria and Calabar in particular. Current meta-analytic research depicts essentially a positive correlation between supply chain resilience performance; however, they identify incongruities due to context factors, the variable of interest being measured, or other mediating factors (Gesese & Singh, 2025; Negi et al., 2025). Specifically, the study conducted by Hamidu et al. (2024) illustrates the paradoxical correlation between supply chain network complexity levels increasing or suppressing performance achievements from resilience efforts as a function of companies' capacity to coordinate this process effectively. Similarly, other research undertaken by Ahmed et al. (2025) exemplifies soft aspects of organizations such as culture influencing the conversion of resilience capacities to actual performance outcomes. In other words, resilience is not directly correlated with performance, but rather it is an element of organizational structures.

From a theoretical perspective, the dynamic capabilities approach provides an interesting framework for understanding when supply chain resilience has an impact on organizational performance. The dynamic capabilities approach holds that resilience represents an organizational capability that allows an organization to detect disturbances, seize opportunities for adaptation, and adjust and re-align resources when faced with a turbulent environment (Gu & Huo, 2017; Singh, 2024). When these capabilities are appropriately leveraged, it results in an increase in organizational performance metrics such as financial performance, customer service, and competitive advantage in addition to improving organizational capabilities related to day-to-day operating performance in supply chain resilience environments (Huo,

Li, & Gu, 2024; Huang et al., 2023). In this manner, supply chain resilience ceases to operate under a mere responsive approach and instead enters the realm of organizational performance strategy. Therefore, a question related to supply chain resilience continues to serve an important purpose regarding organizational performance metrics in an uncertain and potentially turbulent operating context.

The issue with the manufacturing sector in Nigeria can be considered a representation of the numerous problems that exist in the form of common supply chain glitches and logistics bottlenecks. But there are certain issues associated with the Calabar environment concerning the manufacture of goods. In this case, one can see that the infrastructure environment surrounding issues like transport and regional issues increases the various limitations and constraints imposed on manufacturers. Thus, there arises an environment that is prone to supply chain disruption in which being stable is a necessity. Even as there has been prior research conducted in Nigeria based on similar constructs such as agility and risk management, there is a lack of local, empirical knowledge that seeks to establish the specific influence of supply chain resilience on performance in Calabar's manufacturing industry. Thus, there is an apparent research void that can be filled with research that illustrates how resilience in a supply chain affects organizational performance in that context. By so doing, this research will ensure that there is a supply chain resilience solution for improved organizational performance that is based on a clear understanding of Calabar's manufacturing environment. Thus, the study specifically:

- (i) *Examine the effect of supply chain agility on performance of manufacturing firms.*
- (ii) *Determine the effect of supply chain collaboration on performance of manufacturing firms.*
- (iii) *Examine the effect of supply chain robustness on performance of manufacturing firms.*

2. Literature Review and Hypothesis Development

2.1. Supply Chain Agility and Organizational Performance

A focus on the importance of agile supply chains has been highlighted as an essential consideration for organizations that operate in environments characterized by increased uncertainty, variability, and disruption. On a broader level, agility has been defined as the organization's ability to sense changes in demand and supply and respond quickly through flexible business processes and speedy decision-making in line with the supply chain participants (Wu, 2019; Zhu & Gao, 2021). Unlike efficiency-based approaches, agile supply chains focus on speed, flexibility, and responsiveness as key drivers for ensuring the effectiveness of supply chains in dynamic environments. On a conceptual level, agile supply chains have been highlighted as a dynamic capability that enables organizations to make changes in line with the demands of the environment in which they operate (Khan & Wisner, 2019).

The literature has robustly demonstrated the importance of agile supply chain management for achieving enhanced performance outcomes. This is because agile supply chain management enables organizations to reduce lead times, improve service performance, minimize exceptions in operations, and optimize manufacturing activities in line with the demands of the environment, thus ensuring enhanced performance (Panigrahi et al., 2023). Studies that have used meta-analytic techniques and large-scale studies have demonstrated that organizations that implement agile supply chain management achieve enhanced performance in comparison to their less agile competitors in terms of efficiency, customer satisfaction, and gaining a competitive advantage (Alfalla-Luque et al., 2023). In the manufacturing sector, agility enables organizations to respond to variability in the market in terms of demand and supply risk without any compromises in productivity or quality, thus enabling an agile supply chain management approach for achieving enhanced performance.

Empirical studies suggest that the advantages of supply chain agility are the result of the following virtuous cycles: An agile enterprise demonstrates its capabilities to achieve increased speed, facilitate innovations, and refine products, processes, and frameworks of logistics in response to changing customer needs and

dynamics of the market (Ayoub & Abdallah, 2019). The literature also highlights the significance of developing the capacity to attain higher levels of agility through increased interconnectivity, information sharing, and learning to enhance agility performance (Shukor et al., 2021; Baah et al., 2022). Indeed, in emerging economies characterized by high infrastructural disruption and environmental uncertainty, supply chain agility plays a vital role in improving performance (Alkrait & Almaktoom, 2021).

Empirical findings related to performance improvement in the context of the Nigerian economy also support the literature that supply chain agility is advantageous to manufacturing organizations operating in unstable environments as they are able to attain more business value by leveraging supply chain agility (Abiji et al., 2025). The benefits of adopting supply chain agility are many, but it also has trade-offs that need to be considered. Supply chains that are highly responsive are associated with significant investments in information technology and coordination mechanisms that can increase costs if not managed effectively and can also cause inefficiencies if high responsiveness is overplayed to the detriment of long-term strategies (Dubey et al., 2019; Feizabadi et al., 2021). Thus, supply chain agilities stand out both as facilitators of high-performing organizations and as capabilities whose balancing act should not result in undesired outcomes. Based on these arguments and prior empirical evidence, this study proposes the following hypothesis:

H₁: Supply chain agility has a significant effect on organizational performance.

2.2. Supply Chain Collaboration and Organizational Performance

Collaboration in supply chains has emerged as an important phenomenon with growing trends, considering the increased uncertainties and disruptions surrounding companies' operations. Collaboration in supply chains can be described based on the extent to which companies collaborate with their upstream and downstream partners along with information sharing, decision-making, solving problems, and relational contracting to overcome mutual objectives (Ho et al., 2019; Uddin, 2022). Unlike transactional models, supply chain collaboration involves trust, openness, and shared responsibilities between companies to necessitate their operations despite organizational boundaries. It has been emphasized in literature that collaboration is an important factor for organizational performance. This collaborative method makes the supply chain more transparent, thus mitigating the issue of imbalance in this regard and hence increasing efficiency in the organization (Baah et al., 2022; Huang et al., 2023). Suppliers and customers can be included in planning and executing activities; this increases the efficiency of an organization in dealing with fluctuations in organizational performance (Khan & Wisner, 2019; Shukor et al., 2021).

Moreover, the importance of the role played by collaboration in the supply chain, in terms of enhancing the robustness and resilience of the supply chain, with the secondary effect of improving performance, has also been emphasized in the relevant literature. Chowdhury et al. (2019) found that the activities of relationship building, including collaboration and joint decision-making, have a substantial positive impact on the resilience of the supply chain, enabling the firm to recover well. Further, the findings of the study conducted by Liu et al. (2018) and Munir et al. (2023) also suggest that the activities of supply chain collaboration enable the operations of the firm to adjust to the uncertain environment, hence having a positive impact on performance. Collaboration and learning also enable the development of advancements in supply chain innovation, which plays an important role in improving the efficiency of the firm in the long run. According to the findings of the study conducted by Jimenez-Jimenez et al. (2019), the activities of collaboration enable firms to leverage the investment in technology and achieve the desired innovation. Supply chain collaboration also enables the development of improvements in green innovation efficiency, as the activities of environmental collaboration play an important role in this regard (Yang & Lin, 2020).

From a strategic management perspective, both resource-based theory and dynamic capabilities theory collectively address the construct of supply chain collaboration, with a focus on the intangible aspects involved in building a competitive advantage. Collaborations provide the ability to tap into

complementary assets, share risk, and develop intangible capabilities that are difficult to imitate by competitors (Gu and Huo, 2017; Chunsheng et al., 2020). In turbulent environments, collaboration increases agility and flexibility for firms to respond better to market changes and disruptions (Feizabadi et al., 2021; Hotlan et al., 2021). It follows therefore that organizations that invest in strong collaborative ties are in a position to realize superior performance results in comparison to others that may have isolated or adversarial supply chain relationships.

Despite the vast theoretical and practical evidence available about collaboration, there is also evidence that indicates that the performance advantages that can be derived from collaboration can be affected by how deep the process of collaboration is (Ho et al., 2019; Hendijani & Norouzi, 2023). Just sharing information without building trust can weaken performance enhancements, causing additional costs for coordination (Ho et al., 2019; Hendijani & Norouzi, 2023). It is, therefore, important for a company to focus on a holistic approach when pursuing supply chain collaboration for performance advantages. Based on the theoretical arguments and empirical findings reviewed above, this study proposes the following hypothesis:

H2: Supply chain collaboration has a significant effect on organizational performance.

2.3. Supply Chain Robustness and Organizational Performance

Supply chain robustness is an essential competency in business operations as it enables a company to build immunity to disruptions through their inherent supply chain structures and processes (Munir et al., 2023; Mackay et al., 2020). Supply chain robustness provides immunity for an organization through redundancy, standardized business processes, and diversified sourcing, thus helping manage disruptions in business environments (Sindhuja, 2021; Mackay et al., 2020). Supply chain robustness plays an important role in the optimization of efficiency, satisfaction, and performance of the organization (Hendijani & Norouzi, 2023). In an organization, supply chain robustness enables strategic planning for future business activities, thus reducing disruptions resulting from fluctuations in business environments (Aslam et al., 2023; Munir et al., 2023). However, despite robustness being an established concept for stability and continuity, it has also been identified as creating rigidity in business processes, which could hinder adaptability and responsiveness to unforeseen business disruptions (Mackay et al., 2020; Tetteh et al., 2025). Organizations that excel in robust structures but lack adaptability mechanisms may be adversely affected by business environments, as rigidity in configurations may hinder radical and innovative actions (Naghshineh & Lotfi, 2019; Liu et al., 2018). Supply chain robustness, therefore, plays a dual role of being both beneficial and detrimental to organizational stability and continuity due to its rigidity over flexibility and adaptability.

From empirical findings, it is clear that robustness has a significant impact on firm performance. In the textile industry in Pakistan, Munir et al. (2023) found that companies that showed robust supply chain management were more likely to display better efficiency and better overall finance-related performance, especially when robustness strategies were combined with overall resilience strategies. Other studies that looked at supply chains that were improved through blockchain technology found that overall technological integration improved capabilities with respect to robustness, especially with respect to more effectively resisting challenges, as well as improving overall processes with respect to increased efficiency and time optimization (Aslam et al., 2023). Companies with robust supply chain functions performed better in their ability to withstand the effects of the COVID-19 situation compared to their counterparts, which emphasizes its overall importance in particularly challenging scenarios involving pandemics such as COVID-19 (Ruel & El Baz, 2023; Hendijani & Norouzi, 2023). Accordingly, this study proposes the following hypothesis:

H3: Supply chain robustness has a significant effect on organizational performance.

2.4. Dynamic Capabilities Theory

This theory was first proposed by Teece et al. (1997). It begins with the premise that organizations exist in an ever-changing, uncertain environment in which change is constant. Organizations, according to the concept, must develop the capability to sense opportunities and threats, exploit these opportunities, and reconfigure the resources to remain competitive in the industry. One of the concepts in the theory is that quick and efficient adaptation to the environment is one of the contributors to success. The theory of dynamic capabilities is applicable to the study because it explains the contribution of supply chain agility to the performance of manufacturing organizations. Agile supply chains enable organizations to efficiently respond to fluctuations in demand, disruptions, and changes in the environment. By constantly adapting and reconfiguring the supply chain processes, organizations can improve efficiency, responsiveness, and competitiveness, thus enhancing performance.

2.5. Relational View Theory

This concept was introduced by Dyer and Singh (1998), stating that valuable resources and capabilities are not exclusive to a particular firm, as they spill over into the relationships between these firms, living in these relationships. This leads to increased cooperation and reduced transactional costs through mutual trust, open information sharing, and joint decision-making. Hence, it is strategic cooperation that leads to enhanced firm performance. The relational view theory is relevant to this research as it illustrates the role of collaboration and resilience in the supply chain on the performance of manufacturing firms. When supply chain partners collaborate, information flows are enhanced, coordination is improved, and problems are solved in a collaborative manner, thus improving efficiency and innovation in the supply chain. On the other hand, strong and well-built relationships make the supply chain more resilient, thus enabling manufacturing firms to cope with supply chain disruptions through mutual support. Hence, this theory offers a complete picture on how these two factors contribute to enhanced organizational performance.

3. Methodology

3.1. Research Design

The study employed a survey research design to investigate the impact of supply chain resilience on the performance of Lafarge Africa Plc, Calabar. The study adopted the survey research design because the design enables the casting of thorough research into the independent and dependent factors of the study among the workers at Lafarge Africa Plc who participate in the management of the company's supply chain. First, the study reached out to the management of the company to request permission for carrying out the study. The study also contacted the head of departments of the company to request the time for carrying out the study.

3.2. Sampling

The target population was 435 employees in the operational, logistics, and management departments of Lafarge Africa Plc, Calabar. A sample size of 205 was required for the population and confidence level of 95% as indicated by the table by Krejcie and Morgan (1970). A simple random sampling technique was used as employees directly involved with the decision and activities/operational levels in the supply chain were selected and targeted. A list of eligible staff members involved in supply chain and operational activities was obtained, and each member of staff was given a unique identification number. A computer-generated random number table was used as a basis for selecting a random sample, with every staff member having an equal, independent chance of being selected. A total of 205 subjects was proportionally selected out of the required departments.

3.3. Data Collection Instrument

The data were collected with the use of a structured questionnaire. The research instrument was divided into two main sections. The first part of the questions pertained to information about the respondent, while the second part focused on questions about supply chain resilience and organizational performance. All the questions were measured using a five-point Likert scale, ranging from 1, which means “strongly disagree,” to 5, which means “strongly agree,” in order to measure the perceptions and evaluations of the respondents about the different aspects of supply chain resilience.

The first questionnaire was reviewed by three different academics with expertise in the field of supply chain management and organizational performance in order to establish the content validity of the questionnaire. The pilot study was conducted by administering the questionnaire to 20 individuals who were not the main target population of the study. The reliability of the constructs was measured by using the alpha value, which was above 0.70 for all the constructs.

The process for administration was also planned carefully. The participants knew that it was voluntary to take part in this study, promised confidentiality, and asked to avoid putting any identifiers on their forms. The forms had to be returned in six weeks after administering them to participants. The way in which this research study was planned guaranteed high-quality data that can easily be replicated in a similar work setting again in the future. Table 1 indicates that reliability coefficients exceed the minimum cut-off level of 0.70.

Table 1. Reliability Test Table

Variable	Number of Items	Results
Supply chain agility	5	0.897
Supply chain collaboration	5	0.901
Supply chain robustness	5	0.817

Source: Researcher's computation (2025) from for SPSS 27.0

3.4. Data Analysis

Data was analyzed with the aid of Statistical Package for Social Sciences (SPSS) to ascertain the proposed relationships between supply chain resilience and performance of organizations. Descriptive and inferential statistics were used, with regression weights to test proposed hypotheses at a level of significance of 5%, that is, 0.05.

3.5. Hypothetical Model

The hypothesized relationships in this study can be represented as follows:

$$OP = \beta_0 + \beta_1 SSA + \beta_2 SSC + \beta_3 SSR + \mu$$

Where:

OP = Organizational Performance;

SSA=Supply chain agility;

SSC=Supply chain collaboration;

SSR=Supply chain robustness;

β_0 = Constant term;

$\beta_1 - \beta_3$ = Coefficient of model parameters;

μ = Error term.

4. Data Analysis and Results

Table 2. Bio Data of Respondents

Category	Sub-category Variable	Number Respondents	Percentage (%)
Questionnaire Response	Managerial staff	59	29
	Non-managerial staff	141	69
	Total	200	98
Sex	Male	85	43
	Female	115	57
	Total	200	100
Age	21–30	24	12
	31–40	45	23
	41–50	96	48
	51 and above	35	17
	Total	200	100
Educational Qualification	OND/NCE	65	33
	B.Sc/HND	98	49
	M.Sc/MBA	30	15
	Ph.D	7	3
	Total	200	100
Duration of Work	Less than 5 years	85	43
	6–10 years	85	43
	10 years and above	30	14
	Total	200	100

Source: Researcher’s computation, 2025.

Table 2 above shows a clear summary of demographic variables and response tendencies of the surveyed individuals. The total number of questionnaires distributed was 205, of which 200 were accurately filled and submitted, representing an 98 percent response rate, hence justifying the accuracy of the survey exercise. The male and female respondents were 43 percent and 57 percent, respectively. In terms of age group, most of the respondents (48 percent) were aged 41-50, 23 percent were aged 31-40, 17 percent were 51 and above, and 12 percent were aged 21-30, hence justifying that it was basically a mature workforce. In addition, most of these respondents (49 percent) possessed B.Sc/HND, 33 percent had OND/NCE, 15 percent had M.Sc/MBA, and 3 percent were Ph.D. degree holders, hence justifying that it was a fairly educated population. Finally, the respondents’ work experience indicated that 43 percent had worked for less than five years, 43 percent had worked for 6-10 years, and 14 percent had worked for 10 years and above, meaning that the majority had a moderate work tenure in the organizations. This data reveals a balanced representation of the respondents in terms of sex, age, education, and work experience.

Table 3: Multi Co-linearity Test

	Co-linearity statistics	
	Tolerance	Variance inflation factor (VIF)
(Constant)		
Supply chain agility	.388	5.362
Supply chain visibility	.556	8.770

Supply chain collaboration	.442	7.024
Supply chain robustness	.665	6.070

Source: Researcher’s Computation, 2025

The multicollinearity test, as shown in Table 3, implies that the independent variables of supply chain agility, visibility, collaboration, and robustness are independent enough for regression analysis. Tolerance values ranged from 0.388 to 0.665, all above the critical threshold level of 0.1, while VIF values ranged from 5.362 to 8.770, below the conservative limit of 10 (Gujarati & Porter, 2009). It would, therefore, appear that multicollinearity is within acceptable limits, rendering the estimated effects of the predictors on organizational performance reliable and not distorted to a significant extent by the correlations across variables.

Table 4. Model Summary on Supply Chain Resilience and Organizational Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin Watson
1	.933a	.871	.869	.404	1.614

Source: Researcher’s Computation, 2025

Note: Predictors: (Constant), Supply chain agility, supply chain collaboration, supply chain robustness.
Dependent Variable: organizational performance

The summary display in Table 4 shows the overall fitness of the regression equation developed to test the impact of supply chain agility, collaboration, and robustness on organizational performance. The value of the correlation coefficient $R = 0.933$ indicates that the overall independent variables have an excellent positive relationship with the dependent variable that indicates that overall organizational agility, collaboration, and robustness are well identified with the variations in their organizational performances. The value of R^2 , also known as the coefficient of determination, is 0.871, indicating that the three predictor variables in the model explain about 87.1% of the variation in the organizational performance. The adjusted value of R^2 is also high at 0.869, which takes into consideration the number of predictor variables in the model. An R^2 value is considered to be extremely good if its value is close to 1. Hence, it is amply validated that the model is explaining a large variation in the organizational performance.

The standard error of estimate is 0.404, indicating how much, on average, observed data points depart from their projection points along the regression line. A low standard error indicates that observed performance values tend to be close to the predicted values. The value obtained for the Durbin-Watson STAT is 1.614, which falls between the acceptable limits of 1.5 and 2.5. The model has good explanatory power, which indicates that variables like increased supply chain flexibility, collaboration, and robustness would have a significant and positive effect on the organizational performance of Lafarge Africa Plc, Calabar.

Table 5. ANOVA on Supply Chain Resilience and Organizational Performance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	215.108	4	53.777	330.110	.000b
	Residual	31.767	195	.163		
	Total	246.875	199			

Source: Researcher’s Computation, 2025

Table 5: ANOVA for regression analysis of supply chain agility, supply chain collaboration, and supply chain robustness on organizational performance. From this table, the F-statistic of the regression model

is 330.110 with a corresponding p-value (Sig.) of 0.000, which is less than 0.05 significant level. This implies that the regression model is statistically significant, and the independent variables put together reliably predict organizational performance. The explained variance, or the regression sum of squares, SSR, is 215.108, while the residual sum of squares, SSE, is 31.767, indicating that the variation explained by the model is significantly larger than the unexplained one. This again supports that the model is a good fit to the data. The degrees of freedom for regression and the degrees of freedom for residuals are 4 and 195, respectively. They represent the number of coefficients and the constant, while the degrees of freedom for residuals represent the free residuals. The mean square values of 53.777 and 0.163 have been used for calculating the F-statistic.

The results from the ANOVA test affirm that the combined effect of supply chain agility, supply chain collaboration, and supply chain robustness has a significant impact on the performance of the organization at Lafarge Africa Plc, Calabar. The use of the regression equation has therefore been justified.

Table 6. Regression Coefficients on Supply Chain Resilience and Organizational Performance

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	.636	.112		3.882	.000
Supply chain agility	.546	.084	.358	4.138	.000
Supply chain collaboration	.472	.062	.191	2.801	.002
Supply chain robustness	.675	.060	.186	2.942	.002

Source: Researcher's Computation, 2025

Table 6 shows the regression coefficients for testing the combined effects of supply chain agility, supply chain collaboration, and supply chain robustness on organizational performance at Lafarge Africa Plc, Calabar. The table gives both unstandardized coefficients (B), showing the amount of change in organizational performance for a one-unit change in the predictor, and standardized coefficients (Beta), which show the relative contribution of each predictor to the model. The constant (intercept) is 0.636 (p = 0.000). This means that if all the independent variables are zero, the baseline level of organizational performance is 0.636.

H₁: Supply chain agility does not have a significant effect on organizational performance

The unstandardized coefficient for supply chain agility is 0.546, t = 4.138, and p-value = 0.000. This shows the positive significance of supply chain agility on organizational performance. The result shows that the increase in supply chain agility will result in the increase of 0.546 units of organizational performance, and this will be while keeping all the other variables constant. The Beta coefficient for supply chain agility of 0.358 shows the highest significance out of the three variables.

H₂: Supply chain collaboration does not have a significant effect organizational performance

The unstandardized coefficient for supply chain collaboration is 0.472, with a t-value of 2.801, and a p-value of 0.002, which is less than 0.05. This verifies that supply chain collaboration is a significant predictor for organizational performance. A one-unit change in supply chain collaboration is seen to increase organizational performance by 0.472 units, all things being equal. The Beta (0.191) is moderately strong compared to other predictors.

H₃: Supply chain robustness does not have a significant effect organizational performance

The unstandardized coefficient for the robustness of the supply chain is 0.675, and the t-value and p-value are 2.942 and 0.002, respectively. This reveals a positive and significant impact on organizational performance. A positive impact implies that if the robustness of the supply chain measured on the unit scale is enhanced by a single unit, the performance measured on a 0.675 unit scale improves. The Beta value is 0.186, and this reveals that the contribution of the robustness of the supply chain is relatively smaller than the overall impact associated with the supply chain agility.

5. Discussion of Findings

Findings show that supply chain agility positively and significantly influences organizational performance. This means that the better the organizations became in supply chain agility, the more they achieved in terms of their performance, regardless of the changes in the other variables. This outcome supports the arguments presented by previous studies emphasizing the importance of supply chain agility as a key dynamic capability to enable organizations to respond rapidly to changes in the market, fluctuations in demand, and environmental changes (Alkrait & Almaktoom, 2021; Alfalla-Luque et al., 2023; Panigrahi et al., 2023). Supply chain agility helps to sense changes in the market, reconfigure, and rapidly react to changes, thus improving operational effectiveness (Wu, 2019; Zhu & Gao, 2021).

In addition, the effectiveness of supply chain agility depends on the theoretical underpinnings of the resource-based theory and the dynamic capabilities theory, which emphasize that organizations with the ability to make more agile changes to their supply chain configurations are more likely to outperform less agile competitors (Dubey et al., 2019; Manzoor et al., 2022). The findings of this study are in line with the arguments presented by Khan and Wisner (2019), Cadden et al. (2022), and other studies emphasizing the importance of supply chain agility to improve operational and financial performance through accelerated decision-making processes. The findings of this study substantiate the assertion presented by several authors emphasizing the importance of supply chain agility as a key driver of organizational performance, especially in uncertain environments and situations of susceptibility to disruption.

The findings indicate that when supply chain partners collaborate with each other, the firm's performance improves. This supports the findings of other studies, as collaborative relationships characterized by mutual sharing of information, joint decision-making, and trust-building were found to improve firm performance (Ho et al., 2019; Uddin, 2022). Past research has shown that collaboration in the supply chain improves coordination, eliminates wastes and inefficiencies, and improves results (Baah et al., 2022; Jimenez-Jimenez et al., 2019). In addition, with respect to supply chain resilience, the findings of this study indicate that collaboration emerged as a significant relational factor in anticipating and adapting to supply chain risks (Chowdhury et al., 2019; Naghshineh & Lotfi, 2019). Furthermore, the findings of this study indicate that a collaborative approach to supply chain management leads to innovation, thus improving firm performance (Rejeb et al., 2021; Yang & Lin, 2020). The beta coefficient indicates that although supply chain collaboration improves supply chain performance, such performance can be further enhanced by combining it with agility and other supply chain resilience practices.

The results show quite clearly that a robust and resilient supply chain positively impacts organizational performance. In brief, increasing supply chain robustness results in enhanced supply chain performance and, in turn, organizational performance. This finding aligns with previous research that included robustness among key aspects for supply chain resilience, especially in terms of supply chain continuity in cases where disruptions occur (Mackay et al., 2020; Munir et al., 2023). Robust supply chains describe redundancy in supply chain operations, stability in supply chain processes, and risk mitigation in supply

chain activities that reduce performance losses in cases where disruptions occur in supply chain activities (Ruel & El Baz, 2023; Tetteh et al., 2025). Many researchers, such as Gu and Huo (2017), as well as Singh (2024), have emphasised the fact that while robustness improves the stability of the organization; however, it lacks the qualities of agility. Hamidu et al. (2024) in their view, averred that if the emphasis increases on robustness, it results in rigidity, which in turn further limits the performance in the changing scenario. Thus, the results reveal that the contribution of robustness is more of the supportive type; it supports agility and collaboration, rather than being the performance driver itself.

6. Conclusion and Recommendations

From the above results, this research indicates that each of the roles of supply chain agility, collaboration, and robustness is essential to improving organizational performance. In this case, while comparing the factors above, the role of agility is found to be more paramount to organizational success as it is linked to organizations' capability to immediately respond to changing market conditions. Additionally, the role of collaboration in improving organizational performance stands out as it helps to reinforce coordination, trust, and the dissemination of information among members. The role of robustness in improving organizational performance is also essential as it enables organizations to remain unaffected despite the changes occurring amidst their operations.

Based on the findings of the study, the following are the recommendations:

- (i) The company should invest in activities and technology that enhance supply chain agility, which includes the achievement of real-time data visibility, flexible supply chains, and rapid decision-making processes. This is because agility is the factor with the greatest impact on supply chain performance.
- (ii) The company should strengthen its relationships with its supply chain partners by embracing supply chain collaborative activities such as sharing information and planning with the supply chain partners. This can help the company eliminate inefficiencies and increase supply chain efficiency.
- (iii) The company should also look to achieve supply chain resiliency by embracing supply chain risk mitigation strategies such as diversification of supply chains, safety stock management, and contingency planning. This should be done in such a way that resiliency does not add rigidity to the supply chains in the ever-changing business environment.

Despite the important findings and implications, there are limitations of the study that need to be pointed out. Firstly, the study relied on self-reported data, which was collected through questionnaires. In an attempt to ensure validity and reliability, certain measures were put in place; however, the perceptions of the respondents may not accurately represent actual organizational practices and performance. Secondly, the study is limited in that it relied on a singular organization (Lafarge Africa Plc, Calabar). Thus, the findings may not be generalized across the broader manufacturing industry. In other words, the operations and practices of Lafarge may differ from other manufacturing firms in Nigeria and other emerging markets.

Declarations

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This research received no external funding.

Conflict of Interest

The authors declare no conflict of interest.

Ethical Approval and Informed Consent

Informed consent was obtained from all subjects involved in the study.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon request.

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