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SUPPLY CHAIN DESIGN STRATEGIES AND EFFECTIVENESS OF PLASTIC MANUFACTURING FIRMS IN RIVERS STATE

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ABSTRACT

This study examines the relationship between supply chain design strategies and effectiveness of plastic manufacturing firms in Port Harcourt, Rivers State. This study adopted a cross-sectional survey research design. The study adopted a census population. 3 managers (operational manager, logistic manager and branch manager) were selected from each firm multiplied by 19 firms 57 respondents. Structured questionnaire instrument title "supply chain design strategies and effectiveness of plastic manufacturing firms in Rivers State" was developed on five-point likert scale. The result of the Cronbach's Alpha reliability test indicates .708 which is above .70 which implies that the items are reliable. Data analysis of hypotheses tested was tested using Spearman rank order correlation coefficient on SPSS. The study revealed that there is a significant relationship between efficient supply chain and adaptability of plastic manufacturing firms in Rivers State. There is a significant relationship between responsive supply chain and resource allocation of plastic manufacturing firms in Rivers State. There is a significant relationship between agile supply chain and goal accomplishment of plastic manufacturing firms in Rivers State. The study concluded that there is a positive correlation between supply chain design strategies and effectiveness in plastic manufacturing firms in Rivers State. In conclusion, the application of assignment models. The study recommended plastic manufacturing firms should invest in advanced technologies such as automation, Internet of Things (IoT), and data analytics, plastic manufacturing firms should focus on developing flexible supply chain strategies that allow for rapid adjustments to fluctuations in demand and supply conditions and plastic manufacturing firms should prioritize agility by fostering a culture of continuous improvement and innovation.

INTRODUCTION

Supply chain design strategies encompass various dimensions, including lead time, demand forecasting, and the cost of materials, each playing a pivotal role in the overall performance of supply chains. Lead time refers to the duration between the initiation of a process and its completion, significantly influencing customer satisfaction and inventory management (Chopra & Meindl, 2019). Effective demand forecasting is essential for aligning production schedules with market needs, thereby minimizing excess inventory and stockouts (Mentzer et al., 2001). Additionally, managing the cost of materials is crucial as it directly impacts profitability; firms must balance quality with cost-effectiveness to maintain competitive advantage (Heizer & Render, 2017). The interplay among these dimensions necessitates a holistic approach to supply chain design that considers both internal capabilities and external market conditions.

Effectiveness in organizational contexts is a multifaceted concept that encompasses various dimensions, including adaptability, resource allocation, and goal accomplishment. Adaptability refers to an organization's ability to adjust its strategies and operations in response to changing external conditions, market demands, and technological advancements (Burns & Stalker, 1961). This flexibility is crucial for organizations aiming to maintain competitiveness in dynamic environments. Resource allocation pertains to the strategic distribution of financial, human, and material resources to optimize performance and achieve desired outcomes (Mintzberg, 1979). Effective resource allocation ensures that an organization can respond efficiently to challenges and opportunities while maximizing productivity. Goal accomplishment is the ultimate measure of effectiveness; it reflects how well an organization meets its predefined objectives and fulfills its mission (Drucker, 1954).

According to Chopra & Meindl (2016) effective supply chain management can lead to enhanced operational efficiency, reduced costs, and improved customer satisfaction (Heizer et al., 2017). In the context of plastic manufacturing, where competition is fierce and market demands are continually evolving, firms must adopt innovative supply chain strategies that align with their operational goals (Christopher, 2016). The dynamic nature of the industry necessitates an understanding of how different design strategies impact overall effectiveness and performance metrics such as lead time reduction, inventory turnover, and responsiveness to

market changes (Mentzer et al., 2001). This study aims to explore these relationships within the unique socio-economic landscape of Port Harcourt's plastic manufacturing sector.

Statement of the Problem

In a rapidly evolving industry characterized by fluctuating demand and environmental concerns, firms that exhibit high adaptability are more likely to sustain their competitive advantage (Smith 2020). However, many plastic manufacturers in Port Harcourt struggle with this aspect due to rigid operational structures and a lack of innovative practices. This rigidity not only hampers their responsiveness but also limits their potential for growth and sustainability in an increasingly eco-conscious market (Johnson 2019).

Effective resource allocation involves optimizing the use of financial, human, and material resources to enhance productivity and reduce waste (Brown & Green 2021). In Port Harcourt, many firms face challenges related to inadequate infrastructure, limited access to capital, and inefficient supply chain management. These challenges often lead to suboptimal resource utilization, which can result in increased production costs and diminished profitability (Williams 2022). Consequently, firms that fail to allocate resources effectively may find themselves at a disadvantage compared to competitors who have successfully streamlined their operations.

The ability of firms to set realistic goals and achieve them is essential for long-term success (Taylor 2018). In Port Harcourt's plastic industry, many companies encounter difficulties in aligning their strategic objectives with operational capabilities. This misalignment can stem from various factors such as unclear vision statements, lack of employee engagement, or insufficient performance metrics (Davis & Lee 2023). As a result, firms may struggle not only with achieving short-term targets but also with sustaining growth over time. Addressing these issues is crucial for enhancing overall effectiveness and ensuring the viability of plastic manufacturing enterprises in the region.

Conceptual Framework

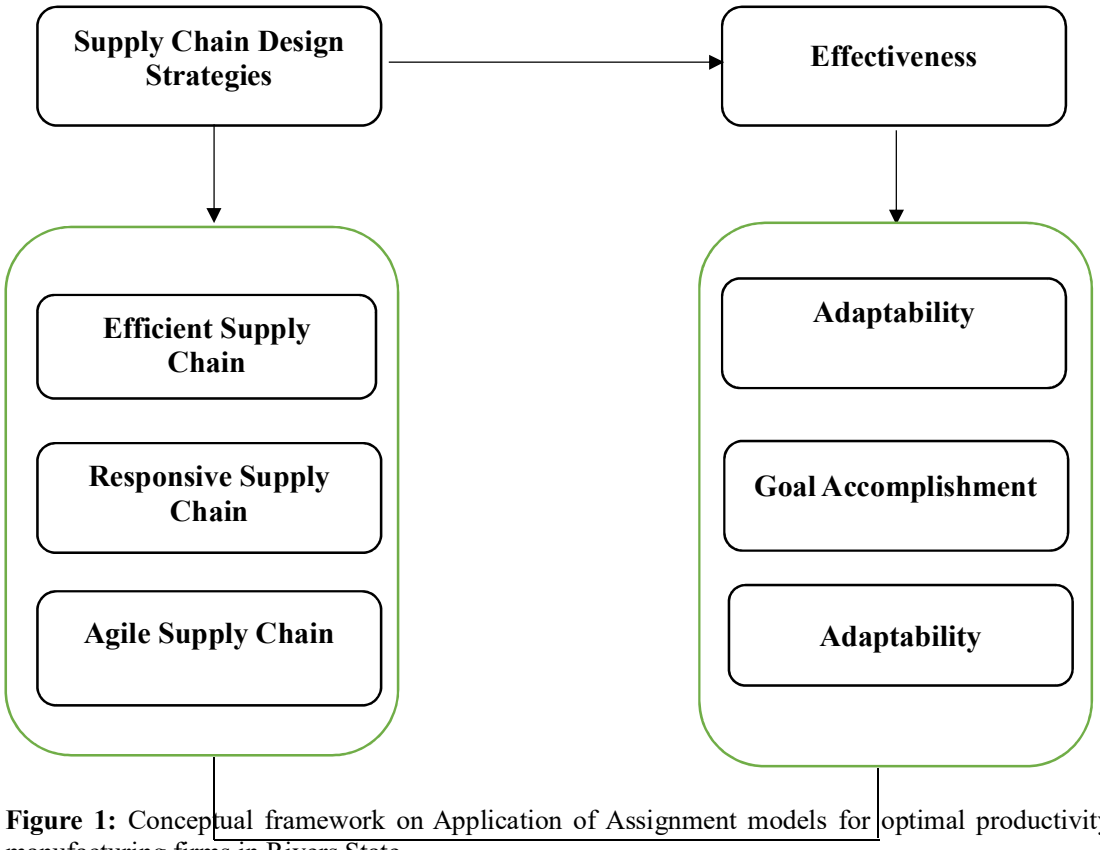

Figure 1: Conceptual framework on Application of Assignment models for optimal productivity in plastic manufacturing firms in Rivers State.
Source: Adopted from Chopra, et'al. (2014) & Hillier & Lieberman (2015)

Aim & Objectives

The aim of this study is to determine the relationship between supply chain design strategies and effectiveness of plastic manufacturing firms in Rivers State. The specific objectives are to:

i. Determine the relationship between efficient supply chain and adaptability of plastic manufacturing firms in Port Harcourt, Rivers State.
ii. Determine the relationship between responsive supply chain and resource allocation of plastic manufacturing firms in Port Harcourt, Rivers State.
iii. Determine the relationship between agile supply chain and goal accomplishment of plastic manufacturing firms in Port Harcourt, Rivers State.

Research Questions

i. What is the relationship between efficient supply chain and adaptability of plastic manufacturing firms in Port Harcourt, Rivers State?
ii. What is the relationship between responsive supply chain and resource allocation of plastic manufacturing firms in Port Harcourt, Rivers State?
iii. What is the relationship between unbalanced Assignment Model and Resource Allocation of plastic manufacturing firms in Port Harcourt, Rivers State?

Hypotheses

Ho_1: There is no significant relationship between efficient supply chain and adaptability of plastic manufacturing firms in Port Harcourt, Rivers State.
Ho_2: There is no significant relationship responsive supply chain and resource allocation of plastic manufacturing firms in Port Harcourt, Rivers State.

Ho_3: There is no significant relationship between agile supply chain and goal accomplishment of plastic manufacturing firms in Port Harcourt, Rivers State.

REVIEW OF RELATED LITERATURE

Conceptual Review

Concept of Supply Chain Design Strategies

Supply chain design strategies encompass the systematic planning and structuring of a supply chain to optimize its efficiency, responsiveness, and overall performance. According to Chopra and Meindl (2019), supply chain design involves making critical decisions regarding the configuration of the supply chain network, including the location of facilities, the distribution of inventory, and the selection of suppliers. These decisions are influenced by various factors such as market demand, production capabilities, and transportation costs. The authors emphasize that an effective supply chain design strategy aligns with a company's overall business strategy and is essential for achieving competitive advantage in today's dynamic marketplace.

In addition to network configuration, supply chain design strategies also involve considerations related to technology integration and sustainability practices. For instance, Gunasekaran et al. (2017) highlight that modern supply chains increasingly leverage advanced technologies such as artificial intelligence and big data analytics to enhance decision-making processes. Furthermore, sustainable supply chain design has gained prominence as companies strive to minimize their environmental impact while maintaining profitability (Seuring & Müller, 2008). By integrating these elements into their supply chain design strategies, organizations can not only improve operational efficiency but also respond more effectively to changing consumer preferences and regulatory requirements.

Dimensions of Supply Chain Design Strategies

Efficient Supply Chain

The concept of an efficient supply chain emphasizes cost minimization, waste reduction, and the enhancement of operational processes to deliver products in a timely and cost-effective manner. An efficient supply chain is designed to streamline operations, reducing lead times, and ensuring optimal resource utilization. This approach is critical in industries where cost competition is intense and profit margins are narrow. By leveraging strategic inventory management, logistics optimization, and supplier coordination, firms can achieve a balance between cost efficiency and service quality (Chopra & Meindl, 2020). Additionally, the efficient supply chain approach often involves the integration of technology, such as enterprise resource planning (ERP) systems, to improve information flow and decision-making processes, which further enhances operational efficiency (Christopher, 2016).

Responsive Supply Chain

A responsive supply chain is a strategic approach to supply chain design that emphasizes flexibility and adaptability to rapidly changing market conditions. Unlike traditional supply chains that prioritize cost efficiency through inventory minimization and process optimization, responsive supply chains focus on speed and agility in meeting customer demand. This concept is crucial for industries that experience volatile demand patterns, as it allows them to swiftly react to changes in customer preferences, technological advancements, and market competition. By integrating real-time data and advanced technologies such as artificial intelligence and machine learning, companies can forecast demand more accurately and adjust production schedules, inventory levels, and logistics in response to market fluctuations. According to Christopher (2000), a responsive supply chain helps firms to not only meet customer expectations in terms of product availability but also maintain competitive advantage by reducing lead times. The responsive supply chain model often involves close collaboration with suppliers and logistics partners, ensuring that the entire supply chain is aligned with the goal of meeting dynamic market needs (Holweg, 2005).

Agile Supply Chain

The agile supply chain concept emphasizes responsiveness, flexibility, and adaptability to changing market conditions and customer demands. It is a dimension of supply chain design strategies aimed at ensuring rapid responses to uncertainties, market volatility, and customization requirements (Christopher, 2000). Unlike traditional supply chains, which prioritize efficiency and cost reduction, agile supply chains focus on speed and adaptability to deliver products in a timely manner while managing unpredictable demand fluctuations. The

agile approach supports businesses in rapidly reconfiguring their processes, enabling them to respond to both anticipated and unforeseen changes in the marketplace (Lee, 2004). This flexibility is critical for industries facing fast-changing technological advancements and evolving customer preferences.

Concept of Effectiveness

According to Cameron and Whetten (1983), organizational effectiveness can be understood through various criteria, including goal attainment, resource utilization, and stakeholder satisfaction. They argue that an effective organization not only meets its stated objectives but also does so in a manner that is sustainable and responsive to the needs of its stakeholders. This perspective emphasizes the importance of aligning organizational activities with both internal capabilities and external demands, suggesting that effectiveness is contingent upon a dynamic interplay between the organization and its environment.

Furthermore, Quinn and Rohrbaugh (1983) introduced a competing values framework that categorizes organizational effectiveness into four distinct models: the open systems model, the internal process model, the rational goal model, and the human relations model. Each of these models highlights different aspects of effectiveness, such as adaptability, internal cohesion, efficiency, and employee satisfaction. The authors contend that understanding these diverse dimensions allows organizations to tailor their strategies to enhance overall performance. Thus, organizational effectiveness is not merely about achieving specific outcomes; it encompasses a broader understanding of how organizations can thrive in complex environments by balancing multiple priorities (Cameron & Whetten, 1983; Quinn & Rohrbaugh, 1983).

Measures of Effectiveness

Adaptability

Adaptability refers to an organization's ability to adjust to changing circumstances, environments, and demands in a dynamic market. It is a crucial measure of organizational effectiveness as it allows firms to respond to external challenges, exploit opportunities, and maintain competitiveness in volatile environments. Organizations that prioritize adaptability are often better equipped to innovate, restructure their operations, and adopt new technologies, which in turn enhances their resilience and sustainability (Jones et al., 2022). The adaptability of an organization is not just about its ability to survive in turbulent times but also about thriving in them by developing new capabilities and strategies that align with emerging trends and customer expectations (Gibson & Birkinshaw, 2020). Studies have shown that adaptable organizations tend to have higher levels of employee engagement and motivation, as their workforce is often empowered to make decisions and contribute to organizational change (Spreitzer & Porath, 2021).

Resource Allocation

Resource allocation plays a vital role in determining organizational effectiveness, particularly in managing resources to achieve desired outcomes. Effectiveness, in this context, refers to an organization’s ability to utilize its resources efficiently and productively to meet its goals (Jones & George, 2022). The process of resource allocation involves distributing an organization’s financial, human, and material resources across different units, projects, or tasks in a way that maximizes productivity and minimizes waste (Hitt, Ireland, & Hoskisson, 2021). A well-structured resource allocation strategy allows organizations to match the right resources to the right tasks, which leads to better performance outcomes and increased efficiency (Daft, 2020). For instance, allocating adequate financial and human resources toward research and development activities can result in innovative product offerings, which are critical for staying competitive in today’s dynamic market environments (Robbins & Coulter, 2023). Additionally, resource allocation involves not only physical assets but also the allocation of time and efforts to tasks that align with strategic goals, ensuring that the organization moves closer to its long-term objectives (Barney & Hesterly, 2021).

Goal Accomplishment

Goal accomplishment refers to the extent to which an organization or individual achieves predefined objectives. It is considered a key indicator of organizational effectiveness because it measures the success of an entity in reaching its targets (Jones & George, 2017). In an organizational context, effectiveness is often assessed by determining whether specific goals, such as financial, operational, or strategic objectives, have been met. This measure provides insight into how well resources have been allocated and whether the organization’s strategic initiatives are yielding desired results (Hitt, Ireland, & Hoskisson, 2020). For example, a company's goal might

be to increase market share by 10% over a fiscal year. The degree to which this goal is accomplished reflects not only on the company's overall effectiveness but also on the efficiency and adaptability of its processes (Daft, 2018). Thus, goal accomplishment serves as both a performance metric and a barometer for continuous improvement.

Theoretical Review

Transaction Cost Economics Theory

Transaction cost economics (TCE) theory was primarily propounded by economist Ronald Coase in his seminal work "The Nature of the Firm" (1937), where he introduced the concept of transaction costs as a critical factor influencing the structure and boundaries of firms. Later, Oliver Williamson expanded on Coase's ideas, providing a more comprehensive framework for understanding how transaction costs affect economic organization and governance structures (Williamson, 1981). The relevance of transaction cost economics theory to supply chain design strategies is particularly significant in the context of plastic manufacturing firms in Rivers State, as these firms must navigate various transaction costs associated with sourcing raw materials, negotiating contracts, and managing relationships with suppliers and distributors. By applying transaction cost economics theory principles, firms can optimize their supply chain configurations to minimize costs and enhance operational efficiency, ultimately leading to improved effectiveness in a competitive market environment (Williamson, 1996).

Assumptions of Transaction Cost Economics Theory

1. Bounded Rationality: Decision-makers have limited cognitive capabilities, which affects their ability to process information and make optimal decisions.
2. Opportunism: Parties in a transaction may act in self-interest with guile, leading to potential conflicts or exploitation.

Implications of Transaction Cost Economics Theory

1. Governance Structure Choice: Firms must choose between market-based transactions, hybrid forms, or vertical integration based on transaction cost considerations.
2. Risk Management: Understanding the potential for opportunism and uncertainty helps in designing contracts and relationships that mitigate risks.

Empirical Review

Ojo and Ogunleye (2021) carried research on supply chain design strategies in the Nigerian plastic manufacturing sector. The primary aim of this study was to evaluate the effectiveness of supply chain design strategies employed by plastic manufacturing firms in Nigeria. The objectives included identifying the various supply chain strategies utilized, assessing their impact on operational efficiency, and determining the challenges faced by these firms in implementing effective supply chain designs. The research adopted a descriptive survey design, targeting plastic manufacturing firms across Nigeria. The population comprised 150 firms registered with the Manufacturers Association of Nigeria (MAN). A sample size of 75 firms was selected using stratified random sampling to ensure representation across different regions. Data were collected through structured questionnaires administered to supply chain managers within these firms. To ensure validity, a pilot test was conducted with a small group of respondents, leading to necessary adjustments in the questionnaire. Reliability was established using Cronbach's alpha coefficient, yielding a value above 0.7, indicating acceptable reliability levels. Data analysis involved both descriptive statistics (mean and standard deviation) and inferential statistics (regression analysis) to draw meaningful conclusions from the data collected. The study found that effective supply chain design strategies significantly enhanced operational efficiency among plastic manufacturing firms in Nigeria. Key strategies identified included just-in-time inventory management, supplier relationship management, and lean manufacturing principles. However, challenges such as inadequate infrastructure and lack of skilled personnel were noted as barriers to optimal implementation of these strategies. The study concluded that while Nigerian plastic manufacturing firms are aware of various supply chain design strategies, their effectiveness is often hampered by external factors such as infrastructural deficits and internal challenges like workforce skills gaps. It was recommended that stakeholders invest in training programs for employees to enhance skills relevant to modern supply chain practices and that government initiatives focus on improving infrastructure to support efficient logistics.

Adeyemi and Salami (2022) explored analyzing supply chain effectiveness in Nigerian plastic manufacturing firms. This study aimed to analyze how different supply chain design strategies affect overall effectiveness within Nigerian plastic manufacturing companies. Specific objectives included evaluating performance metrics related to cost reduction, delivery time improvement, and customer satisfaction linked with various supply chain approaches used by these firms. A mixed-methods approach was employed combining quantitative surveys with qualitative interviews for deeper insights into practices within the industry. The population consisted of 200 plastic manufacturing companies registered under MAN; a sample size of 100 companies was determined using simple random sampling techniques for surveys while purposive sampling was used for interviews with key informants such as operations managers and logistics coordinators from selected firms. Data collection involved distributing questionnaires complemented by semi-structured interviews which provided qualitative context to quantitative findings. Validity was ensured through expert reviews while reliability was assessed through test-retest methods showing consistent results over time intervals. Statistical analysis included ANOVA for comparing means across different groups alongside thematic analysis for qualitative data interpretation. Results indicated that strategic alignment between supply chain design and business objectives led to significant improvements in cost efficiency and customer satisfaction levels among participating firms. Notably, companies employing integrated supply chains reported better performance metrics compared to those utilizing fragmented approaches. The study concluded that adopting coherent supply chain design strategies is crucial for enhancing operational effectiveness in Nigeria's plastic manufacturing sector. Recommendations included fostering collaboration among stakeholders within the supply chain network and leveraging technology solutions such as ERP systems to streamline processes.

METHODOLOGY

This study adopted a cross-sectional survey research design as the study seek to determine the relationship between supply chain design strategies and effectiveness of plastic manufacturing firms in Port Harcourt, Rivers State. The population of this study consisted of 19 plastic manufacturing firms in Port Harcourt that have been operational for over 5 year and registered with upstream as retrieved from business directory.

Population of the Study

S/N	FIRMS
1	Indorama Eleme Petrochemicals
2	Nexans Kabelmetal
3	West African Glass Industry
4	Rosat Global Concept
5	Nigerian Ropes
6	Elecktrint
7	COMETSTAR
8	Festo Automation Limited
9	Akogate Ventures
10	Rockson Engineering
11	Century Energy Services
12	Cakasa
13	GOX International
14	Candix Engineering Limited
15	RANDSON
16	H.f.schroeder (West Africa) Ltd
17	Dembal Generators
18	Schneider Electric
19	BG Cleaning Systems

Source: Nigerian Business Directory, 2024

The study adopted a census population. 3 managers (operational manager, logistic manager and branch manager) were selected from each firm multiplied by 19 firms 57 respondents. Structured questionnaire instrument title "supply chain design strategies and effectiveness of of plastic manufacturing firms in Rivers State" was developed on five-point likert scale.

The questionnaire was independently subjected to content and construct validity by three Lecturers in the Department of Management, Faculty of Management Sciences, Ignatius Ajuru University of Education, Port

Harcourt. The corrections and suggestions of the validators were affected on the finale copy of the instrument. The reliability of empirical measurement is indicated by the internal consistency. One of the most commonly used indicators of internal consistency is Cronbach's alpha coefficient. Questionnaire item statements with Cronbach's alpha reliability coefficient below the 0.70 threshold were eliminated. the test-re-test method was used. 10 copies of the questionnaire instrument were issue and some later same copies were issue through electronic media. The results were used in computation using Cronbach's alpha test of reliability.

Table 2: Reliability Statistics

Cronbach's Alpha	N of Items
.708	4

Source: Researcher Computation via SPSS Version 25

The result of the Cronbach's Alpha reliability test indicates .708 which is above .70 which implies that the items are reliable. Data analysis of hypotheses tested was tested using Sparkman rank order correlation coefficient on SPSS.

Data Analysis

HO_1: There is no significant relationship between efficient supply chain and adaptability of plastic manufacturing firms in Rivers State.

Table 3: Correlations on Efficient Supply Chain and Adaptability

			Efficient supply chain	Adaptability
Spearman's rho	Efficient supply chain	Correlation Coefficient	1.000	.845**
		Sig. (2-tailed)	.	.000
		N	57	57
	Adaptability	Correlation Coefficient	.845**	1.000
		Sig. (2-tailed)	.000	.
		N	57	57

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

HO_1: There is no significant relationship between efficient supply chain and adaptability of plastic manufacturing firms in Rivers State revealed that there is a significant relationship between efficient supply chain and adaptability of plastic manufacturing firms in Rivers State with a probability value .845 which led to acceptance of alternate hypothesis: There is a significant relationship between efficient supply chain and adaptability of plastic manufacturing firms in Rivers State.

Ho_2: There is no significant relationship between responsive supply chain and resource allocation of plastic manufacturing firms in Rivers State.

Table 4: Correlations on Responsive Supply Chain and Resource Allocation

			Responsive supply chain	Resource allocation
Spearman's rho	Responsive supply chain	Correlation Coefficient	1.000	.766**
		Sig. (2-tailed)	.	.000
		N	57	57
	Resource allocation	Correlation Coefficient	.766**	1.000
		Sig. (2-tailed)	.000	.
		N	57	57

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

Table 4: Correlations on responsive supply chain and resource allocation revealed there is a significant relationship between responsive supply chain and resource allocation of plastic manufacturing firms in Rivers State with a probability value of .766 which led to acceptance of alternate hypothesis: There is a significant relationship between responsive supply chain and resource allocation of plastic manufacturing firms in Rivers State.

Ho_3: There is no significant relationship between agile supply chain and goal accomplishment and of plastic manufacturing firms in Rivers State.

Table 5: Correlations on Agile Supply Chain and Goal Accomplishment

			Agile supply chain	Goal accomplishment
Spearman's rho	Agile supply chain	Correlation Coefficient	1.000	.743**
		Sig. (2-tailed)	.	.000
		N	57	57
	Goal accomplishment	Correlation Coefficient	.743**	1.000
		Sig. (2-tailed)	.000	.
		N	57	57

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

Table 5: Correlations on agile supply chain and goal accomplishment revealed that there is a significant relationship between agile supply chain and goal accomplishment of plastic manufacturing firms in Rivers State with a probability value of .743 which led to acceptance of alternate hypothesis: There is a significant relationship between agile supply chain and goal accomplishment of plastic manufacturing firms in Rivers State.

Discussion of Findings

Table 3: There is no significant relationship between efficient supply chain and adaptability of plastic manufacturing firms in Rivers State revealed that there is a significant relationship between efficient supply chain and adaptability of plastic manufacturing firms in Rivers State with a probability value .845 which lead to acceptance of alternate hypothesis: There is a significant relationship between efficient supply chain and adaptability of plastic manufacturing firms in Rivers State. Table 4: Correlations on responsive supply chain and resource allocation revealed there is a significant relationship between responsive supply chain and resource allocation of plastic manufacturing firms in Rivers State with a probability value of .766 which led to acceptance of alternate hypothesis: There is a significant relationship responsive supply chain and resource allocation of plastic manufacturing firms in Rivers State.

Similarly, Ojo and Ogunleye (2021) carried research on supply chain design strategies in the Nigerian plastic manufacturing sector. The study found that effective supply chain design strategies significantly enhanced operational efficiency among plastic manufacturing firms in Nigeria. Key strategies identified included just-in-time inventory management, supplier relationship management, and lean manufacturing principles. However, challenges such as inadequate infrastructure and lack of skilled personnel were noted as barriers to optimal implementation of these strategies. The study concluded that while Nigerian plastic manufacturing firms are aware of various supply chain design strategies, their effectiveness is often hampered by external factors such as infrastructural deficits and internal challenges like workforce skills gaps. It was recommended that stakeholders invest in training programs for employees to enhance skills relevant to modern supply chain practices and that government initiatives focus on improving infrastructure to support efficient logistics.

Table 5: Correlations on agile supply chain and goal accomplishment revealed that there is a significant relationship between agile supply chain and goal accomplishment of plastic manufacturing firms in Rivers State with a probability value of .743 which led to acceptance of alternate hypothesis: There is a significant relationship between agile supply chain and goal accomplishment of plastic manufacturing firms in Rivers State.

Similarly, Adeyemi and Salami (2022) explored analyzing supply chain effectiveness in Nigerian plastic manufacturing firms. Results indicated that strategic alignment between supply chain design and business objectives led to significant improvements in cost efficiency and customer satisfaction levels among participating firms. Notably, companies employing integrated supply chains reported better performance metrics compared to those utilizing fragmented approaches. The study concluded that adopting coherent supply chain design strategies is crucial for enhancing operational effectiveness in Nigeria's plastic manufacturing sector. Recommendations included fostering collaboration among stakeholders within the supply chain network and leveraging technology solutions such as ERP systems to streamline processes.

CONCLUSION

In conclusion, the study demonstrates that supply chain design strategies have a significant relationship with the effectiveness of plastic manufacturing firms in Port Harcourt, Rivers State. By aligning supply chain strategies with firm-specific goals such as resource utilization, adaptability, and operational efficiency, these firms can enhance their overall effectiveness. Effective supply chain design ensures optimal flow of materials, improved production processes, and enhanced responsiveness to market demands, ultimately contributing to the success and sustainability of these firms.

RECOMMENDATIONS

1. Plastic manufacturing firms should invest in advanced technologies such as automation, Internet of Things (IoT), and data analytics.
2. Plastic manufacturing firms should focus on developing flexible supply chain strategies that allow for rapid adjustments to fluctuations in demand and supply conditions.
3. Plastic manufacturing firms should prioritize agility by fostering a culture of continuous improvement and innovation.

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