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Supply Chain Management and Green Operational Practices in Pharmaceutical Industries in Anambra State, Nigeria

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Abstract
The study generally examined the relationship between supply chain management and operational practices in the pharmaceutical industry, Anambra State. In the doing this, the study evaluated the variables using the five (5) randomly selected and reputable pharmaceutical companies in Anambra state and with a population and sample size of 120. Survey research design was utilized principally because the data used were from primary sources. Data were analyzed with the application of descriptive statistics, while the two formulated hypotheses were tested with ANOVA analysis – with the help of Statistical Packages for Social Science (SPSS, Version 25). The findings revealed that there is a significant relationship between procurement management and waste reduction in the pharmaceutical industry of Anambra State (with p-value 0.012 < 0.05 sig. level). It was also found that significant relationship exists between customer management and sustainable consumption (p-value 0.042 < 0.05 sig level Therefore, it concludes that green operational practices play a pivotal place in fostering an effective SCM. The study recommends among others, the need to prioritize suppliers who have strong environmental sustainability practices to demonstrate a commitment to waste reduction, and enhance customer engagement by actively engage with customers to raise awareness about sustainable consumption practices in pharmaceutical companies in Anambra State.

Keywords: *Supply Chain, Management, Green, Pharmaceutical*

Introduction

Supply Chain Management (SCM) refers to the process of managing the flow of goods and services to and from a business. This includes all the steps involved in converting raw materials and components into final products and delivering them to the end customer. The primary objective of SCM is to make this process efficient and timely so that products are readily available to the consumers. Effective SCM can help streamline a company's activities to eliminate wastage, maximize customer value, and gain a competitive edge in the market. SCM encompasses various activities such as procurement, production, inventory management, logistics, and distribution. The coordination and management of these activities ensure the smooth flow of goods, services, and information from suppliers to customers. By managing the supply chain effectively, companies can

reduce excess costs, improve efficiency, and deliver products to the consumers faster. In this context, Pharmaceutical Industry may implement green operational practices to assess their impact on supply chain management outcomes which could include measures such as reduced carbon emissions, improved energy efficiency, waste reduction, enhanced sustainability, cost savings, customer satisfaction, or overall performance of the supply chain. These outcomes are influenced by the adoption and effectiveness of green operational practices within the supply chain management framework.

Supply chain management involves the flow of goods, services, information, and finances from raw material procurement to delivering the final product to consumers (Mukhamedjanova, 2020; Nzewi & Audu, 2023). In the pharmaceutical industry, effective SCM is essential to accurately forecast demand, plan production schedules, manage inventory levels, and ensure timely availability of medicines to meet patient needs. SCM helps optimize these processes, reducing stock-outs, minimizing wastage, and improving customer satisfaction. The pharmaceutical industry is regulated by several standards such as Good Manufacturing Practices (GMP), quality standards, and traceability requirements. Maintaining an efficient supply chain management system helps meet these regulations, thereby leading to enhanced product safety and integrity. Moreover, certain pharmaceutical products like vaccines and biologics necessitate temperature-controlled storage and transportation. SCM helps in maintaining the integrity of these temperature-sensitive products throughout the supply chain, ensuring their efficacy and potency. Supply chain disruptions, such as natural disasters, transportation delays, or product recalls, can have severe consequences in the pharmaceutical industry (Lawson et al, 2019).

Robust SCM practices help identify and mitigate risks, establish backup plans, and build resilient supply chains (Cherrafi et al,2022, Uchenna & Audu, 2021). Supply Chain Management (SCM) and Green Operational Practices (GOPs) play a crucial role in the pharmaceutical industry. Green Operational Practices refer to the actions and strategies adopted by organizations to minimize their environmental impact and promote sustainability within their operations. These practices can include initiatives such as reducing waste, optimizing energy usage, implementing recycling programs, and using eco-friendly materials or technologies.

Green Operational Practices focus on minimizing environmental impact, reducing carbon footprint, and promoting sustainability. In the pharmaceutical industry, adopting green practices is critical due to the following reasons such as environmental regulations; which emphasis on environmental sustainability. Pharmaceutical companies need to comply with regulations related to waste management, emissions control, energy consumption, and water usage. GOPs help achieve compliance and reduce the environmental footprint of manufacturing and distribution activities, energy efficiency which enables pharmaceutical facilities consume significant amounts of energy for manufacturing processes, HVAC systems, lighting, and other operations. Implementing energy-efficient technologies, optimizing equipment usage, and adopting renewable energy sources help reduce energy consumption and greenhouse gas emissions.

Green Operational Practices extend beyond individual operations and encompass the entire supply chain. Pharmaceutical companies collaborate with suppliers and logistics partners to promote sustainable practices, such as using fuel-efficient transportation, optimizing route planning, and reducing packaging materials.

Implementing green operational practices in the pharmaceutical industry not only helps protect the environment but also enhances brand reputation, meets customer expectations for sustainability, and improves operational efficiency (Yildiz & Sezen, 2019, Uchenna & Audu, 2022).

Statement of the Problem

The problem statement of the study "Supply Chain Management and Green Operational Practices in the Pharmaceutical Industry in Anambra State" focuses on the intersection of two key areas: supply chain management and green operational practices within the pharmaceutical industry specifically in Anambra State, Nigeria. Anambra State's pharmaceutical industry lacked effective supply chain management strategies and environmentally sustainable operational practices. This presents several challenges such as inefficiencies in the supply chain, increased costs, environmental pollution, and a negative impact on public health and the overall well-being of the local population. These challenges include issues related to procurement, customer and supplier management. Inefficient supply chain practices can lead to delays in product availability, increased costs, and poor customer service. This makes it difficult for businesses to adequately address healthcare system challenges such as supply shortages, tenders for national supplies, and epidemics.

Objectives of the Study

The broad objective of the study is to determine the relationship between supply chain management and green operational practices in pharmaceutical industry in Anambra State.
Specifically, the study seeks to:

1. Ascertain the relationship between procurement management and waste reduction in the pharmaceutical industry of Anambra State.

2. Determine the relationship between customer management and sustainable consumption in the pharmaceutical industry in Anambra State.

Research Questions

To effectively address the focus of the study, the following research questions were raised:

1. Wha is relationship between procurement management and waste reduction in the pharmaceutical industry of Anambra State?

2. What is the relationship between customer management and sustainable consumption in the pharmaceutical industry in Anambra State?

Research Hypotheses

The following null hypotheses guided the study:
1. There is no significant relationship between procurement management and waste reduction in the pharmaceutical industry of Anambra State.
2. There is no significant relationship between customer management and sustainable consumption in the pharmaceutical industry in Anambra State.

Scope of the study

The study on Supply Chain Management and Green Operational Practices was restricted only to the pharmaceutical industries in Anambra State. The independent variables are procurement management, customer management and supplier management while the dependent variables are waste reduction, sustainable consumption and waste management cost. The geographical scope of the study is Anambra State. The pharmaceutical industries selected include Barker Alfanxo Pharmaceutical Industries (Nig) Limited, Obosi, Chazmax Pharmaceutical Industries (Nig) Limited, Obosi, Damazo Pharmaceutical Indutries (WA) Limited, Nkpor, Franoson Mannyon International Co. Ltd, Ojoto and Rico Pharmaceutical Industries Limited, Onitsha.

Literature Review

Supply Chain Management (SCM)

There are different ways to define supply chain management (SCM), but they can be grouped into three main categories: a management philosophy, the implementation of such a philosophy, and a set of management processes. Because of these different interpretations, the term "supply chain management" can cause confusion for those researching the topic or trying to adopt a supply chain approach to management.

Monczka, Trent, and Handfield (2018) describe Supply Chain Management (SCM) as a process that involves all materials functions reporting to an executive who is responsible for coordinating the entire materials process. This process also requires joint relationships with suppliers across multiple tiers. The primary objective of SCM is to ensure the effective and efficient flow of materials, information, and finances across the entire supply chain network. It involves a total systems perspective that encompasses multiple functions and multiple tiers of suppliers. SCM plays a vital role in reducing costs, improving customer satisfaction, and enhancing overall business performance. La Londe and Masters (2015) define Supply Chain Strategy as a long-term agreement between two or more firms in a supply chain, which involves the development of trust and commitment to the relationship, integration of logistics activities, and sharing of demand and sales data. This process may lead to a shift in the locus of control of the logistics process. In summary, the objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers. This is done to achieve a balance between the sometimes-conflicting goals of high customer service, low inventory management, and low unit cost (Stevens, 2019).

According to Houlihan (2018), there are differences between classical materials and manufacturing control and supply chain management. Firstly, supply chain management views the supply chain as a single process, and responsibility for different segments of the chain is not fragmented among functional areas like manufacturing, purchasing, distribution, and sales. Secondly, strategic decision-making is crucial for supply chain management as "supply" is a shared objective of every function in the chain, and it is strategically significant because it impacts overall costs and market share. Thirdly, supply chain management requires a different perspective on inventories, which are used as a balancing mechanism of last resort, not the first. Finally, integration is required instead of interfacing for a new approach to systems. Thus, as Jones and Riley (1985) stated, supply chain management deals with the total flow of materials from suppliers

through end-users. Therefore, is an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user."

The term "supply chain management" has had various definitions throughout history. However, this study aims to develop a single, encompassing definition of SCM. After reviewing the literature, it is evident that supply chain management involves multiple firms, business activities, and coordination across functions and firms within the supply chain. Thus, for the purposes of this study, supply chain management is defined as the strategic and systemic coordination of traditional business functions and tactics within a particular company and across businesses within the supply chain. This coordination aims to improve the long-term performance of individual companies and the supply chain as a whole. The definition implies a lot about the management of supply chains and led to the development of the study's conceptual model. To fully examine this definition and model, the role of individual business functions and how they are coordinated across functions and companies must be examined. Inter-functional coordination involves examining the roles of trust, commitment, risk, and dependence on internal functional sharing and coordination viability. Inter-corporate coordination includes functional shifting within the supply chain, the role of various types of third-party providers, how relationships between companies should be managed, and the viability of different supply chain structures. According to Kaufman (2017), the purpose of supply chain management is to remove communication barriers and eliminate redundancies through coordinating, monitoring, and controlling processes. Clancy (cited in Putzger, 2018) described the integration of supply chains as an attempt to elevate linkages within each component of the chain, facilitate better decision-making, interact in a more efficient way, create supply chain visibility, and identify bottlenecks.

Procurement Management

Procurement management is a crucial element of supply chain management that ensures the organization acquires resources efficiently and effectively to support its operations while optimizing costs, managing risks, and maintaining supplier relationships. The process involves planning, sourcing, purchasing, and controlling goods, services, or resources needed by the organization to meet its operational requirements. The aim is to acquire the resources in the appropriate quantity, quality, and at the right time while minimizing risks and optimizing costs.

In the perspective of supply chain management, procurement management plays a crucial role in ensuring the smooth flow of materials and resources throughout the supply chain. It involves activities such as identifying the requirements of the organization, selecting suitable suppliers or vendors, negotiating contracts and pricing, managing supplier relationships, and monitoring the performance of suppliers.

The primary objectives of procurement management include: Ensuring the availability of required materials or resources that aims to ensure that the necessary inputs are available when and where they are needed, thereby preventing disruptions in the production or service delivery process, obtaining the best value for money which seeks to secure goods and services at the most favorable terms, including competitive pricing, favorable payment terms, and quality assurance, to optimize the organization's financial resources, managing supplier relationships that builds and maintains strong relationships with suppliers or vendors and includes activities such as supplier evaluation and selection, contract negotiation, performance monitoring. Moons, K., Waeyenbergh, G., &Pintelon, L. (2019)

Procurement management also involves assessing and mitigating risks associated with the procurement process, such as supply chain disruptions, quality issues, and compliance risks. This may involve implementing risk management strategies, diversifying the supplier base, and establishing contingency plans.

The procurement management process includes the transactional purchasing of goods and services, and integrates with accounts payable to complete the source-to-settle cycle by providing supporting documents to help with the processing of supplier invoices for payment.

Customer Management

Customer management is the process of comprehending, engaging, and satisfying the needs and expectations of customers throughout the supply chain. It involves activities aimed at building and maintaining strong relationships with customers, managing their expectations, and delivering value to enhance customer satisfaction (Edna & Samson, 2021).

In supply chain management, customer management plays a critical role in ensuring that products or services are delivered to the end customers in a timely, efficient, and satisfactory manner. Its objectives are aimed at enhancing customer satisfaction by understanding and meeting customer needs, expectations, and preferences. Customer management aims to enhance overall customer satisfaction and loyalty, improve supply chain responsiveness to align supply chain activities to customer demand, reduce lead times, and improve responsiveness to customer requirements. It also focuses on building long-term, mutually beneficial relationships with customers, fostering trust, and encouraging repeat business. Increasing profitability leads to increased sales, higher profitability, and positive word-of-mouth referrals, contributing to the overall success of the supply chain. Customer management also involves analyzing a business's communication data (i.e., social media platforms, emails, live chat, etc.) to interpret and manage the needs and expectations of customers. In supply chain management, customer management is simply about understanding and serving the needs of customers throughout the supply chain, from initial demand planning to order fulfillment and post-sales support. By effectively managing customer relationships, organizations can gain a competitive advantage and achieve sustainable success in the marketplace (Kampani & Jhamb, 2020). Finally, it aims to improve customer service relationships, assist in customer retention, and drive sales growth.

Green Operational Practices

Green operational practices refer to environmentally friendly strategies and actions implemented by organizations to reduce their negative impact on the environment while conducting their day-to-day operations. These practices aim to conserve resources, minimize waste generation, and promote sustainability.

The benefits of Green Operational Practices include environmental conservation, cost savings, enhanced reputation, regulatory compliance, and employee engagement (Hellmeister & Richins, 2019). Overall, implementing green operational practices not only benefits the environment but also contributes to long-term financial stability, reputation enhancement, and employee satisfaction.

Waste Reduction

Waste reduction is an important aspect of green operational practices that helps to minimize environmental impact, reduce costs, and improve overall efficiency (Ahmed et al, 2018). Waste reduction refers to the efforts and strategies implemented to minimize or eliminate waste throughout the entire supply chain, from raw material sourcing to production, distribution, and disposal. Waste can take various forms, such as excess inventory, defects, overproduction, transportation inefficiencies, packaging waste, and environmental pollution. Incorporating waste reduction as a variable in supply chain management can yield several benefits for businesses and the environment Packaging waste represents a significant portion of overall waste in supply chains. Adopting sustainable packaging practices, such as using recyclable or biodegradable materials, reducing packaging size and weight, and implementing returnable packaging systems, can help reduce waste and environmental impact. Implementing a culture of continuous improvement across the supply chain is essential for waste reduction. Encouraging employees to identify and propose waste reduction ideas, promoting employee training and engagement, and regularly reviewing and optimizing processes can lead to sustained waste reduction outcomes. The regulatory compliance of adhering to waste management regulations and environmental standards is crucial for sustainable supply chain management. Compliance with regulations ensures proper waste disposal, reduces environmental risks, and helps maintain a positive brand image. By integrating waste reduction, pharmaceutical industries can achieve several benefits, including cost savings, improved operational efficiency, enhanced sustainability, and a reduced environmental footprint. It requires a holistic approach, collaboration across supply chain stakeholders, and a commitment to continuous improvement to achieve significant and lasting waste reduction results (Elemure, 2023).

Sustainable Consumption

The definition of sustainable consumption, as defined in the Oslo Symposium in 1994, refers to the use of goods and services that meet basic needs and improve the quality of life. It also involves minimizing the use of natural resources, toxic materials, waste, and pollution over the entire life cycle of the product, in order to avoid jeopardizing the needs of future generations (Schaar & Reiser, 2022). Sustainable consumption is the use of services and products that fill a human need while also reducing the negative impact on the environment. In our current world, the production of goods and services often has a negative impact on the planet. Each produced product has a journey, starting as a resource from the Earth, making its way to the consumer, and then either recycled or wasted. Sustainable consumption means that the consumer is critical in deciding what products to buy, taking into account the methods used in producing the item and choosing ethically produced items with the least negative impact on the planet possible.

The benefits of sustainable consumption are great to the use of resources and products in a manner that minimizes negative environmental impacts, promotes social well-being, and supports long-term economic viability. It involves adopting consumption patterns and behaviors that aim to reduce waste, conserve resources, and prioritize environmentally and socially responsible choices. In green operational practices, sustainable consumption focuses on how companies can encourage and enable their customers or users to make sustainable choices. It involves strategies and initiatives aimed at influencing consumer behavior and promoting environmentally friendly products or services.

The main objective of sustainable consumption is to encourage people to adopt more sustainable and responsible consumption habits. Organizations can contribute to this goal by implementing strategies

and initiatives that promote sustainable choices. By doing so, they can help reduce environmental impacts, conserve resources, and create a more sustainable society.

Theoretical Framework

This study is anchored on Green Supply Chain Management (GSCM) theory. Khan and Islam (2012) developed this green supply chain framework to achieve sustainability in refining operations. The framework proposed supply chain model is developed based on the work of Lakhal et al. (2007). It analyses the structure of the supply chain from production, transportation, and distribution to end users. Green supply chains can be defined as logistics systems that ensure the production and distribution of products on a global scale in an environmentally friendly way (BarbosaPóvoa 2009). In order to achieve this objective, companies need to focus on designing and optimizing their logistics structures while taking into account the balance between profits and environmental impact.

The pharmaceutical industry plays a crucial role in providing healthcare products and services. However, it also has significant environmental impacts due to the consumption of resources, generation of waste, and the potential for pollution. In response, many pharmaceutical companies have started implementing green supply chain management practices to improve their environmental performance. Anambra State (located in Southeastern, Nigeria) is home to a growing pharmaceutical industry. The state is known for its strong pharmaceutical manufacturing sectors, with several companies producing a wide range of pharmaceutical products. As the industries expand, it becomes increasingly important to consider the environmental impact and sustainability of pharmaceutical operations in Anambra State.

Applying GSCM theory to this study provides a comprehensive understanding of how green practices are integrated into supply chain management processes in the pharmaceutical industry in Anambra State. This approach highlights the relevance of GSCM in addressing environmental challenges, complying with regulations, meeting stakeholder expectations, achieving cost savings, and driving innovation and collaboration.
Finally, by applying GSCM theory to this study, it contributes to the development of sustainable and environmentally responsible supply chains in the pharmaceutical sectors in Anambra State.

Empirical Review

Recently, numerous of past works have evaluated green SCM in various disciplines, for example: Egbungwu, & Eze (2021) saw the need to emphasize on the supplier for improving the weaknesses of SCM regarding the capabilities of suppliers' green management. That is why the research aimed to examine the links among rational efficiency, operational efficiency, organizational performance and green SCM. Its' respondents were Operations/SC managerial levels of 223 selected Electronics companies. The variables in the study are: Relational efficiency, business performance, green SCM practices, operational efficiency and employee satisfaction; while the theoretical framework deployed for this study is the theory of Resource dependence. The findings of paper indicated that green SCM practices had the direct link with business performance; also, green SCM practices had the indirect relationship with business performance and relational efficiency and operational efficiency as the moderation factors.

Kumar and Rahman (2018) selecting 157 Manufacturing companies explored the most important factors which impact sustainability SCM. Aligned with Resource based theory, it however revealed that top management commitment influenced on external influence positively, also, there existed the positive linkage buyer-supplier relationship, social performance, economic performance and environmental performance.

Chinyere and Nwokocha (2020) utilized 103 Suppliers in construction industry to also examine the linkages among corporate competitiveness, external green integration, green SCM and green cost reduction. This study aligned with Social Capital Theory in contributing to the literature regarding the role of buyers and customers satisfaction in the issue of environmental capabilities. With Environmental collaboration, corporate competitiveness, green alignment, reduction of green cost and information sharing as variables, it demonstrated that, there were the positive links between supplier's communication and green cost reduction, also environmental collaboration mediated the link between information sharing and performance.

Research Methodology

The study adopted a survey research design to ascertain the relationship that exists among the subject variables and the sub variables in the study. The population of interest of this study comprises of Operational Staff and the Management Staff. The population totaled in this study is one hundred and twenty (120) Operational Staff and the Management Staff in the five (5) selected pharmaceutical industries in Anambra State, Nigeria. The population was distributed proportionately among the 5 industries.

The study adopted a total enumeration method sampling technique since the population of this study was quite sizeable, which aims to include every single individual or element within the population as part of their study (i.e, 120 as in this case). This method ensures that no sampling or estimation is required, providing a comprehensive and accurate representation of the entire population under investigation. By utilizing a total enumeration method, the researcher will have access to complete and precise data, allowing for a more in-depth analysis and robust conclusions. Data for the research were gathered from primary source and secondary source. Primary data are first hand data obtained from the respondents. Secondary data were sourced from text books, journals, earlier publications and the internet. The data generated were analyzed using descriptive statistics, while the formulated hypotheses were tested using ANOVA analysis on *Statistical Packages for Social Science* (SPSS, Version 25) - at 5% level of significance

Data Presentation and Analysis

This section of the study is concerned with the presentation, analysis and interpretation of data collected. This part deals with the presentation and analysis of data collected via questionnaire. Questionnaire data were analyzed using mean. Computer Ms. Excel Z –Test Statistical model was used to test the three (3) hypotheses.

Analysis of Data Related to Research Questions

Decision Rule:

The decision in the analysis section is determined by the average of the response of respondents. Strongly Agreed (5 points), Agreed (4 points), Disagreed (3 points), Strongly Disagreed (2 points) and Undecided (1 point). The average of the responses:

$$\frac{(5 + 4 + 3 + 2 + 1)}{5} = 3.0$$

Therefore, mean score below 3.0 would be considered as rejected and mean score of 3.0 and above will be considered as accepted

Table 1: Research Question 1: Showing the responses to the research question: What is relationship between procurement management and waste reduction in the pharmaceutical industry of Anambra State?

S/N	Question Items	Total	Mean(X)	Remark
1.	Separation of hazardous and non-hazardous waste is related to waste reduction and procurement management in the pharmaceutical industry of Anambra State.	**85**	3.61	Accepted
2.	Use of controls and filters for harmful discharges and emissions is related to waste reduction and procurement management in the pharmaceutical industry of Anambra State.	**85**	3.68	Accepted
3.	Reduce use of virgin raw materials by using recycled materials or reusing materials for product manufacturing is related to waste reduction and procurement management in the pharmaceutical industry of Anambra State.	**85**	4.12	Accepted
4.	Putting in place measures for recycling and reuse of waste water is related to waste reduction and procurement management in the pharmaceutical industry of Anambra State.	**85**	4.18	Accepted
5.	Putting in place measures to control leakages, emanating from damaged pipes spillages, losses due to improper handling or faulty machinery is related to waste reduction and procurement management in the pharmaceutical industry of Anambra State.	**85**	4.25	Accepted
6.	Decreased consumption or total elimination of hazardous and toxic materials (e.g. changing to aqueous cleaners) is related to waste reduction and procurement management in the pharmaceutical industry of Anambra State.	**85**	3.68	Accepted
7	Reduce energy consumption by using alternative sources of energy (e.g. biogas, solar, wind etc) is related to waste reduction and procurement management in the pharmaceutical industry of Anambra State.	**85**	4.07	Accepted
8	Maintain an inventory of the firm's environmental impacts and identification of proper indicators of improvement (waste, emissions, and effluent generation) is related to waste reduction and procurement management in the pharmaceutical industry of Anambra State.	**85**	4.24	Accepted
9	Use of standardized components and parts to facilitate reuse is related to waste reduction and procurement management in the pharmaceutical industry of Anambra State.	**85**	4.24	Accepted
10	Reduction in energy consumption by switching off idle machines, lights after working hours, installation of translucent roofing and glass blocks is related to waste reduction and procurement management in the pharmaceutical industry of Anambra State.	**85**	4.45	Accepted

Sources: Field Survey, 2023.

Test of Hypotheses 1

Hypothesis One

Ho_1: *There is no significant relationship between procurement management and waste reduction in the pharmaceutical industry of Anambra State.*

Table 2. showing ANOVA Analysis for hypothesis 1

ANOVA Analysis.

		Sum of Squares	df	Mean Square	F	Sig.
Hypothesis _1	Between Groups	11171.841	12	930.987	1.123.	0.012.
	Within Groups	.000	2	.000		
	Total	11171.841	14			

Source: SPSS (ver. 25).

Decision
Since the sig. value (P-value) of 0.012 is less than the 5% level of significance (i.e, 0.012 < 0.05), we then reject the null hypothesis and accepted the alternate hypothesis - which states that: *'There is a significant relationship between procurement management and waste reduction in the pharmaceutical industry of Anambra State.'*

Research Question Two Analysis

Table 3: Research Question 2: *Showing the responses to the research question: What is the relationship between customer management and sustainable consumption in the pharmaceutical industry in Anambra State?*

S/N	Questions	Total	Mean(X)	Remark
1	Location near customers to reduce resources consumed in getting the product to them is related to customer management and sustainable consumption in the pharmaceutical industry of Anambra State.	**85**	3.25	Accepted
2	Employment of transport modes that use less energy or use energy more efficiently is related to customer management and sustainable consumption in the pharmaceutical industry of Anambra State.	**85**	3.51	Accepted
3	Delivery of products directly to the user site is related to customer management and sustainable consumption in the pharmaceutical industry of Anambra State.	**85**	4.07	Accepted
4	Sale of vehicles that have reached their end of useful life rather than leave them to fill the parking yard is related to customer management and sustainable consumption in the pharmaceutical industry of Anambra State.	**85**	3.68	Accepted
5	Distribution of products together, rather than in smaller batches to ensure full vehicle loads for efficiency is related to customer management and sustainable consumption in the pharmaceutical industry of Anambra State.	**85**	3.61	Accepted
6	Use of logistics firms that abide to environmentally friendly principles or have EMS certification (e.g. ISO 14001, BS7750, EMAS), in case transport is outsourced is related to customer management and sustainable consumption in the pharmaceutical industry of Anambra State.	**85**	3.68	Accepted

7	Usage of warehousing facilities that have been certified as environmentally efficient is related to customer management and sustainable consumption in the pharmaceutical industry of Anambra State.	**85**	4.45	Accepted
8	Putting in place systems to monitor reverse flows of materials is related to customer management and sustainable consumption in the pharmaceutical industry of Anambra State.	**85**	4.07	Accepted
9	Consolidate freight in case where used material and packaging is to be shipped back to the firm is related to customer management and sustainable consumption in the pharmaceutical industry of Anambra State.	**85**	4.24	Accepted
10	Use of a good information system and innovative management for efficient loading, scheduling and routing is related to customer management and sustainable consumption in the pharmaceutical industry of Anambra State.	**85**	3.68	Accepted

Source: Field Survey, (2023)

Test of Hypotheses 2
Hypothesis Two

Ho_2: *There is no significant relationship between customer management and sustainable consumption in the pharmaceutical industry in Anambra State.*

Table 4: *Showing* ANOVA Analysis *for hypothesis 2*

Table 4.3.4.2: *ANOVA Analysis.*

		Sum of Squares	df	Mean Square	F	Sig.
Hypothesis_2	Between Groups	9753.328	12	812.777	1.547	.042
	Within Groups	1050.442	2	525.221		
	Total	10803.771	14			

Source: SPSS (ver. 25).

Decision:
Since the sig. value (P-value) of 0.042 is less than the 5% level of significance (i.e, 0.042 < 0.05), we then reject the null hypothesis and accepted the alternate hypothesis - which states that: *'There is a significant relationship between customer management and sustainable consumption in the pharmaceutical industry in Anambra State.'*

Discussion of Finding
1. Hypothesis one revealed that procurement management has a significant positive relationship with waste reduction in the pharmaceutical industry of Anambra State with the sig. value (P-value) of 0.012 less than the 5% level of significance (i. e, 0.012 < 0.05). Therefore, we then reject the null hypothesis and accepted the alternate hypothesis and concluded that procurement management has a positive relationship with waste reduction in the pharmaceutical industry of Anambra State. This finding is in line with Egbungwu, & Eze (2021) finding that examines the links among rational efficiency, operational efficiency, organizational performance, and green supply chain management (SCM). The study highlighted the importance of suppliers' green management capabilities in improving the weaknesses of SCM and confirms that procurement management has a positive relationship with waste reduction in the pharmaceutical industry of Anambra State. This finding is significance to suppliers' green management capabilities in improving SCM and achieving waste reduction goals. Procurement management plays a crucial role in selecting and managing suppliers who have strong green management practices, which can contribute to waste reduction efforts in the pharmaceutical industries.

2.Hypothesis two showed that customer management has a significant positive relationship with sustainable consumption in the pharmaceutical industry of Anambra State with the sig. value (P-value) of 0.042 less than the 5% level of significance (i.e, 0.042 < 0.05). Therefore, we then reject the null hypothesis and accepted the alternate hypothesis and concluded that customer management has a positive relationship with sustainable consumption in the pharmaceutical industry of Anambra State. To support this finding, a study conducted by Kumar and Rahman in 2018 was referenced. The study focused on 157 manufacturing companies and explored the significant factors impacting sustainability supply chain management (SCM). The study aligns with the resource-based theory and examined variables such as top management commitment, buyer-supplier relationships, social performance, economic performance, and environmental performance. The findings of this study reveal that top management commitment influenced external influences positively. Additionally, the study has a positive linkage between buyer-supplier relationships and environmental performance further suggests that effective customer management has a positive relationship with sustainable consumption and can contribute to sustainability efforts in the pharmaceutical industry of Anambra State.

Conclusion

The aim of this study was to examine the impact of implementing Green Supply Chain Management (GSCM) practices with suppliers and customers on operational performance in pharmaceutical companies located in Anambra State. Specifically, the study aimed to determine if the relationship between GSCM practices and operational performance is stronger when green practices are adopted jointly with suppliers and customers. In other words, the study sought to investigate whether the adoption of environmental practices in a balanced way with suppliers and customers through green practices enhances operational performance in eight aspects, namely: product performance, production costs, product quality, customer support, lead time, ability to meet customer requirements, speed of new product launches, and flexibility to adapt to demand. The findings of the study support the three hypotheses that were formulated, indicating that the adoption of GSCM practices by the company and its partners has a positive impact on operational performance. Furthermore, the results suggest that when GSCM practices are developed jointly with suppliers and customers, there are operational benefits.

According to the study, adopting Green Supply Chain Management (GSCM) practices in their entirety can lead to improved organizational performance in terms of better financial and marketing outcomes (Rao & Holt, 2005; Lee et al., 2012; Green et al., 2012). Thus, manufacturing companies should incorporate eco-friendly practices at every stage of their supply chain, starting from the procurement of raw materials and supplies, through design, manufacturing, packaging, distribution of their products, and finally, end-of-life disposal. By following this approach, they are likely to achieve better financial and marketing results.

Reverse logistics is often overlooked as a key GSCM practice. Previous research has shown that recovering products and packaging at the end of their useful life can significantly reduce the environmental impact of a company's operations. This is because it eliminates the need for disposal and additional consumption and enhances the company's reputation, which in turn can increase profitability. Therefore, it is important for the government to review the regulatory framework to facilitate product recovery and for manufacturers to raise awareness among consumers about the benefits of collecting and recovering used products and packaging. This will create a market for remanufactured/refurbished products, leading to a reduction in the country's import bill. As a result, all stakeholders, including the manufacturer, customer, government, and environment, will benefit.

Recommendations

The study recommendations that:

1. Pharmaceutical industries in Anambra State should prioritise suppliers who have strong environmental sustainability practices and demonstrate a commitment to waste reduction. This will help to consider factors such as recyclable packaging, eco-friendly materials, and effective waste management systems when choosing suppliers. By implementing these principles, pharmaceutical industries can enhance their procurement management practices to effectively contribute to waste reduction and promote sustainability throughout their supply chain.
2. Pharmaceutical industries in Anambra State should enhance customer engagement by actively engage with customers to raise awareness about sustainable consumption practices. This can be done through educational campaigns, product labeling, or online platforms that provide information and resources on sustainable choices. By implementing this, pharmaceutical industries can leverage customer management strategies to drive sustainable consumption practices and contribute to a more environmentally and socially responsible future.

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