

## Sustainable Shipping Practices and Supply Chain Performance of Shipping Firms in South-South Nigeria

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**Abstract:** Every so often, the “safety at sea” aphorism is used to communicate the need to develop and maintain a comprehensive regulatory structure for shipping operations. Especially in developing economies like Nigeria which has been at the center of international attention following the increasing pressure to combat sea piracy, oil spillage and carbon emissions from ships. This paper provides empirical evidence on the impact of Sustainable Shipping Practices on Supply Chain Performance of Shipping Firms in South-south Nigeria using a survey and descriptive research design. The population of the study covered twenty-three (23) Supply chain managers of shipping firms in south-south Nigeria. On account of the small size of the population, the census method was implemented. Out of the twenty-three (23) copies of questionnaire distributed, twenty (20) copies were retrieved and deemed usable for data analysis. Research hypotheses were formulated and tested using the Multiple Linear Regression with the aid of the IBM (SPSS) software, version 25. The findings revealed that with a 1% increase in Sustainable shipping practices, Supply chain performance will increase by 0.523% (B value). Consequently, we conclude that Sustainable shipping practices have substantial and positive impact on Supply chain performance. It is therefore recommended that Shipping firms in Nigeria should continuously improve their economic, social, and environmental responsibility quotient to sustain optimum Supply chain performance.

**Keywords:** Sustainable Shipping Practices, Supply Chain Performance, Stakeholder Theory, On-Time Delivery, Damage-free Delivery

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### Introduction

Concerned about the crash in oil prices and the waning oil revenue in Nigeria, the Nigerian Chamber of Commerce has clamored for a diversified economy (Iheamnachor, 2015). Though, the oil and gas sector has sustained its place as the backbone for infrastructural development in the country (Poi & Opara, 2021), managing an economy of approximately two hundred and eleven (211) million people with a single major commodity is not plausible (Anyachie & Areji, 2015; World Bank Group, 2022). Today, the government is hell-bent on diversifying the economic base of the nation to other promising sectors like the agricultural and shipping industry (Ahon, 2022). The shipping sector is directly or indirectly the foothold of global supply chains, consolidating supply chain flows, maintaining a proliferation of Stock Keeping Units (SKUs)

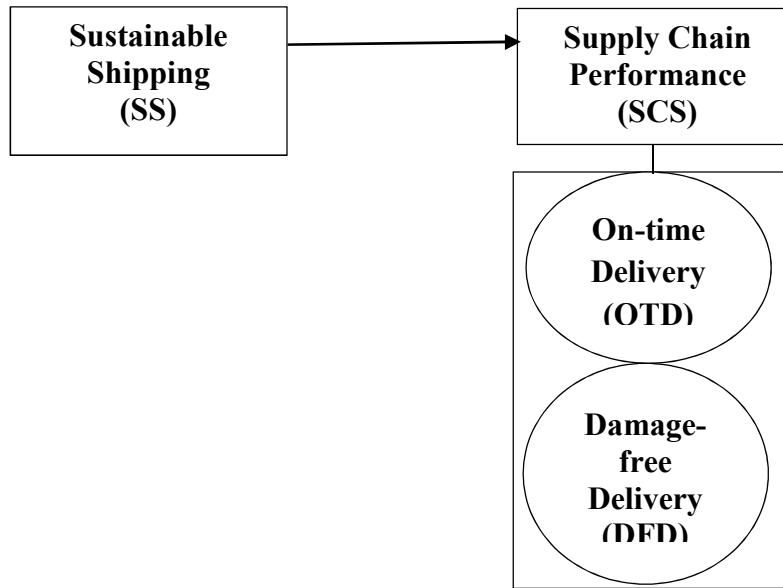
and fulfilling customers' requirements for products efficiently around the world as a prime logistics service provider (Hausman, 2002). Marine Digital, (2022) reports that approximately, eighty five percent (85%) of materials manufactured in the world have been on vessels, to this end, the shipping sector is the driving force of global logistics and supply chain management. It utilizes a wide range of transportation modes; marine, air, rail, road, pipeline, cable, space, and intermodal transportation and facilitates business operations. However, shipping goods by sea is the most profitable way to move bulky and heavy products around the world, it has improved the industrialization of both developed and developing countries worldwide (Poi & Ihunwo, 2021). The Fulfillment Lab, (2022) indicates that more than ninety percent (90%) of the world trade to communities universally is navigated across our oceans and waterways. According to Lim, (2016), approximately fifty thousand (50,000) liner ships, tramp ships, tankers and ferry businesses etc transport more than ten (10) billion tons of valuable cargoes, including commodities, petroleum products, raw materials and consumer goods yearly (Shi & Voß, 2011; International Maritime Organization, 2019). Following the significance of shipping to the prosperity of businesses worldwide, sustainable shipping has taken center stage of many environmental discussions.

Sustainable shipping is predicated on the implementation of the principles of sustainable development in the shipping sector. This is achieved by designating financial, environmental, and social responsibilities to firms in the shipping industry (Ouertani, 2022). These responsibilities constitute a set of ethical values through which organizations set their business goals and objectives. Hence, sustainable shipping practices define how effective firms in the shipping sector are in achieving the results they are expected to produce. Due to the recent environmental sensitivity and the close relationship between shipping activities and societal wellbeing, inter-governmental agencies, the academia, business practitioners and other stakeholders worldwide have appealed to organizations in the shipping sector to coordinate their business goals with conserving Earth's natural resources through policies, market-driven initiatives, technologies and measures that encourage the protection of the oceans and humanity (IMO, 2019). For example; the Energy Efficiency Design Index, Ship Energy Efficiency Management Plan, and Ballast Water Management System to limit greenhouse gas emissions, ISO 14000, ISO 26000, slow-steaming, cold-ironing, biocide-free paints, and renewable fuel alternatives to lessen operating cost and cut down the effects of shipping operations on the society and environment (Yuen, Wang, Yiik & Qingji, 2017). Moreover, since the shipping sector does not operate in isolation, the entire supply chain performance needs to be measured to ascertain the viability of its sustainable practices. (Sanchez-Flores, Ojeda-Benitez, Sotelo & Carlos, 2020).

With the dramatic growth of global supply chains, sustainable shipping has become a precursor for the achievement of the blue economy in Nigeria; the effective use of ocean resources for consistent economic growth, enhanced livelihoods and ocean ecosystem well-being (Leiva, 2022). However, Oritse, (2022) points out a long list of problems facing the Nigerian shipping sector, ranging from corruption among government agencies, policy clashes and contradictions across diverse regulatory bodies, poor integrated transport system, high operating cost in cargo clearing and delivery chain, high shipping charges by terminal operatives to the dollarization of payments in the sector. In addition, Anagor, (2022) reports that in spite of the launch of the Integrated National Security and Waterways Protection Infrastructure; designated "The Deep

Blue Project” by the President of the Federal Republic of Nigeria, Muhammadu Buhari and the provisions of Section 219(4) of the Merchant Shipping Act of 2007, the Nigerian oceans are still piracy nerve centers due to continuous attacks on oceangoing vessels, abduction of crew members, loss of life at sea, cargo and ship damage and hijacking of inbound cargoes (Gilbert & Bows 2012; Ukwuoma & Ogungbe, 2022). Iduk & Samson, (2015) opine that oil spills and pollutants via exhaust emissions from ships like sulphur dioxides (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM) constitute threats to the environment and human health. On the other hand, Akinjise, (2018) identified poor participation of indigenous operators in the country’s shipping sector contrary to the provisions of the Coastal and Inland Shipping Act 2003, nicknamed the “Cabotage Act” as the reason for low freight revenue generated by local shippers, hence, the significant decline of her foreign exchange earnings. Though, ThisDay News, (2022) reports that indigenous shipping firms lack the capacity to enhance the effectiveness of the sector as most owners are terrible managers (Ekpo, 2012).

The majority of previous studies indicate that sustainable shipping has significant positive impact on some performance aspects of supply chain management. Mann & Kaur, (2020) linked sustainable supply chain activities and financial performance in Indian, Alexandrou, Panayides, Tsouknidis & Alexandrou, (2022) explored green supply chain management strategies and financial performance in the shipping industry, Omai & Ngugi, (2018) related supply chain practices with sustainable supply chain performance in Kenya, Adebayo & Aworemi, (2021) connected transport management practices with firms’ performance in Nigeria, Tippayawong, Niyomyat, Sopadang & Ramingwong, (2016) examined green supply chain and operational performance of the Thai auto parts industry and Hamdy, Elsayed & Bassam, (2018) investigated the impact of sustainable supply chain management practices on Egyptian companies’ performance. Our review of the literature reveals that studies that comprehensively discuss the impact of Sustainable Shipping on Supply chain management performance of Shipping Firms in South-South Nigeria are sparse. Hence, drawing on, and contributing to the literature on Sustainable Shipping and Supply chain performance, this study is expected to fill the knowledge gap and propose solutions to sustainability related issues of Shipping Firms in South-South Nigeria. The conceptual framework below shows the expected link between variables of the study.



**Figure 1: Conceptual Framework of the Impact of Sustainable Shipping Practices on Supply Chain Performance of Shipping Firms in South-South Nigeria.**

**Source: Researchers' Conceptualization, (2022) as adapted from: (Alahmad, 2021).**

## **Literature Review**

### **Theoretical Foundation**

The theoretical foundation of this paper is rooted in the Stakeholder theory, it provides a theoretical perspective and the basis for this research.

### **Stakeholder Theory (ST)**

In 1963, the term “stakeholder” sprung up from a revolutionary memorandum at the Stanford Research Institute indicating that business executives are expected to fully comprehend the concerns of shareholders, employees, financial intermediaries and suppliers, in order to develop favorable policies, goals and objectives (Sinclair, 2010). Afterwards, in 1984, R.E. Freeman, a Professor at the University of Virginia, introduced the Stakeholder theory in his book titled; “Strategic Management: A Stakeholder Approach”, in defiance of the long-standing shareholder theory propounded by Economist Milton Friedman. Friedman’s shareholder theory holds that an organization is only obligated to its shareholders but the stakeholder theory proposes that shareholders are only one of the myriad stakeholders in a firm; it suggests that all stakeholders should be treated with fairness, honesty, and kindness (Freeman, 1984; Simon, 2022). In this circumstance, stakeholders are any group of people or organizations within or outside a firm that impact its operations and performance. They include: employees, shareholders, suppliers, host communities, competitors, governmental bodies, financiers, environmental groups, the media etc (Freeman & Abreu, 2015; Simon, 2022).

The stakeholder theory encourages a pragmatic, ethical and effective way to manage organizations, create value and some kind of synergy for optimum performance. Specifically, how an organization treats its employees influences their customer service and customer response. And how it relates with its suppliers and host communities impacts on its profit margin

and shareholders' dividend (Cording, Harrison, Hoskisson & Jonsen, 2014). Evidently, customer satisfaction, on-time delivery, quality and quantity are relevant to both the stakeholder theory and supply chain management. Supply chain management adopts a comprehensive approach in planning, organising and controlling of materials, logistics services, and information streams from suppliers, manufacturers to the customers (Ibrahim & Hamid 2016) as cited in (Poi, Owuso & Amadi 2022). In part, these variables are based on strategic supply chain decisions on insourcing, outsourcing, transportation management, customer service management, supplier relationship management etc. Consequently, pundits have applied the stakeholder theory using a wide range of theoretical perspectives, for instance: the doctrine of fair contracts (Freeman, 1994), pragmatism (Wicks & Freeman, 1998; Freeman, Harrison, Wicks, Parmar & deColle, 2010), the principle of fairness (Phillips, 2003), feminist ethics (Wicks, Gilbert & Freeman, 1994), integrated social contracts theory (Donaldson & Dunfee 1999), Kantianism (Evan & Freeman, 1993), Make or buy supply chain decisions, contracting, suppliers and sourcing strategies (Wittke, 2014). Therefore, we are inclined to adopt the Stakeholder theory as a baseline for shipping sustainably in South-south Nigeria through value creation for all stakeholders and improved Supply chain performance.

### **Conceptual Review**

#### **Concept of Sustainable Shipping Practices (SSP)**

Literally, the term “sustainable” is an adjective used to describe the ability to maintain a thing, a state, an entity, an outcome or a process at a certain degree over a period of time (Mensah, 2019). According to Thomas, (2015), sustainability consolidates human activities and their ability to satisfy needs and wants without wasting available resources. This meaning has been popularised and adopted as an international and national policy principle and business initiative around the world. One of such is the concept sustainable development, introduced in 1987 by the United Nations World Commission on Environment and Development (WCED) report, also referred to as the Brundtland Commission's report titled; “Our Common Future”. According to the report, sustainable development is “the development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987, p. 43). From this standpoint, the concept of sustainable development assimilates all human activities to create a responsible society through economic, social and environmental dimensions. By ensuring the availability of the necessary quantity and quality of goods and services, achieve societal wellbeing and protect the eco system (Sztangret, 2020). Based on the World Health Organisation's, (WHO) directives for air pollution, climate change, acidification and eutrophication, the Organization for Economic Cooperation and Development, (OECD) as cited in Chatzinikolaou & Ventikos, (2011), defined sustainable shipping practices as shipping activities that does not jeopardize public health and satisfy societal accessibility needs with the utilization of ecofriendly resources below their rates of regeneration, and non-renewable resources below their rates of development of ecofriendly alternatives. In the view of Yuen, Wang, Yiik & Qingji, (2017), sustainable shipping practices necessitate shipping firms to be economically, socially, and environmentally responsible. Ouertani, (2022) opined that not only does sustainable shipping practices reduce the environmental influence on transportation, but aid the effectiveness of business organizations. Adopting the United Nations General Assembly's (1987) perspective, as cited in Nwokah, & Poi, (2022), sustainable shipping practices are activities that meet the shipping needs and wants of the present generation without compromising the capacity of future generations to meet theirs.



### **Concept of Supply Chain Performance (SCP)**

A supply chain is a multifaceted network of firms, individuals, activities, information and resources involved in moving a product or service from point of origin to the end user (Sanchez-Flores, Ojeda-Benitez, Sotelo & Carlos, 2020). It encompasses all parties involved in satisfying customers' requirements, namely: producers, suppliers, transporters, marketing intermediaries, warehouses and the customers themselves (Chopra & Meindl, 2013). As the product moves from the point of origin to consumption, management principles are applied to ensure coordination and customer satisfaction, hence, the concept of supply chain management. Felea & Albăstroi (2013) opine that Supply chain management is the planning organizing, implementing, inspiring and controlling all activities relating to the transportation, processing and storage of raw materials, work-in-process inventory and finished goods from original suppliers, through warehouses, production facilities, stores and other marketing intermediaries to the final consumers in order to satisfy their requirements and achieve a competitive advantage. Consequently, to successfully manage the chains of supply, businesses need to keep a close eye on their Supply chain performance. According to Tarafdar & Qrunfleh, (2017), Supply chain performance is the degree to which a supply chain satisfies its customers' needs and wants with respect to the product(s)' availability and time of delivery. Supply chain performance depicts how viable a supply chain is in reducing costs, inadequacies, and fulfilling customers' requirements (Meredith, 2022). Alahmad, (2021) argue that Supply chain performance is predicated on some parameters used to ascertain the efficiency and effectiveness of the supply chain system. From this perspective, this current study adopts on-time delivery and damage-free delivery as metrics to determine the efficacy of the supply chain of Shipping firms in South-south Nigeria.

### **On-Time Delivery (OTD)**

On-time delivery (OTD) is one of the measures used in determining a firm's supply chain efficiency or inefficiency. The purpose is to discover if the organization is meeting its timely delivery goals or not (Patel, 2022). From this standpoint, Dalin-Kaptzan, (2022) sees On-time delivery (OTD) as a key performance indicator that reveals whether or not a firm is meeting its supply chain goals and objectives as regards the stipulated time of delivery which is important to ascertaining carrier performance and ensuring customer satisfaction. In agreement with (Dalin-Kaptzan, 2022), Warchoł, (n.d) avers that evaluating on-time delivery (OTD) enables business practitioners to assess the delivery performance and efficiency of the entire supply chain. According to XcelPros, (2018), on-time delivery shows the ratio of customers' orders shipped on or before the requested date of delivery / customer promised date versus the total number of orders. This is generally stated as a percentage and can be calculated for numerous measurement periods. XcelPros emphasizes that on time delivery initiates improved customer relationship, ensures customer trust and loyalty. Howbeit, Warchoł, (n.d) posits that to improve on-time delivery some guiding principles are required based on the peculiarity of the supply chain, for instance: make customer service a priority, plan appropriate schedules that are consistent with firms' capacities, ensure precise inventory monitoring, accurate forecasting and healthy suppliers' relationship management. In a nutshell, on-time delivery (OTD) simply entails delivering products on or before the agreed time. It is the firm's capacity to meet customers'

deadlines and convey goods in a timely manner. On time delivery is calculated thus: On-time delivery =  $[(\text{total orders} - \text{orders shipped on time}) / \text{total orders}] \times 100$

### **Damage-free Delivery (DFD)**

Shipping damages constitute a 0.5% reduction in the gross sales of businesses, they account for approximately \$1 billion loss yearly. Hence, damage-free delivery is a vital ratio that measures the ability to deliver products and services free of damages. It requires both the product and packaging to be free of damages (Rakesh, 2022). Lemmen, (2017) indicates that a damage-free delivery (DFD) is a product with perfect packaging and protection which makes it to the final consumer in excellent condition. This is achieved by reducing the damage during shipping. As the product(s) moves from the manufacturer(s) through the logistics provider(s) to the time it is delivered to the customer's doorstep, it passes through different mediums of transport. Damage-free delivery occurs when the firm is able to ensure careful materials' handling, avoid poor packaging, poor loading style and in-transit damages. All goods and services are at risk of getting damaged during the logistics process, and damages sustained during the transportation process are one of the major reasons that products venture into the reverse logistics process. Not only does damaged deliveries affect the reputation of the third- and fourth-party logistics (3PL & 4PL) provider, it also impacts negatively on the reputation of the shipper(s) and his/her relationship with the customer(s). Denizhan & Konuk, (2013) reiterate that demand-free deliveries are instances in which a product is handled safely in the hands of Logistics providers during the logistics process until it gets to the final consumer(s). Damage-free delivery is a Supply chain performance metric used to analyze the number of damaged deliveries and flawless deliveries that occur in the order-to-delivery (OTD) process. Some firms use this rate to monitor and determine packaging process and chose the appropriate logistics or transportation firm convey their products and services. Damage-free delivery is calculated thus:

Damage-free delivery =  $[(\text{total orders} - \text{orders that arrive damaged}) / \text{total orders}] \times 100$

### **Sustainable Shipping Practices and Supply Chain Performance**

Many business executives and practitioners promote sustainability as a basis of competitive advantage and conduit of corporate durability for businesses rather than an expensive inconvenience. Sustainable shipping is a topline priority because the resolve for hard work and profit maximization will be unfulfilled except supply chains sustainably "deliver products and services." According to Mahler & Kearney, (2007), various groups of Fortune 100 firms were surveyed to determine how they promote sustainable practices based on economic development, environmental stewardship and societal well-being. The study reveals that fifty to seventy percent (50-70%) of a product's value is predicated on suppliers, hence, customers buy products and the supply chains that deliver the products. The study also found that virtually sixty percent (60%) of organizations have employed sustainable practices to consolidate their brand names or differentiate their products. Fu, Rahman, Hui, Abbas & Comite, (2022) connected sustainable supply chain with business performance of Pakistani manufacturing firms. The study population included manufacturing firms in Pakistan listed in the Securities and Exchange Commission of Pakistan (SECP) with two hundred and nine (259) firms as the sample size. The structural equation modeling (SEM) techniques was used to test the proposed hypotheses. Findings show that sustainable supply chain has a significant and positive impact on business performance. This entails that most sampled organizations are sufficiently benefiting from sustainable supply chain

to enhance their operational and financial performance. Alubeze & Ambakederemo, (2018) explored Nigeria maritime trade and transport by analyzing the demand of shipping tonnage in the Nigeria. A parametric analysis was done to determine the demand for shipping tonnage and shipping routes using shipment level data collected from port terminals records. A trend analysis of accumulated trade volumes was also conducted to evaluate the potential of Nigeria's seaborne trade in the short term. The study concluded that the projected demand is sustainable in the short term given the positive trend observed from the analysis. Azevedo, Carvalho & Virgilio (2011), linked green practices with supply chain performance in the Portuguese automotive industry. The study employed multiple case studies with a qualitative data analysis method. The data were obtained through semi-structured interviews. The study found a positive relationship between green practices implementation and operational performance in terms of customer satisfaction and quality. Omai, Ngugi & Kiarie, (2018) studied the impact of supply chain practices on sustainable supply chain performance in Kenyan textile and apparel industry. A cross-sectional survey design was adopted and census sampling was used to select subjects to participate on account of the the small number of textile firms in Kenya. Hence, fifty-nine (59) key informants were selected from fifty-nine (59) textile firms in Kenya. The findings revealed that supply chain practices had a positive effect on supply chain performance in the textile industry in Kenya. Finally, Alubeze & Samuel, (2018), studied the Nigeria maritime trade and transport. A trend analysis on shipping tonnage demand in Nigeria was done to evaluate the viability of Nigeria's seaborne trade in the short term. Findings reveal that projections of Nigeria's freight market are positive, and the positive trends should be sustained by implementing trade facilitation policies effectively. Considering the above discussion, the study is guided by the following hypotheses:

$H_{01}$ : Sustainable shipping practices has no significant impact on on-time delivery of shipping firms in South-south Nigeria.

$H_{02}$ : Sustainable shipping practices has no significant impact on damage-free delivery of shipping firms in South-south Nigeria.

### **Methodology**

The paper adopted a survey approach with emphasis on utilizing the descriptive research design. This design was well thought-out to describe and expand the knowledge of the research phenomenon. The population of the study covered twenty-three (23) supply chain managers of Shipping firms in South-south Nigeria according to (Finelib 2016 a, b, c, d). By reason of the small size of the population, the census method was implemented and a structured questionnaire, adapted from existing studies with a 5-point Likert scale solicited responses via mail. The research instrument was validated through professional advice and reliability determined by the Cronbach alpha analysis. Out of the twenty-three (23) copies of questionnaire distributed, twenty (20) copies were retrieved and deemed usable. Multiple Linear Regression was used to test the hypotheses and describe the impact of Sustainable shipping practices on Supply chain performance with the aid of the IBM (SPSS) software, version 25.

### **Results and Interpretation**

#### **Reliability Test**

Cronbach's alpha reliability is one of the most extensively used measures of reliability in the social sciences. It is a measure of the internal consistency of a scale; the extent to which a group of questions are related and if all items in the scale measures the same variable using the



benchmark of 0.7 and above as its acceptable, good and excellent measurement accuracy (Cronbach, 1951; Bonett & Wright 2014).

**Table 1: Sustainable Shipping Practices Scale Reliability Statistics**

Cronbach's Alpha	N of Items
.965	3

**Source:** (SPSS Output of Data Analysis 2023)

**Table 2: Supply Chain Performance Scale Reliability Statistics**

Cronbach's Alpha	N of Items
.984	6

**Source:** (SPSS Output of Data Analysis 2023)

The result of the Reliability test above indicates a Cronbach's Alpha coefficient of 0.965 and 0.984 respectively; excellent internal consistency for Sustainable Shipping Practices and Supply Chain Performance.

**Table 3:  
ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.113	3	7.704	35.861	.000 <sup>b</sup>
	Residual	3.437	16	.215		
	Total	26.550	19			

a. Dependent Variable: Our goods arrive in full and are undamaged

b. Predictors: (Constant), Our company is financially responsible to all stakeholders, Our company has standard operating procedure to dispose ship's waste, Our company protects the wellbeing of society

**Source:** (SPSS Output of Data Analysis 2023)

**Table 4:  
Model Summary<sup>b</sup>**

Model	R	Adjusted R Square	Std. Error of the Estimate	Change in R Square	Change in F	df1	df2	Sig. Change	F
1	.933 <sup>a</sup>	.871	.464	.871	35.861	3	16	.000	

a. Predictors: (Constant), Our company is financially responsible to all stakeholders, Our company has standard operating procedure to dispose ship's waste, Our company protects the wellbeing of society

b. Dependent Variable: Our goods arrive in full and are undamaged

Source: (SPSS Output of Data Analysis 2023)

Table 5:

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta	t		Lower Bound	Upper Bound
1	(Constant)	.560	.397		3.525	.001	.891	.792
	Our company has standard operating procedure to dispose ship's waste	.350	.499	.333	5.172	.000	.283	.983
	Our company protects the wellbeing of society	.456	.336	.476	3.359	.001	.255	1.168
	Our company is financially responsible to all stakeholders	.523	.593	.545	5.636	.000	.287	.532

a. Dependent Variable: Our goods arrive in full and are undamaged

Source: (SPSS Output of Data Analysis 2023)

The *F*-ratio in the Analysis of Variance (ANOVA) results in Table 3 shows that the overall regression model is suitable for the data. It implies that the predictor variables are statistically significant to anticipate the criterion variable, therefore,  $F(3, 16) = 35.861$ ,  $p < .0005$ ; the *P* value is less than .0005. The *R* value of .933 on Table 4 shows that the model has a very high measure of the quality to predict the dependent variable. Inversely, the  $R^2$  value of .871 indicates that our independent variables explain 0.871% of the variability of our dependent variable and the Adjusted  $R^2$  value of .846 which is not far off from .871 shows the fit of the regression model with the addition of more independent variables. Lastly, Table 5 shows the *P* values (quoted under Sig.) as .000, .001 and .000, all below the acceptable level of significance, that is below 0.05 for 95% confidence interval. With a 1% increase in Sustainable shipping practices, Supply chain performance will increase by 0.523% (B value). Hence, the null hypotheses earlier formulated are rejected.

### Discussion of Findings

This study examined the impact of Sustainable shipping practices on Supply chain performance of Shipping firms in South-south Nigeria. The analyses unveil that Sustainable shipping practices have a positive and statistically significant impact on Supply chain performance. The findings are attuned with Mahler & Kearney, (2007), who found that over sixty percent (60%) of organizations have employed sustainable practices to achieve competitive advantage. It is also in line with Fu *et al*, (2022), who concluded that sustainable supply chain has a significant and

positive impact on business performance. Moreso, the findings are in consonance with Azevedo *et al*, (2011), who discovered that a positive relationship exists between green practices implementation and operational performance in terms of customer satisfaction and quality. Finally, the current findings validate Omai, Ngugi & Kiarie, (2018), who revealed that supply chain practices have a positive effect on supply chain performance in the textile industry in Kenya.

### **Conclusion and Recommendations**

The purpose of this study was to determine the impact of Sustainable shipping practices on Supply chain performance of Shipping firms in South-south Nigeria. The empirical data was gathered through copies of questionnaire distributed among Supply chain managers of Shipping firms in South-south Nigeria. The results of this study indicate that with a 1% increase in Sustainable shipping practices, Supply chain performance will increase by 0.523% (B value). Therefore, we conclude that Sustainable shipping practices have substantial and positive impact on Supply chain performance. As with any other research, this study has a few limitations; a major one is the geographical scope; it only focused on Shipping firms in South-south Nigeria. The study covered only organizations in the Shipping industry and therefore might not be representative of other sectors. Thus, future research could address it. However, the study recommends that Shipping firms in Nigeria should continuously improve their economic, social, and environmental responsibility quotient to sustain optimum Supply chain performance.

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