THE FIRM'S LOCATION IN RELATION TO THE SEAPORT AS A KEY FACTOR IN ENHANCING FIRM PERFORMANCE IN THE MANUFACTURING SUPPLY CHAIN

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ABSTRACT
 In the context of the global supply chain management, port-hinterland transport is viewed as one stage in the logistics chain from origin to destination. This stage covers between 40 and 80% of the total cost of shipping containers internationally. Therefore, for Nigerian manufacturers looking to enhance their supply chains, improving port-hinterland transport operations may be an effective approach. However, the literature is unclear regarding the importance of hinterland locations in enhancing firm performance. This study investigates how the location of import-dependent firms in relation to seaports affects their profits in Lagos and Ogun States, Nigeria. The population of the study consists of 10 publicly listed manufacturing firms that frequently import goods in containers through the seaports in Lagos and have been continuously listed on the Nigerian Stock Exchange (NSE) list for more than ten years (2010-2019). A structured questionnaire was employed in collecting primary data for the study. Only 6 of the ten firms filled and returned the questionnaires. This number accounts for 60% of the sample size. The results of the regression analysis show that the hinterland location has a strong positive relationship (r=0.731) with the profits of industrial products firms and that it explains around 53.4% (r2=0.534) of the variation in the profits of these firms. In order to transport goods between ports and industries efficiently, firms must look for strategic locations with access to cost-effective means of transportation such as rail and inland waterways. Similar to this, firms must understand how to prioritize their strategy in order to prevent the impact of rising port-hinterland transport costs on their revenue and profit.

Key words: Location, seaports' hinterland, firm, performance, manufacturing
JEL. Classification: L95; L91; L98

1. INTRODUCTION

Firms must look for successful success-driven strategies if they want to sustain and improve competitiveness in the current global business environment. In fact, Chopra and Meindl (2007) asserted that sustaining and improving competitiveness is the basic idea behind supply chain management. Among supply chain strategies, effective transportation stands out as a key factor in determining success due to its ability to change a firm's performance. For instance, effective transport offers an opportunity to gain quicker market access and financial incentives for future investments (Ogwu and Agu, 2016). It has the ability to cut operating costs for businesses (Uzonwanne et al., 2020). Similarly, efficient transportation improves timely product delivery (Yusuf, 2023; Ohida et al., 2023). Since the goal of transportation is to move goods as cheaply and effectively as possible, whether it is between a coal mine and a power plant or a chemical plant and a wholesaler of fertilizer, the facts provided above regarding an effective transport system also applies to transportation between a port and a factory location. Accordingly, the premise of this study is that the performance of the supply chains of Nigerian manufacturing firms could improve if port-hinterland transportation of commodities is made more efficient based on the potentials of effective transportation shown in the studies mentioned above among others.

In the context of the maritime transportation system, port-hinterland transport is viewed as one stage in the container logistics chain from origin to destination (Toluwalase, 2005). This stage covers the movement of commodities to and from the seaport. It happens both prior to and following the cargo's arrival at the exporting port or foreign port. According to Sdoukopoulos and Boile (2020), port competitiveness is significantly influenced by a number of factors, with hinterland connection ranking second. Noteboom, (2008) also noted that port-hinterland connectivity is increasingly shaping the supply chain solutions of shippers and manufacturers as it covers between 40 and 80 % of the overall costs of international container transport (Beresford *et al*., 2012; Behdani, 2020). In Nigeria, the cost of moving containers from the seaport in Lagos to various part of the country soared high by 400% for the first time since the 1970s due to various logistic challenges (Nigerian Logistics Sector Reports, 2017; and Moov Logistics, 2018). Increased production costs result from higher logistical expenses, which raise product prices and reduce consumer demand for those products (Akintayo, 2010). Thus, effective management of port-hinterland transport therefore can be a good strategy for shaping the supply chain solutions of firms in Nigeria.

The Nigerian port-hinterland challenges include an aging hinterland transport infrastructure, an overreliance on the road mode of transportation, inefficient rail transportation, and a lack of inland water transportation that connects seaports with their hinterlands (Financial Times, 2020; Stephen and Ukepere, 2011). The conditions under which cargoes are transported from seaports to firms' locations within the hinterland will probably worsen as the trend in container transport growth is expected to continue both locally and globally (Fan et al 2019). According to a breakdown of port statistics, the amount of containerized imports delivered into Nigerian seaports increased by 13.10% during the course of five years, from 2017 to 2021. In 2017, there were 806, 219 TEUs of imported containerized goods. In 2018, the volume grew by 3.11% to 831,314 TEUs. Additionally, it increased by 7.32% to 892,137 TEUs in 2019, 0.03% to 892,401 TEUs in 2020, and 13.10% to 1,009,312 TEUs in 2021 (Abstract of Port Statistics: Business Day, 2023). Since Nigerian businesses rely heavily on the importation of raw materials and industrial chemicals, among other things, reducing production costs through effective port-to-factory-site transportation may be an effective strategy. Investigating the potential benefits of a firm's location in relation to seaports in terms of the effectiveness of its operations is therefore essential in order to use this circumstance to business. Actually, a 2017 survey by the Lagos Chambers of Commerce and Industry found that 40% of enterprises in

Apapa region of Lagos State had relocated or scaled back operations due to port-related challenges, suggesting that a firm's location in relation to seaports may have an impact on its performance.

Several researches have been conducted in connection with seaport-hinterland relationship (Marquez-ramos *et al.,* 2011; Paflioti et al., 2014; Chen *et al.,* 2016; Wang *et al.,* 2017; Ticiana, 2019; Zgonc *et al.,* 2019; and Mueller, Wiegmansand and Duin, 2020). For instance, Chen *et al.* (2016), studied the volume of inland transportation infrastructure to determine the hinterland connections of seaports, access to important manufacturing and logistics centers (measured by travel time and transport expenses), the diversity of modal alternatives accessible to transport providers, the carrying capacity of the main corridors, and the dependability of shipment delivery across the hinterland. Wang *et al.* (2017) investigated how distance affected the decision between intermodal railroad and unimodal vehicle transport. Similarly, Zgonc *et al.* (2019) investigated how far a port is from its hinterland (distance) and how that affected the flow of import cargo. Mueller, Wiegmansand, and Duin (2020) proposed an innovative model in demonstrating the adaptability of containerized shipments to developments in port hinterland approaches. Out of the 11 components included, five essential port decision criteria—the price of land transportation, the price of marine transportation, the duration of land transportation, the frequency of port visits, and an adverse substitute variable for rail transportation—achieved the best model fit. The cost of transportation into the hinterland was determined to be crucial.

The seaport-hinterland relationship as seen in literature in more of the physical attributes between the seaports and the hinterland. These consist of inland facilities, modal alternatives, and seaport-hinterland transportation linkages. Indicators of location and reliability have also been used in relation with hinterland measurement, such as the regularity of modes of transport between seaports and hinterland facilities.

Despite the volume of works on the role of port-hinterland connectivity in firms supply chain management, the literature is unclear regarding the importance of hinterland locations in enhancing manufacturing firm performance. The current study is of the opinion that using carefully selected industrial locations, import-dependent firms can improve port-hinterland transportation operations. A decrease in manufacturing costs will result in a decrease in the cost of goods as a result of cost-effective transport through strategically located businesses. A thorough understanding of the relationships between locations within the port's hinterland and firm performance is thus required in light of the growing complexity at the port's hinterland, numerous logistical challenges preventing effective port-hinterland transportation, and the fierce competition among firms. This article attempts to answer the following question: Is there a statistical relationship between the performance (profits) of import-dependent firms and firm locations in relation to seaports in Lagos and Ogun States, Nigeria? The paper is divided into five sections. Following the introduction, the second section covers studies that link firms' locations to firm performance. The third section provides a description of the methodology. Section four presents the findings and associated discussions. Section 5 presents the findings and recommendations.

2. LITERATURE REVIEW

2.1 Port-hinterland Concept
Toluwase (2005) asserts that in the context of maritime transport, the phrase "hinterland transport" is widely used to refer to the in-land movement of commodities to and from the port. As a result, the hinterland is described in connection to the port. Therefore, hinterland

transportation occurs both before and after the commodities arrive at the export port, or foreign port. Road, rail, and waterways are the most important modes of transportation for getting to the hinterland. The hinterland uses trucks and other vehicles for road transportation. Local ships can operate in coastal commerce, while barges and lighters can transport commodities from the hinterland to the coast via internal waterways and canals (Toluwase, 2005). According to Notteboom (2008), the hinterland is the area from which a port receives the majority of its trade, depending on the type of commodity, the time of year, and the mode of conveyance. Rodrigue and Notteboom (2010) added that the hinterland is a part of the port network, which consists of a variety of locations connected to the port via corresponding commodity flows. Between 60 and 80% of the costs associated with international container transportation are covered by common modes of transportation that are commonly used in the connections, including barge, rail, and roadways (Beresford et al., 2012; Behdani, 2020).

Basically, the seaport serves as the main entry point for operations that allow the transfer of goods or cargo (such as loading, unloading, and stacking; transit areas where goods and people travel from and to the sea; and points of contact between lands and marine), while the hinterland of the seaports acts as the base (geographical entity) where general economic activities take place. As a result, the seaport serves as a crucial part of the nation's infrastructure and logistics, attracting several industry clusters there to facilitate and speed up the transportation of goods and overall economic growth. In reality, the proximity of seaports to their hinterland could be advantageous for the local surrounding environments.

Notteboom and Jean-Paul (2017) identified and described three major divisions of the hinterland as shown in Table 1.0. These divisions are the hinterland of the macroeconomic, physical, and logistical systems. Understanding the driving forces behind transportation demand, particularly in a global context, comes from the macroeconomic hinterland. The nature and size of the transport supply, both modally and intermodally, are explained by the physical hinterland. The structure of flows as they balance supply and transportation is referred to as the logistical hinterland.

Table 1.0: Components of the hinterland

	Macro-Economic	Physical	Logistical
Concept	Transport Demand	Transport Supply	Flows
Element	Logical site production and consumption as part of GCCS	Transport Links And Terminal	Mode, Timing, Punctuality And Frequency Of Service
Attributes	Interest Rate, Exchange Rate, Prices Savings Production, Debt.	Capacity, Corridors, Terminals, Physical Assets, Fixed and Mobile	Added value, Tons/km, TEU, Value of time, ICT
Challenge	International Division Of Production And Consumption	Additional Capacity (Modal And Intermodal)	Supply Chain Management

Source: Notteboom and Jean-Paul, (2017)

2.2 Hinterland Location in Business Performance

Sefiani *et al*. (2016) studied how owners and managers in Tangier assessed the impact of location on the success of small to medium-sized enterprises there. The authors conducted

semi-structured interviews with selected owners and managers of Small and Medium-size Enterprises (SMEs). It was found that location has a significant impact on how well SMEs perform in Tangier. This study shows that the location of a business significantly affects how well it performs. Similarly, Wang, Godchild, and Wang (2017) investigated the effects of distance on import goods patterns from a seaport to its hinterland. The findings demonstrated that cargo shipped via seaports with a comparatively small volume mostly serves local communities. The amount of cargo transported from bigger seaports to associated places is significantly less. A gravity model, the Gompertz function, and other methods were used to show that freight flows from a major seaport to its hinterland increase with distance until a specific point and begin to stabilize once they pass it.

Guerrero (2017) investigated how the scope of the hinterlands is impacted by the effectiveness of inland and maritime links. Data were acquired using export records for France. The results of a spatial interaction analysis showed that distance remained a key influence in shippers' decision-making, but substantially less so than in the past. When intermodal connections like frequent barges or rail services are accessible, their impact is noticeably reduced. According to this study, port selection is affected by the distance to the hinterland. The study on hinterland distance should be enlarged to take into account the interaction with shippers' operations in light of the aforementioned assertion that the hinterland and the ports are intertwined. Such investigation will provide recommendations for the best business location.

Zgon, Tekavcic, and Jaksic (2019) investigated the impact of distance on selecting between intermodal railroad and unimodal road transport in order to test the hypothesis that distance is a significant factor determining the choice of mode in freight transport. The findings support the significance of distance in determining mode selection and demonstrate that there are numerous break-even distances between the two choices rather than just one. They vary greatly based on various travel itineraries and the state of the transportation infrastructure. This study infers a connection between distance and the form of freight transportation. To advance understanding in this area, a study looking into the connection between distance from the harbor and the performance of firms in the hinterland would be helpful. In a related study, Ticiana (2019) used the Spanish scenario to propose and empirically evaluate a framework for defining the seaport's hinterland. Throughput (attractiveness) and port location (distance/repulsiveness) were found to be related.

In order to understand a port's sphere of influence, Oni et al. (2022) conducted a study on the significance of delimiting a port's hinterland. The study shows that hinterland distance can be used as an indicator for assessing a seaport's influence on the hinterland around it. Additionally, Champagne and Dube's (2023) investigation of how transportation infrastructure affects business location decisions in suggests that transport infrastructure has a positive and significant impact on business activities like real estate, insurance, and finance. The analysis also emphasizes how crucial it is to consider both the temporal and spatial dimensions of location activities when assessing the impact of transportation infrastructure. In the study by Sun et al. (2023), the suggestion that seaport infrastructure be improved alongside international trade so as to maximize its potential in promoting the growth of Tanzania's economy (of which manufacturing is an important part) suggests a relationship between seaport infrastructure and economic activities such as trade, manufacturing, and so on. This is because shipping goods by sea is more affordable than using other types of transportation.

The earlier studies demonstrate that a firm's location has an impact on its success (Sefiani et al., 2016). Additionally, it was discovered that location (as determined by proximity to the ports) affects the mode of transportation used and that the availability of transportation

infrastructure improves business performance (Guerrero, 2017; Zgon, Tekavcic, and Jaksic, 2019; Oni et al, 2022; Champagne and Dube, 2023). The literature is unclear, though, when it comes to the significance of hinterland locations in increasing firm profitability in Lagos and Ogun States. Considering that between 40 and 80% of the cost of shipping containers internationally goes toward transportation from the port to hinterland areas, optimizing operations at this stage of the maritime logistics network may be a useful strategy for Lagos and Ogun States firms looking to increase their profitability. The purpose of this study therefore, is to determine how the location of import-dependent firms in relation to seaports impacts their profitability in Lagos and Ogun States, Nigeria.

3. METHODOLOGY

3.1 The logistics value chain model.

The foundation on which the paper is based is the Logistics Value Chain Model. It explains how firms (producers in one county) create and organize the activities that generate value in their supply chains with producers or suppliers in another county (Zhou, 2013; and Chopra and Meindl, 2007). It is a link in the company's value chain, which also consists of internal logistics operations like production and selling and external operations like transporting inventory and final products. Logistics value chain exists in the relationship of logistics process, from upstream to downstream (Zhou, 2013). From the international transport Logistics Value Chain perspective, port-to-site or port-hinterland transport is a part of a series of intrinsic logistics value-added activities in the logistics process. From the foregoing, Logistics Value Chain Model depicts port-hinterland transport as part of firms' logistics value-added activities in the international transportation logistics process. The argument made here is that there is a strong relationship between the location of firms within the port's hinterland and the cost of transporting containers from the seaports to various sites of firms.

In this investigation, linear regression was carried out using SPSS. Dependent and independent variables were measured as two sets of variables. The distance between the locations of the firms and the ports serves as the independent variable (Tongzon, 2009; Ticiana, 2019; Oni et al., 2022). On the other side, the dependent variable is the sampled firms' profit. Profitability is significant to this study since it has been identified as one of the most important indicators of business performance (Grzedorz and Dominik, 2015). Finding the percentage of the change in the dependent variable that the independent variable or variables can explain is crucial in a regression study (Kline, 2011). Here is the regression equation:

$$Y = a + bX + E \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where Y is the dependent variable, X is the independent variable, a is the intercept, b is the slope, and E is the residual. For this study, the regression formula or model is given as:

$$D = a + bP + E \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.. (2)$$

Where D stands for distance between the seaport and factory, a is the intercept, b is the slope p represents firms' profits, and E is the residual.

3.2. Data Sources and Variable description

The study focused on a panel of industrial manufacturing firms with locations in Nigeria's most industrialized states- Lagos and Ogun. 10 publicly quoted manufacturing firms that frequently import cargo in containers through the seaports in Lagos and have been consistently listed on the Nigerian Stock Exchange (NSE) list for more than ten years (beginning from 2010) make

up the study's population. These firms are located in the major industrial estates in Lagos and Ogun States, which are Ilupeju, Agbara, Ewekoro, Ikeja, Ikorodu, Isolo, and Shagamu. The study used a structured questionnaire to collect primary data for a period of ten years (2010-2019). Only 6 of the 10 administered questionnaires were actually completed and returned. This number makes up 60% of the sample size. According to Osemwota, Okhaku, and Tomwe (1996), this percentage is appropriate for analysis and reporting of the study's findings.

4. RESULTS AND DISCUSSION OF FINDINGS

4.1 Relationship between firms' locations in relation to the seaport and firms' profits.
The indicators of firms' locations in relation to the seaport and firms' profits are discussed here. Table 2.0 shows their respective average values obtained from our survey. The industrial goods firms' profits have a yearly average of ₦31,355,886,417 (approx.), while the firms' locations in relation to the seaport have an average of 104.167km.

Table 2.0 Effect of Firms' Location in relation to the seaport on Industrial Goods Profit

Descriptive Statistics[a]

	Mean	Std. Deviation	N
Profit	31355886416.55	25307518202.019	60
Distance	104.1667	37.75002	60

a. Business = Industrial Goods
Source: SPSS Analysis.

Analysis of the effect of firms' locations on firms' profit as shown on Table 3.0 reveals that firms location has a strong positive association ($r = 0.731$) with industrial goods firms' profits, and it accounts for about 53.4% ($r^2 = 0.534$) in the total variation of industrial goods businesses' profit.

Table 3.0 Model Summary

Model Summary[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.731[b]	0.534	0.527	17151069622.645

a. Business = Industrial Goods
b. Predictors: (Constant), Distance
Source: SPSS Analysis

The result in Table 4.0 shows that the model significantly ($p < 0.001$) assesses the effect of firms' locations on industrial goods firms' profits. A summary of regression coefficients as presented in Table 5.0 shows that the hinterland location variable significantly ($p < 0.001$) contributes to the overall model. The standardized regression coefficients further indicates that hinterland location has positive effect ($\beta = 0.731$) on profits.

Table 4.0: Analysis of Variance

ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2160625401293614300000 0.000	1	2160625401293614300000 0.000	73.451	0.000[c]
	Residual	1882618810885193500000 0.000	58	294159189200811500000. 000		
	Total	4043244212178808000000 0.000	59			

a. Business = Industrial Goods
b. Dependent Variable: Profit
c. Predictors: (Constant), Distance
Source: SPSS Analysis

Table 5.0 Standardised Regression Coefficients

Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-20897282197.172	6238198972.448		-3.350	0.001
	Distance	482965223.855	56353037.680	0.731	8.570	0.000

a. Business = Industrial Goods
b. Dependent Variable: Profit
Source: SPSS Analysis

5. DISCUSSION OF FINDINGS AND RECOMMENDATION

The results of this study demonstrate a positive relationship between firms' locations in relation to the seaport and firms' profit. In other words, profit grows in direct proportion to the distance between the port and the industrial site. This result is not anticipated because an increase in transportation costs should have an adverse effect on firms' profitability. This results show that import-dependent firms in Lagos and Ogun States know how to direct their strategies to control the effects of the rising cost of port-hinterland transport. Again, using cost-effective transportation modes such as barges and rail, which have the potential to transport numerous containers at once, are likely to be less expensive than truck transportation. For effective container transportation between ports and factories, new businesses must seek out strategic locations with access to means of transportation including rail and inland waterways.

The results of this study and those of Guerrero (2017), who found that the impact of regular barges or rail services on businesses is noticeably reduced when intermodal connections are available, are in agreement. In order to examine that location is a significant factor influencing the choice of mode in freight transport, this study is also supported by the work of Zgon,

Tekavcic, and Jaksic (2019) on the impact of distance on selecting between intermodal railroad and unimodal road transport. This study suggests the following actions to ensure that container transportation from ports to sites in Lagos and Ogun States is cost-effective:

i. The Federal Ministry of Transportation needs to make investments in new infrastructure to replace the outdated ones.
ii. The National Inland Waterways Authority (NIWA) shall create a network of inland waterways for transporting containers from ports to their final locations.
iii. Firms that produce industrial goods need to know how to concentrate their strategies to prevent their income and profit from being impacted by the rising costs of port-hinterland transport.
iv. It is suggested that new businesses locate their production hubs near important points with easy access to affordable modes of transportation like rail and inland waterways.

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