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Seaport Cost and Time Reduction Strategies for Enhancing Nigerian Healthcare Manufacturing Performance

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Abstract

The study explores cost and time reduction strategies for Nigerian healthcare manufacturing organizations to enhance business performance by minimizing seaport clearance costs, clearance time, hinterland transport costs, and hinterland distance. The paper utilized both primary and secondary data, obtaining primary data through a questionnaire survey and secondary data from the annual reports of the sampled firms. The paper's population consists of 10 manufacturing firms purposefully selected from listed companies between 2010 and 2019, and which regularly importing goods via Lagos Seaports. The regression analysis revealed a strong positive association between seaport clearance cost, clearance time, hinterland transport cost and hinterland distance and healthcare manufacturing profits, accounting for 62.7% of the total variation in these organizations.The standardized regression coefficients further indicates that only clearance time has negative effect ($\beta = -0.346$) on profits, while clearance cost, hinterland transport cost and hinterland distance all have positive effects ($\beta = 0.527, \beta = 0.024$ & $\beta = 0.380$, respectively) on profits. The study suggests that reducing seaport clearance times can enhance the performance of the Nigerian healthcare sector. The strategy should concentrate on reducing seaport clearance time to enhance manufacturing performance. The Federal Government should integrate technology into seaport operations to streamline customs processes, while healthcare manufacturers should develop business plans to reduce seaport clearance time's negative impact on profits.

Keywords: Cost and Time Reducing Strategy, Healthcare Manufacturing, Seaport Operations, and Business Performance

1. Introduction

Healthcare manufacturing organizations are crucial for Nigeria's economic growth and prosperity, fulfilling a vital social and economic developmental function. Nigerian healthcare manufacturing organizations are enhancing access to quality healthcare services by producing essential medicines, medical devices, and equipment. The provision of essential medicines, medical devices, and equipment in Nigeria has reduced its reliance on imported medical products, thereby improving healthcare affordability and accessibility. Socially, organizations that manufacture healthcare also provide thousands of individuals with direct and indirect job possibilities. This leads to a decrease in unemployment, enhanced living standards, and a boost in the country's economic growth. Nigerian healthcare manufacturing organizations are utilizing research and development to develop innovative healthcare solutions to address specific health issues. Considering the social, economic, and developmental implications of healthcare manufacturing, it is imperative that they be taken into account in all plans, regulations, and policies.

Adofu et al., (2015), Anyaehie and Areji, (2015), Ekpo (2018), African Development Bank (2021) and Manufacturers Association of Nigeria (MAN, 2023) are just a few of the studies and reports that have pushed for better performance of Nigeria's manufacturing sector by addressing issues like poor infrastructure, a lack of funding, a shortage of skilled labor, and a high dependence on imported manufacturing inputs. The Manufacturer Association of Nigeria (2023), in particular, warns that the chemical and pharmaceutical industries heavily rely on imports for raw materials and draws attention to the potential repercussions of inefficient importation. Ibrahim's (2015) study has previously emphasized the importance of the technological and infrastructure environment, port efficiency, customs administration, and regulatory environment for economic growth. In order for the trade environment to support cost and time efficiency in imports, strategies for reducing costs and time in seaport operations, customs administrations, regulatory environments, technology, and infrastructural environments must be developed. By 2050, it is anticipated that Nigeria's population would have grown to 400 million, necessitating greater healthcare manufacturing benefits. Nigeria should take the initiative to support healthcare manufacturing enterprises by providing solutions for the problems they encounter.

Studies indicate that reducing logistics cost is a crucial factor for enhancing firm performance (Hoang & Nguyen, 2019; Delfim et al., 2021). Nigeria's manufacturing input importation incurs various logistics costs including transportation, inventory, customs, regulatory, insurance, risk, documentation, and loss and damage. In Lagos and Ogun state, over 82% of importers' logistics costs are for clearance, with clearance times ranging from two to three weeks. Seaports are crucial for manufacturing due to benefits and logistical interaction, necessitating strategies to reduce high logistics costs, as increased costs lead to higher production costs and decreased product demand (Akintayo, 2010).

Several authors have examined the relationship between logistics costs and organizational performance. For instance, Holzner and Peci (2009) examined the customs procedures in Kosovo and discovered a positive correlation between formal customs instruments and small- and medium-sized businesses' economics. Similar to this, Hornok and Koren (2015) examined how trade volumes are affected by administrative per-shipment costs. The authors determine that a 50% decrease in per-shipment costs is equal to a 9% decrease in tariffs using Spanish shipment-level export data for the years 2006–2012.

Dhakal and Jha (2020) examined how long it took for freight transport to clear customs at Birgunj customs areas and found that freight vehicles were spending more time inside the custom yard than it was taking for processing, which indicates that delays are more common between processes than

in the actual processing units. The primary reasons for this are the owner's failure to clear the goods on schedule because there aren't enough agents, and an unseen syndicate with ulterior motives. Again, Nguyen et al. (2021) carried out a study in Vietnam with an emphasis on the factors that encourage and hinder the adoption of e-customs. They discovered that compatibility and ease of use are barriers, but national culture and comparative advantages are important motivators.

In their studies, Ibrahim (2011) and Oni et al. (2023) stress that managing the customs environment is a crucial logistics area for enhancing supply chain management. Additionally, research by Notteboom & Jean-Paul (2005), Beresford et al. (2012), and Behdani et al. (2020) highlighted the significance of the inland transport component of the global supply chains network in addition to the seaport clearance. The hinterland is an area that is linked to the port by associated goods flows (Rodrigue and Notteboom, 2010). These connections usually take many different forms of transportation, such as rail, road, and barges. Research indicates that hinterland transport accounts for 40–80% of the costs associated with the global maritime supply chain, indicating a connection between firms and intermodal hinterland transport (Beresford et al., 2012 and Behdani et al., 2020). Studies indicate a relationship between organizational performance and the logistical costs of transportation in the hinterland, with transportation costs potentially having a 40–80% impact on businesses. It is unclear from the literature how additional import-related logistical costs, such as those associated with seaport clearance, seaport delays, and hinterland distance from the seaport, affect Nigerian healthcare manufacturing companies. Therefore, more study is required to comprehend how hinterland costs and seaport clearance affect Nigeria's healthcare sector, which is heavily reliant on imports. Therefore, the goals of this study are to close a gap in the literature: (i) to evaluate how reducing seaport logistics time and costs affects the performance of Nigerian healthcare manufacturing companies, (ii) to examine the correlation between seaport clearing costs, time, hinterland transportation costs, and distance, and the profitability of Nigerian healthcare manufacturing enterprises.

The paper is divided into five sections. The authors provide an extensive background and inspiration for the research in the introduction section. The literature on the relationship between maritime trade logistics (proxies by seaport clearance time, clearance costs, hinterland transport cost and hinterland distance) and enterprises' profitability is reviewed in the second section. Section three included a description of the methodology. Section 4 presents the findings. Section 5 presents the Conclusion and Recommendations.

2. Materials and Method

2.1 Theoretical Framework

2.1.1 Global Supply Network Theory

Martinez and Eguren (2013); and Ofobrukweta (2017) understood global supply network as a chain comprising of various elements. The global supply network is the spatial link that joins customers, raw material suppliers, distribution centres/warehouses and supply chain partners in the global production systems (Guessan, 1995 and Ofobrukweta (2017). Global supply network typically consists of crucial cost elements of the manufacturing system.

Healthcare manufacturing organizations in Nigeria, predominantly multinationals with global operations, require the movement of raw materials, semi-finished products, and subsidiaries between subsidiaries. The necessity to transport raw materials can also arise when there are insufficient or insufficient local supplies. The seaport clearance systems and hinterland transport are crucial stages in the global supply network, from origin to destination (Notteboom & Jean-Paul, 2005; Ibrahim, 2011). The Global Supply Network Theory is the most appropriate for this

paper because it highlights the potential increase in logistics and production costs in key areas such as hinterland transportation and the customs environment (Notteboom & Jean-Paul, 2005; Akintayo, 2010). As a result, cost-effectiveness in seaport operations can improve the performance of healthcare businesses in Nigeria. The study reveals that Nigerian firms' global supply network is significantly influenced by seaport operations.

2.2 Population and Sample Size of the Study

This paper utilized both primary and secondary data, obtaining primary data through a questionnaire survey and secondary data from the annual reports of the sampled firms. The article focuses on Nigerian healthcare manufacturing enterprises. Ten global manufacturing businesses who regularly import goods through Lagos Seaports and were listed on the Nigerian Stock Exchange between 2010 and 2019 make up the paper's population. The study administered structured questionnaires to 10 organizations using a total population sampling technique (Darpito, 2022), but only 9 of them completed them and returned them back. This number represents 90% of the total sample size. A panel of specialists in the field assessed the instrument before distribution in order to verify its construct validity and content. To ascertain whether the questionnaire items met the necessary quality standards, pilot tests were subsequently carried out, as recommended by Nwankwo (2016). To analyze the data, both descriptive and inferential statistics were employed.

This study employed dependent and independent variables to examine the impact of seaport operations, where time and cost reduction strategies are needed, on the performance of Nigerian healthcare manufacturing. Seaport operations are the independent variables, and Nigerian healthcare manufacturing performance is the dependent variable. The study used organization profits as a proxy for manufacturing performance (Holzner and Peci, 2009), and seaport clearance time, cost, hinterland cost and distance as proxies for seaport operations.

The investigation utilized SPSS for multiple regressions, focusing on determining the percentage of the dependent variable change that the independent variable can explain. The theoretical review suggests a functional link between seaport operations, and healthcare manufacturing performance.

$$HMP = a + b_1(CC) + b_2(CT) + b_3D + e \quad (1)$$

Where:

HMP =Healthcare Manufacturing Profitability

a = Constant of the model

b_1 - b_4 = Coefficients of the model

CC = Clearance Cost

CT = Clearance Time

TC = Transport Cost

D = Distance in relation to the seaport

E = error term representing factors other than those specified in the model

3. Results and Discussion

This section of the paper presents the estimation results of the effects of seaport operations variables on Healthcare manufacturing performance in Nigeria. Prior to the summary of Regression Coefficients, the study presented the results of descriptive statistics, model summary and analysis of variance accordingly.

Table 1 indicates that the average yearly profit from healthcare manufacturing is ₦2,960,299,033 (approximately), the average yearly cost of clearance is ₦662,280, the average clearance time is 72 hours, the average cost of transportation in the hinterland is ₦355,000,000, and the average distance to the hinterland location is 51.667 kilometers.

Table 1: Descriptive Statistics

	Mean	Std. Deviation	N
Profit	2960299032.93	1693177103.754	90
Clear Cost	662.28	422.700	90
ClearTime	72.00	34.131	90
TransportCost	355.00	149.696	90
Distance	51.6667	8.54598	90

The model summary of the regression analysis is displayed in Table 2. The combined variables of seaport operations (seaport clearance processes and hinterland transportation) account for almost 62.7% (r^2=0.627) of the overall variation in the profits of healthcare manufacturing enterprises and have a very significant positive association (r=0.792) with those profits.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.792[b]	0.627	0.610	1057461722.838

The results of the analysis of variance in Table 3 indicate that the model evaluates the impact of the combined predictors of hinterland transport and seaport clearance processes on the profitability of healthcare firms in a significant way (p<0.001).

Table 3: Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1601003846183106000000.000	4	400250961545776500000.000	35.793	0.000[c]
	Residual	950491500978245000000.000	85	111822529526852352000.0		
	Total	2551495347161350800000.000	89			

Regression coefficient summaries in Table 4 demonstrate that all the independent variables contribute significantly to the overall model. The standardized regression coefficients also show that only clearing time has a negative impact on profits (β=-0.346), but clearance cost, hinterland transport cost, and hinterland distance all have positive effects (β=0.527, β=0.024, and β=0.380, respectively).

Table 4: Summary of Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-1186328327.141	742143727.402		-1.599	0.114
	ClearCost	2112118.241	348639.731	0.527	6.058	0.000
	ClearTime	-17163225.580	3358558.028	-0.346	-5.110	0.000
	TransportCost	272419.764	955555.251	0.024	5.285	0.000
	Distance	75229579.565	13856888.290	0.380	5.429	0.000

4. Conclusion

The study investigates the impact of cost and time reduction in seaport operations on the business performance of Nigerian healthcare manufacturing organizations.The study indicates that profits are positively influenced by seaport clearance cost, hinterland transport cost, and hinterland distance.The study found that customs clearance time negatively impacts profits (β= -0.346).The increase in seaport clearance time is expected to result in a decrease in organizations' profits.Inefficient seaport clearance, resulting in delays, negatively impacts the performance of healthcare organizations in Nigeria.The study reveals that healthcare manufacturing businesses' profits are significantly impacted by the cost and time of seaport operations.This finding is consistent with earlier research by Beresford et al. (2012) and Behdani et al. (2020), which found that 40–80% of the costs associated with the global supply chain are borne by hinterland transit. The study emphasizes the importance of reducing seaport operations costs and duration in Nigerian healthcare supply chains, which is expected to enhance healthcare manufacturing performance. The study suggests that the Nigerian government should focus on improving supply chain management to reduce seaport clearance and hinterland logistics costs. Supply chain management involves port clearance procedures, alternative transportation modes, technology use, and developing the hinterland to reduce logistics costs and optimize operations. This study suggests that Nigeria can maximize the benefits of the AfCFTA through appropriate policy reforms. The paper suggests streamlining seaport clearance procedures, developing business plans for healthcare manufacturers, and incorporating technology into operations to improve manufacturing performance and reduce costs.

The study examined the relationship between seaport logistics, such as port clearance costs, clearance times, and hinterland transportation costs, and the profitability of Nigerian healthcare

manufacturing organizations. The study intends to evaluate how Nigerian healthcare manufacturing organizations perform when seaport logistics costs and times are reduced. Since the study is a case study that focuses on specific organizations, it has limitations. Several sectors should be combined in future research. The study's sample size is small, but it might be expanded to include a larger population.

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