Inland Container Depots and Port Congestion in Nigeria

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ABSTRACT

Port congestion in Nigeria significantly hampers operational efficiency and economic growth, leading to delays and operational stagnation. This study aims to identify the primary problems contributing to port congestion, including poor management, inadequate infrastructure, and bureaucratic delays. The study investigates the impacts of decongesting seaports through the development of Inland Container Depots (ICDs) on economic growth, port management, government policy, and transportation systems in Nigeria, focusing on the Kaduna and Jos dry ports. Utilizing a mixed-method approach, the research involved qualitative interviews with port stakeholders and quantitative surveys among dry port users and service providers.

Qualitative findings reveal that developing ICDs in Kaduna and Jos has significantly contributed to economic development through job creation, revenue generation, and reduced shipping costs. However, port congestion remains a challenge due to poor management, inadequate infrastructure, and bureaucratic delays. Specifically, the Kaduna port faces issues such as poor planning, handling, and storage of cargo, while Jos is plagued by traffic bottlenecks, strikes, and inadequate staffing.

Quantitative analysis confirmed these findings, showing significant correlations between seaport decongestion and economic development (r sig. value of 0.00), port management and port congestion (r sig. value of 0.00), government policy and inland port development (r sig. value of 0.00), and transportation systems and inland port development (r sig. value of 0.00). The correlation analysis indicated a low positive relationship between port management and economic development, and a moderate positive relationship with government policies.

In conclusion, the establishment of ICDs in Kaduna and Jos plays a crucial role in alleviating port congestion, fostering economic growth, and improving the overall efficiency of Nigeria's logistics network. Government policies have been identified as barriers to ICD development, highlighting the need for supportive regulations and infrastructure investment. Effective port management, supportive government policies, and robust transportation infrastructure are essential for maximizing the benefits of ICDs and enhancing Nigeria's trade competitiveness. ICDs are proposed as a viable solution to these issues, functioning as inland terminals directly linked to seaports and thereby enhancing the overall efficiency of the supply chain network.

Keywords: Port Congestion, Inland Container Depots, Economic Development, Port Management, Government Policy, Transportation Systems, Kaduna, Jos, Nigeria, Supply Chain Efficiency

INTRODUCTION

Port congestion poses a significant challenge concerning efficiency and economic implications. This problem leads to extended wait times before berthing and diminished service quality for incoming vessels.

Its repercussions extend over the long term, causing reduced competitiveness between ports and a decline in demand (Jin et al., 2015). The congestion brings about delays, prolonged voyage durations, and the stacking of ships and cargo at ports, adversely impacting supply chain operations and logistical processes. Ultimately, these issues culminate in reduced trade, increased expenses, and disturbances in trade and transportation agreements (Chinedum, 2018). The surge in seaborne trade has notably contributed to capacity constraints in various regions (Saeed et al., 2018). Nigeria is one of the countries that have witnessed port congestion. Onyema et al. (2019) explained that there has been a rise in port congestion in Nigeria, characterized by a low ship turnover rate, elevated operational expenses for shipping companies, and increased demurrage for importers. Onyema et al. (2019) discussed that this port congestion in Nigeria emerged in the early 1970s, characterized by extensive waiting times exceeding 100 days. Despite the pivotal role of ports in Nigeria's economic development, this congestion persisted, significantly impacting the country's economic performance (Onyema et al., 2019). Operational stagnation within the ports resulted in inefficiency and prolonged waiting periods for cargo transit from the Tincan Port to Apapa and other national ports (Onyema et al., 2019).

A particularly concerning episode of port congestion in Nigeria took place between October 2008 and March 2009, underscoring the recurring nature of this issue, adversely impacting the country's economic growth (Oyatoye et al., 2011). The federal government has

made numerous attempts to devise lasting solutions to this persistent problem (Oyatoye et al., 2011). Nigeria continues to grapple with port congestion, leading to slower vessel turnaround times at the port. The transportation infrastructure supporting cargo movement, particularly the roads connecting the port area through the city centre to the hinterland, is under immense strain (Chilaka, 2022). The absence of an efficient alternative transport system, especially a robust railway network, is a critical issue requiring urgent attention (Chilaka, 2022).

Objectives of the Study

1. To identify the impacts of the decongestion of seaports through the development of inland container ports on economic
2. To ascertain the effect of port congestion on port management and
3. To assess the policies essential to the development of inland container depots and identify some of the economic benefits of an inland port in
4. To identify an environmentally sustainable and effective mode of transportation system to integrate the gateway seaport and the inland container depots of Jos and

Research Questions

1. How will the decongestion of seaports through the development of inland container ports affect economic development?
2. To what extent has port management contributed to port congestion?
3. To what extent have government policies hindered the development of inland ports?
4. What transportation system can be used to facilitate cargo and reduce transport costs?

LITERATURE REVIEW

Inland Container Depots (ICDs) function as inland terminals that are directly connected to seaports through robust and high-capacity transportation infrastructure. They serve as pivotal points where customers can conveniently retrieve or deposit their container units, providing a similar experience to that of a seaport (Chilaka, 2019). These depots are strategically located to ease the transportation and logistics processes, offering accessibility and convenience to businesses and customers by enabling the efficient movement of

goods to and from seaports (Chilaka, 2022). ICDs play a crucial role in facilitating trade by acting as extensions of seaports, allowing for streamlined container handling and enhancing the overall efficiency of the supply chain network. They serve as essential hubs, ensuring smoother and more cost-effective transport operations while minimizing congestion and enhancing the flexibility of cargo movement between seaports and inland destinations (Chilaka, 2022).

Also, ICDs are typically established to bolster local economies and fortify the overall effectiveness of port operations. These depots, positioned inland, have been implemented worldwide and have shown considerable success in their operations. For instance, studies by Wang et al. (2018) have highlighted the success of numerous inland depots in China, underscoring their effectiveness. They are integral elements within the freight transport system, functioning as key nodes for freight distribution, intermodal transport hubs, and extended gateways for seaports (Jeevan et al., 2019). They play a multifaceted role in not only enhancing cost efficiency but also in improving hinterland connections and bolstering a country's ports' competitiveness by providing supplementary capacity. The significance and functions of ICDs differ across countries and regions, as Beresford et al. (2012) pointed out. Nevertheless, their core objectives remain consistent, aimed at stimulating local economies, optimizing operational efficiency, and reducing the overall cost within the supply chain. Additionally, these depots serve as vital nodes in the logistics network, offering a centralized point for cargo handling, storage, and onward distribution, thus streamlining and augmenting the global supply chain processes. They also contribute to the integration of various transport modes, thereby facilitating a smoother flow of goods between seaports and inland regions. This integration helps decongest seaports and lessens the burden on port infrastructure, thereby enhancing overall trade efficiency.

ICDs and Economic Development

Inland container depots (ICDs) represent logistics centres such as inland terminals, ports, hubs, logistics centres, and freight villages. These sites provide diverse logistical services and are designed to accommodate multiple operators, enabling them to conduct a wide range of activities associated with transportation, logistics, and product distribution (Chakrabartty & Sinha, 2022). In terms of economic development, Inland terminals, including dry ports, play an essential role in facilitating containerized freight transit, improving logistical competitiveness, and supporting economic activities. The available evidence strongly suggests that ports play a pivotal role as economic drivers within the cities they serve (Chakrabartty & Sinha, 2022). They facilitate the integration of various economic industries and the clustering of services, consequently yielding both social and economic advantages (Li et al., 2017). Economic theories often highlight the significance of ports as key contributors to economic development, especially historically, where they significantly influenced commerce and the prosperity of nations (Notteboom & Lam, 2018). Ports are fundamental elements within the broader transportation sector, intricately connected to the expansion of the global economy. They serve as crucial mechanisms for countries to integrate into the global economic system (Dwarakish & Salim, 2015). Since they are integral logistics components, ICDs have emerged as crucial elements within local, national, and global transportation networks, particularly in high-trade regions (Dwarakish & Salim, 2015). The efficient transportation of goods holds immense significance in competitive markets, especially for underdeveloped nations burdened by high logistics costs that hinder their competitiveness in the global economy. ICDs are often regarded as strategic partners to seaport terminals, alleviating port capacity constraints while delivering value-added services across the entire supply chain (Hassan, 2013). These depots also aid seaports by augmenting capacity, facilitating improved access to and from the seaport, enhancing the speed and frequency of container clearance, serving as relief zones for harbour congestion, and increasing overall throughput (Roso et al., 2009). Furthermore, ICDs enhance ports' competitiveness and transform them into more versatile, commercially focused, and adaptable entities (Verhoeven, 2010). Specifically, ICDs have increasingly played an active role in promoting domestic commerce, facilitating the movement and distribution of goods from seaports to their

final destinations (Jeevan et al., 2019). Moreover, container deconsolidation and the availability of diverse transportation options at dry ports relieve seaports from the burden of handling extensive container volumes, consequently reducing transportation costs (Rodrigue & Notteboom, 2010). This shift of container handling to ICDs helps in optimizing seaport operations and enhances the overall efficiency of the supply chain, thereby contributing to more effective and cost-efficient trade operations.

Port Management

Implementing ICDs has emerged as an efficient and effective approach to handling port operations. Port management can be broadly classified into economic, strategic, and operational categories. Strategically, public and private port authorities enhance port efficiency, accessibility, and investment (Parola et al., 2012). From an economic standpoint, the primary focus is on the seaport's economic efficiency in terms of profitability and cost management. Operationally, the decisions made by port authorities aim to maximize port-related activities and efficiently utilize available resources to optimize the overall system's performance (Parola et al., 2012). Tran et al. (2012) assert that quality management is essential for driving efficiency, fostering port competitiveness, and contributing to a country's economic growth. With the evolving role of seaports and their crucial position within supply chains, quality management has gained immense significance. Tran et al. (2012) further stressed that effective management practices are vital for ensuring long-term port competitiveness and sustainability. Baccelli and Morino (2020) asserted that effective management is a pivotal element in enhancing the success of port operations, particularly in logistics processes. Therefore, the administration of port operations plays a critical role in determining a port's sustainability. Management strategies must concentrate on meeting both operational and strategic objectives for sustained success.

ICDs and Policy Development

The establishment and growth of inland ports are heavily influenced by a spectrum of government policies that significantly shape their development, location, and competitive edge. A pivotal policy area impacting these ports is transportation infrastructure (Ansah et al., 2020). Governments have the ability to invest in new transportation infrastructure, such as highways, railways, and intermodal facilities, aimed at enhancing the movement of goods and people (Ansah et al., 2020). Such investments can attract businesses to the vicinity of inland ports, rendering these areas more competitive and appealing for commercial activities.

Moreover, governments can implement policies that encourage the growth of businesses in inland port regions. These policies serve to incentivize businesses to operate within these zones, fostering a conducive environment for the logistics and transportation industry (Ansah et al., 2020). Regulations also play a critical role in the development of inland ports. Environmental protection, safety, and security regulations significantly influence the operations of these ports (Nzengu et al., 2021). For instance, regulations governing emissions and waste disposal impact the development of logistics and transportation infrastructure, dictating the types of goods that can be transported through inland ports and the kinds of facilities that can be constructed (Nzengu et al., 2021).

Additionally, land use policies hold a substantial impact on the growth of inland ports. Governments can designate specific areas as development zones or offer incentives for businesses to establish themselves in particular regions (Sakai et al., 2020). These policies can determine the location and scale of inland ports, as well as the nature of businesses operating within these areas (Sakai et al., 2020). The combined influence of these government policies shapes the landscape and competitiveness of inland ports, impacting their growth and economic significance.

ICDs Transportation in Nigeria

Rožić, Petrović, and Ogrizović (2014) indicate that containers arriving from seaports primarily utilize

railway and road infrastructures for transportation. The railway is effective in meeting temporary container delivery demands, while road transport offers swifter and more convenient container transportation despite a lower volume of containers transported compared to the railway. According to Babatunde and Ibrahim (2020), Nigeria's rail line from Lagos to Kano reopened after undergoing renovations. This revival came after the country's rail system, once an efficient and cost-effective mode of cargo and passenger transport, deteriorated significantly due to decades of neglect and mismanagement (Babatunde & Ibrahim, 2020). Persistent traffic and congestion in Nigeria are primarily attributed to trailers transporting cargo from seaports via roads. This challenge is exacerbated by the presence of an inadequate road network, a large number of trucks waiting for access to the ports, and local government authorities imposing fees on loaded trucks while law enforcement agencies hassle drivers and collect unofficial fines (Chilaka, 2019).

ICDS In Nigeria and Environmental Impacts

The Lagos marine ports, responsible for handling over 70% of Nigeria's non-oil exports, are located in densely populated urban areas, placing immense strain on crucial roadways and resulting in congestion and environmental issues (Center For International Private Enterprise, CIPE, 2016). This situation is compounded by the absence of a functional rail transportation system to alleviate the burden on the overused and deteriorating road network. Chilaka (2019) explained that disruptions, such as fuel shortages, regularly cause lengthy delays on major roads, while breakdowns of vehicles obstruct essential feeder roads due to the urban positioning of the ports. Chilaka (2019) discussed that the roadways connecting the port complex often face overcrowding due to a combination of freight trucks, buses, cars, and other vehicles exceeding their capacity. CIPE (2016) also reported that stalled cargo trucks further exacerbate the challenging situation. The flow of loaded and empty containers at Nigerian ports reflects a significant trade imbalance, with a ratio of 85% empty containers to 15% loaded containers in 2014. Nigerian Ports Authority (2016) established that rectifying this imbalance requires port reform and improved business conditions. The Nigerian government initiated the Landlord Port Model as a measure aimed at addressing these issues.

METHODOLOGY

The study adopted a mixed-method approach with a comparative case study approach. The study was conducted in two research locations, namely Jos and Kaduna dry ports, which served as the case studies. Both qualitative and quantitative approaches were used in the present study. The study participants were classified as qualitative and quantitative samples. The qualitative sample was classified as port stakeholders, including terminal operator, logistic provider, shipping line, inland port user, community member, terminal operator, logistic provider, and any other member of port stakeholder. The quantitative sample entailed dry port users and dry port service providers from different work positions and organizations, mainly those working at top management levels, non-managerial positions, middle management levels, first-line supervisor levels, and surveyors. These participants also worked inland container depots, port terminals, shipping lines, logistic systems, estates, and labour unions.

Qualitative data were collected through interviews conducted in both 2018 and 2020, involving eight respondents each year. An interview protocol was self-developed and consisted of open-ended questions, and each interview with the selected participants lasted for 15-30 minutes. Additionally, quantitative data were obtained through questionnaires distributed to 270 respondents in 2018 and 211 respondents in 2020. A self-constructed interview protocol with open-ended questions was developed. The self-developed questionnaire was developed to follow the Likert scales, where respondents expressed their level of agreement by choosing from the following options: Strongly Disagree (1), Disagree (2), Neither Agree nor

Disagree (3), Agree (4), or Strongly Agree (5). The qualitative data were analyzed using a thematic analysis method, and descriptive analysis was utilized for quantitative data.

RESULTS

Qualitative Results

The study revealed the decongestion of seaports through the development of inland container ports in both Kaduna and Jos, which has affected economic development and resulted in the creation of employment opportunities, increased revenue generation, and reduced overall costs of shipping. Decongestion was found to be associated with economic growth and improved livelihoods through the establishment of inland container depots. Further, the study established that port management in Kaduna and Jos contributed to port congestion through poor planning, infrastructure, and streamlined processes. However, the key factors leading to port congestion in Kaduna include poor planning, handling, and storage of cargoes, bureaucratic protocols, lack of handling equipment, and delayed cargo clearance. Conversely, traffic bottlenecks, insufficient handling equipment, strikes, slow cargo clearance, truck shortages, bureaucratic processes, poor quality control, inadequate staff, political interference, and poor documentation lead to port congestion in Jos.

The study revealed that government policies hinder inland port development. Relating to the Kaduna case study, port management contributed to port congestion due to self-interest, delayed implementation of regulations, and the bureaucratic nature of policy implementation. The Jos case study revealed confines on partnerships, unstable policies affecting investors, limitations on development and financing, slow implementations and funding, resistance from landowners, and changing policies as key obstacles.

For transportation systems that facilitate cargo movement and reduce transport costs, Kaduna and Jos case studies supported railway transport as a feasible system of transport. Railway transport emerged as a promising option for Kaduna and Jos case studies because it handles large cargo volumes efficiently, reduces reliance on road transportation, and provides a cost-effective and environmentally friendly option. For the Kaduna case study, air transport and sea transport were also supported as other efficient and viable transportation systems.

Quantitative Results

The quantitative analysis conducted on the impact of inland container depots on economic development showed that r sig. value was 0.00, which is less than the significant level of 0.05 (See Appendix Table 1). Therefore, the results confirmed that seaport decongestion had a significant impact on economic development through the development of inland container ports. Also, the study confirmed the association between port management and port congestion by indicating a r sig. value of 0.00 (See Appendix Tables 2 and 3), which was less than the significant level of 0.05, hence confirming the hypothesis that there was a significant impact of port management on port congestion. Regarding the association between government policy and inland port development, the r sig. value was 0.00 (See Appendix Table 4), which was less than the significant level of 0.05, therefore confirming that government policies had a significant impact on port congestion. Further, regarding the association between transport and inland port development, the r sig. value was 0.00 (See Appendix Table 5), which is less than the significant level of 0.05, indicating that there was a significant impact of transport on port congestion. The correlation analysis of economic development, transport system, port management, and government policies showed a low positive relationship between port management and economic development with a Pearson product-moment correlation coefficient (r) of 1 for economic development, (r) of .156 for transport system, (r) of .185 for port management, while government policies have a moderate positive relationship with a Pearson product-moment correlation

coefficient (r) of. 238 (See Appendix Table 6).

SUMMARY OF FINDINGS

This present study established that developing inland container ports in both Kaduna and Jos has significant contributions to economic development through the creation of job or employment opportunities, increased revenue generation, and reduced overall shipping costs. Seaport decongestion through inland pots has been linked to economic growth and improved livelihoods. Issues associated with Port management in Kaduna and Jos intensify port congestion because of different factors, including poor cargo handling, bureaucratic delays, insufficient equipment in Kaduna, and traffic bottlenecks, strikes, and inadequate staffing in Jos. The study revealed government policies as the barriers that hinder the development of inland ports in Kaduna and Jos. According to the study's findings, self-interest among port managers, delayed regulation implementation, and bureaucratic processes contribute to congestion in Kaduna.

Conversely, unstable policies, limited partnerships, and resistance from landowners hinder development in Jos. Regarding transport systems, the railway was found to be an effective or viable means of transport. It is evident that railway transport is an efficient, cost-effective, and environmentally friendly option to handle large cargo volumes in Kaduna and Jos. Additionally, air and sea transport are viable alternatives to the transport system in Kaduna.

Based on the quantitative analysis conducted, the findings confirmed the significant impact of inland container depots on economic development, with a significant value of 0.00 ($p< 0.05$). Also, the analysis confirmed the significant impact of port management on port congestion and the effect of government policies on port development, both with a significant value of 0.00 ($p < 0.05$). Transport's impact on port congestion was also similarly significant. Correlation analysis indicated a low positive relationship between port management and economic development ($r = .185$) and a moderate positive relationship between government policies and economic development ($r = .238$). These findings highlight the importance of effective port management, supportive government policies, and efficient transport systems in promoting economic development through inland port infrastructure in Kaduna and Jos.

CONCLUSION

Inland container ports in Kaduna and Jos have a significant role in fostering economic development through job creation, revenue generation, and reduced shipping costs. The decongestion of seaports through these inland depots also facilitates economic growth and enhanced livelihoods. However, port management and supportive government policies are paramount to realizing these benefits. Poor planning, inadequate infrastructure, and inefficient processes contribute to port congestion in inland ports. Some barriers, including bureaucratic delays and insufficient handling equipment in Kaduna, as well as traffic bottlenecks and strikes in Jos, demonstrate the need for streamlined operations and improved resource management in inland ports. Government policies are perceived to hinder inland port development, with issues such as self-interest, delayed regulation implementation, and unstable policies impeding progress. Addressing these policy-related barriers facilitates the growth and efficiency of inland ports. The results from this study may help advocate for developing enhanced transportation systems, particularly railway transport, which provides a cost-effective, efficient, and viable solution for moving large cargo volumes. In Kaduna, air and sea transport are also among the viable options for improved transportation. Also, based on the findings that validate the significant impact of inland container depots, port management, government policies, and transport systems on economic development, there is a need for integrated approaches to port management, policy formulation, and transportation planning to optimize the economic benefits of inland container ports.

RECOMMENDATIONS

The study provides the basis to recommend enhanced economic benefits of inland container ports in Kaduna and Jos through improvements in port management, policy reforms, and transportation infrastructure. Investing in advanced technologies, streamlining bureaucratic procedures, and investing in railway, air, and sea transport should be considered in inland ports to reduce congestion and increase efficiency. Also, capacity building and stakeholder collaboration should be prioritized to reduce port congestion. This study also has significant recommendations for future research. Since this present study was limited to mixed-method research, Future research should focus on longitudinal methods to examine long-term impacts, comparative analyses of management strategies, and the potential of emerging technologies. Additionally, future research should examine environmental implications, socio-economic benefits, and the effectiveness of policy changes to provide a comprehensive understanding of sustainable port development.

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APPENDIX

Table 1. Coefficients Table for Test of Hypothesis One

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.166	.388		13.331	.000
	Inland Container Depot (ICD)	-.075	.066	-.072	-1.131	.259

a. Dependent Variable: Economic Development

Table 2. ANOVA Table for Test of Hypothesis Two

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	90.270	1	90.270	210.193	.000 b
	Residual	106.507	248	.429		
	Total	196.778	249			

a. Dependent Variable: Port Congestion (PC)
b. Predictors: (Constant), Port Management (PM)

Table 3. Coefficients Table for Test of Hypothesis Two

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.776	.264		14.324	.000
	PM	-.044	.045	-.062	-.982	.327

a. Dependent Variable: PC

Table 4. Coefficients Table for Test of Hypothesis Three

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.776	.264		14.324	.000
	GP	-.044	.045	-.062	-.982	.327

a. Dependent Variable: PC

Table 5. Coefficients Table for Test of Hypothesis Four

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.686	.266		14.424	.000
	TP	-.044	.042	-.063	-.973	.397

a. Dependent Variable: PC

Table 6. Correlations Tables

Variables		**Economic Develop-ment**	**Transport system**	**Port Manage-ment**	**Govern-ment Policies**
Economic Development	Pearson Correlation	1	.156*	.185**	.238**
	Sig. (2-tailed)		.010	.002	.000
	N	270	270	270	270
Port Management	Pearson Correlation	.185**	.412**	1	.360**
	Sig. (2-tailed)	.002	.000		.000
	N	270	270	270	270
Government Policies	Pearson Correlation	.238**	.337**	.360**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	270	270	270	270
Transport system	Pearson Correlation	.156*	1	.412**	.337**
	Sig. (2-tailed)	.010		.000	.000
	N	270	270	270	270

*. *Correlation is significant at the 0.05 level (2-tailed).*

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

Source: SPSS v. 26