



INLAND FREIGHT DISTRIBUTION SYSTEMS IN NIGERIA: THE INLAND DRY PORTS STRATEGY

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ABSTRACT

This study reviews the development of inland dry ports (IDPs) as a strategy for inland freight distribution in Nigeria. The objective was to evaluate the volume of containers transported to the inland dry ports in Nigeria between 2018 and 2021 as strategy for inland freight distribution. It adopted a descriptive survey approach using simple random sampling to produce a sample of 343. ANOVA result of the hypothesis tested showed that a statistically significant difference existed in the volume of cargo transported to the IDPs during the period under review. It was found that Kaduna IDP, being the only functional inland terminal, is inadequate to improve the efficiency of seaports in Nigeria. Thus, the study recommends that the Federal Government should provide the enabling environment for the private sector to invest in IDPs to enhance efficiency of ports, optimize port-hinterland connectivity and boost inland freight distribution systems in Nigeria.

Key words: *intermodal, port-hinterland connectivity, concessionaire, inland freight distribution, , containerization*

INTRODUCTION

An inland dry port (IDP) is a rail or a barge terminal linked to a maritime terminal with regular inland transport services (Rodrigue & Notteboom, 2022). IDPs provide a practicable approach to deliver functional and efficient port system, and they are extremely dependent on all modes of transport, especially rail. Unlike seaports that have established management practice for their development, IDPs lack such. This implies that while management practices related to port development are well established and effectively implemented internationally (with all stakeholders being familiar with their roles), no inland dry port implementation mode of operation has ever been streamlined and there is no universally acceptable IDP development process (United Nations Social & Economic Council, 2018).

It was the knowledge and operational gaps in the management practice for the development of inland dry ports that provided the impetus for the Intergovernmental Agreement on Inland Dry Ports. This was organized by the Economic and Social Commission for Asia and the Pacific (to provide a uniform definition of a dry port) and it aimed at providing a regional framework to set standards and principles for the development and operation of inland dry ports of international importance (ESCAP, 2013).

In Nigeria, due to the absence of barge terminals where IDPs are located, inland freight distribution system requires that port-hinterland connections be facilitated by rail and road modes of transport. However, owing to reasons of economies of scale associated with rail transport, this paper focuses more on the need for rail freight transport services in port-hinterland connections in Nigeria in order to facilitate seamless movement of land freight to inland dry ports en route final inland destinations.

Inland dry ports have emerged globally as an integral part of trade facilitation for over three decades, but it was not until 2006 that the Federal Government of Nigeria took a bold step to upgrade the Custom Bonded Terminal in Kaduna to IDP status before giving approval for six more locations for IDP projects. Thus, the implementation of IDPs in Nigeria is geared towards playing an important role in national economic development.

Some of the reasons for the emergence of IDPs in Nigeria are to reduce transport costs to shippers, reduce transit time in order to attract more investment to the hinterland and to



improve the efficiency of seaports. In light of this, the study identifies the daunting challenges associated with the development of inland dry port in Nigeria to include poor rail freight transport services, which have led to over reliance on road transport, with attendant road crashes which result in damages to goods, vehicles and injuries or death due to bad roads and long delays on roads due to deplorable road infrastructure.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Conceptual Clarification

The Concept of Inland Dry Port

An inland dry port is an inland intermodal terminal that is directly connected to a seaport. When connected to rail freight transport services, inland dry ports have the potential to expand the capacity of existing seaports. Since inland dry ports can also be considered as fulfilling the functions of the broader supply chain, they help to improve the performance (competitiveness) and sustainability of the seaports with which they are linked (Hui et al., 2019).

With the availability of services such as storage, maintenance and cleaning of containers, and customs clearance at the inland dry port (at the same level of service as is obtainable at the seaport), the use of inland dry ports frees up significant land space around the seaport (Roso, Woxenius and Lumsden 2009).

In the view of Cullinane and Wilmsmeier (2011) cited in Zeng et al. (2013), inland dry ports represent an occasion to alleviate congestion during periods of economic expansion as witnessed in China. Some authors have further established that inland dry ports can help to increase coastal port capacity and productivity, while at the same time facilitating the reduction in transport costs, traffic congestion, air pollution, and accidents (Rahim, Asef-Vaziri & Harrison, 2008 ; Roso 2007; Wang & Wei 2008 cited in Zeng et al., 2013). In addition to the ability of inland dry ports to drive both capacity and economic growth as well as serve as differentiators for port competition, inland dry ports represent an important prospect for seaport expansion in China (Zeng and Yang 2012 cited in Zeng et al., 2013).

It has become evident that inland dry ports as extended gateways are being developed across the world in response to land-side port capacity constraints. Thus, viewed from a more tactical perspective, inland dry ports offer prospects to improve service to shippers, grow the regional economy, and generate new employment sources (Roso and Lumsden, 2010 cited in Zeng et al., 2013).

Inland dry ports are known to support container volume growth, congestion reduction, and port expansion as confirmed in both the United States and Europe. This point is validated in European ports which took advantage of the global economic downturn in 2008 to invest in inland terminals in order to reduce reoccurrence of previously experienced port congestion (Barnard 2009b).

Allen (2008) cited in Zeng et al. (2013) observe that in the United States, many ports have few opportunities for physical expansion at the port itself, thus off-site inland dry port facilities allow continued volume growth. Similarly in China, inland dry ports offer opportunities to relieve problems of capacity and congestion (Cullinane and Wang 2007; Zeng and Yang 2012).

According to Hui et al. (2019), the idea of extending shipping services inland is a way of expanding a port's cargo handling abilities, as well as its connectivity to the hinterland. Therefore, implementing inland dry ports in Nigeria would eliminate queues at the seaports, with the result of time savings in the supply chain. The shift from transporting goods by trucks to moving goods on rail also enhances possible gains in minimized environmental impacts since a single train trip can substitute for 35 trucks. Moreover, apart from using rail freight transport to address the problems of economies of scale, congestion and lack of space, US EPA (2014) cited in Hui et al. (2019) asserts that in the U.S.A, a single double-stack train alone is tantamount to the removal of 300 trucks from highways. This becomes an important consideration for organizations that are



making efforts to be more environmentally conscious and friendly in their supply chain management.

The complementary functions of inland dry ports with regards to seaports in Nigeria are such that the former enhances seamless transportation and faster movement of goods to and from the seaports thereby impacting a port's competitiveness. This translates to improving a seaport's access to the hinterland market. Furthermore, the implementation of inland dry ports enhances the physical and administrative flows of the seaport, which ultimately leads to reducing much of the work done at the seaport. In addition, it is vital to understand that inasmuch as seaport's functions are replicated at inland dry ports, it is not all seaport activities (such as loading and unloading onto the ship) that can be transferred inland (Hui et al., 2019).

Evolution of Inland Dry Ports in Nigeria

Inland dry port also refers to a terminal where different kinds of cargo handling and value added activities are carried out while being connected to a seaport with either rail or barge services (Roso et al. 2009). The inland dry port concept has to do with a seaport being directly connected by rail with inland intermodal terminals at which containers can be turned in or evacuated as if directly to or from the seaport. In the view of Rodrigue et al. (2010), the emergence of inland dry port happened in a number of places globally, especially where the growth of inland freight distribution required a massification of flows (which is economies of scale attained through larger volumes).

Inland dry ports have evolved over the years to perform both core port functions and broader logistics activities. According to Roso et al. (2009) when an inland dry port concept is deliberately applied, it can (1) shift freight volumes from road to more energy efficient traffic modes that are less harmful to the environment (2) relieve seaport cities from some congestion (3) make goods handling more efficient and (4) facilitate improved logistics solutions for shippers in the port's hinterland.

In the view of Beresford et al. (2012), the management structures of IDPs follow the theoretical framework (i.e. landlord, tool and service ports) which is applied to seaports. It was under the Public Private Partnership concept of Landlord management model that the Federal Government of Nigeria on March 15, 2006 approved the commencement of Inland Dry Port (IDP) projects in six locations in the country under "Build, Own, Operate and Transfer" (BOOT) agreement for 25 years, except Isiala Ngwa inland dry port (Abia) which has thirty (30) years concession period. The project was gazetted vide Federal Republic of Nigeria Official Gazette No.30 volume 94 on May 21, 2007 (Nigeria Shippers' Council, 2022).

The concentration of Nigeria's major seaports in the south made shippers from the hinterland to experience difficulties in the course of clearing goods at the seaports because of the long distance from their location to the seaports and the inefficiency that was associated with port operations. This explains the need for the full integration of the inland dry ports into the supply chain in the country which makes up the maritime shipping networks, port terminal activities and inland transportation. If this is actualized, it would be a big relief for shippers in the hinterland.

The inland dry ports in Nigeria therefore represent an opportunity to bring shipping services to the hinterland and neighbouring landlocked countries in order to assuage the stressful experience by the shippers. Out of the seven IDPs earmarked for development in Nigeria, two (Kaduna and Kano) have been declared as ports of destination for imports and origin for export (Eto, 2023). The inability of other IDP projects to kick-start in order to move shipping services to the hinterland is explained by the absence of a viable public-private partnership even though the Government has expressed preference for concession agreement in a bid to implement the IDP concept in Nigeria.

The Concept of Public-Private Partnership in Operating IDPs in Nigeria



Owing to growing pressure on public budget by competing needs from different sectors of the economy (in the face of dwindling fortunes of government) there is need to encourage private sector participation in operating IDPs in Nigeria (Eto, 2023). In respect of financing infrastructure, Oluyede (2021) opines that capital investments in infrastructure have been accorded world-wide recognition as the most feasible approach for stimulating and fostering sustainable economic development and inclusive growth. Inland dry ports are significant infrastructure to enhance the productivity and competitiveness of the seaports and those being planned for Nigeria are way beyond the carrying capacity of the Federal Government's budget, thus the encouragement to seek for Public Private Partnership (Eto, 2023).

In seeking for an investment model for IDPs, the Nigerian Government adopted the landlord concession agreement under the governance model for inland dry ports (Eto, 2023). According to Beresford et al. (2012), the landlord model describes a structure in which the government offers the investor-friendly environment, while the concessionaire is expected to make provision for infrastructure, maintain and operate it.

In the views of Porter (1990) and Notteboom (2007) cited in Beresford et al. (2012), even though the creation of a favourable economic environment by Public Private Partnership is apparently a rational strategy, it has been observed that government does better by playing a complementary role rather than feature prominently and directly as a participant in the operation of a business concern that provides public good. To promote the involvement of more private and foreign investment, the balancing point in the public-private partnership depends on the one hand on the capacity and capability of the private company and, conversely, on a responsive regulatory approach adopted by government (ADB, 2008a cited in Beresford et al., 2012).

Rodrigue et al. (2009) cited in Beresford et al. (2012) observe that the need to develop a comprehensive regulatory framework when Public Private Partnership is adopted for inland dry port operation is essential to guarantee the success of such a system. Land constraints, infrastructure deficit, poor port hinterland connections, lack of capital to expand and modernize procured equipment, environmental and institutional impediments and inadequate planning for IDPs in Nigeria, all contribute to logistics constraints in inland freight distribution as identified by Eto et al. (2023). The suboptimal performance of IDPs in Nigeria is traceable to the unfriendly operational environment, which does not encourage investors/concessionaires. This perspective constitutes the major focal points for review in this paper.

The Need for Port-Hinterland Connections in Nigeria in the Operations of IDPs

Inland dry ports are reputed to have emerged globally as practicable approach to complement the functions of seaports and to help to make them competitive; this explains the need for port-hinterland transport system to provide the necessary conduit and live wire to sustain the activities at both ends (Eto, 2023). IDPs have been playing significant role in the expansion drive of seaport (Bentaleb et al., 2015); thus since the IDPs are located in the inland, port-hinterland connections are vital.

The cross section of the industry stakeholders that were interviewed were of the idea that the Nigerian government considers inland dry ports as crucial elements towards the efficient performance of intermodal or multimodal transport corridors, which are aimed at facilitating seamless physical and operational connectivity in the country. And according to Notteboom & Winkelmans (2004) cited in Van Der Ho & De Langen (2008), the concern for efficient movement of land freight to and from seaports has prompted port authorities to increasingly aim at enhancing the quality of hinterland transport services because hinterland access is a significant issue in port management (De Langen, 2004 cited in Van Der Ho & De Langen, 2008).

The Kaduna Port Manager opined that the port's potential hinterland is the area that can be reached at a cheaper cost or shorter time than from another port. This according to the Manager is the basis for port-hinterland connections. In the view of Bergqvist (2011), port-hinterland



connections are vital because they enable land freight to be transshipped between seaports and inland destinations. However, since not all of the freight or load units (which arrive at seaports are meant for such seaports as final destination) part of such freight are transshipped to other seaports and the rest is moved to inland destinations (courtesy of port-hinterland connections) through transit points (i.e. inland dry ports).

Operators of the Kaduna IDP asserts that seaports and their hinterland transport systems in Nigeria can only stand a chance of attracting port users and significant volumes of cargo on the condition that the entire hinterland transport network is functionally efficient. And that since port hinterland connectivity involves many actors and activities, which require intense collaboration to work effectively, this calls for inter-organizational coordination, a view equally shared by Van Der Ho & De Langen (2008); Bergqvist (2011).

Firms that show interest in hinterland transport include shipping lines, terminal operating companies, freight forwarders, hinterland transport providers, terminal operators, port authority, and Customs Service and infrastructure managers. Hence, Notteboom (2001); van Klink and van den Berg (1998) cited in Roso & Lumsden (2009) assert that various seaports, as well as shipping lines, join forces vertically to control hinterland transport.

In light of this, Van Der Ho & De Langen (2008) opine that coordination between all these operators is essential to create effective hinterland transport chains. Since IDPs exert influence by facilitating trade, which leads to local economic development, many seaport operators (apart from assisting in port-hinterland connections) participate in inland dry port development by offering expertise or technical support to assist the inland dry port's daily operation (Beresford et al., 2012).

IDPs act as points of convergence where multiple interactions between transport modes, operators and service providers can be synchronized (United Nations Social & Economic Council, 2018). It is the ever increasing economic growth, expanding trade, vast hinterland areas, and long distances between seaports and hinterland destinations, which have warranted the development of inland dry ports, port-hinterland connections and related services in Nigeria (Eto et al., 2022). IDPs have become part of maritime logistics for over a decade in Nigeria (Adejumo, 2020). The initial development of IDPs in China was spurred by the demand from high inland transport and transactional costs and the desire to extend the benefits of containerization to the hinterland from the ports (Beresford et al. 2012). However, Eto (2023) has identified the following needs which led to the emergence of IDPs in Nigeria. The need to (1) improve the efficiency of the seaports by relieving seaports from congestion (2) alleviate pressure on storage space (3) reduce handling operations (4) make freight handling more efficient (5) facilitate improved logistics solutions for shippers in the port's hinterland (6) reduce transport costs to shippers (7) reduce transit time in order to (8) attract more investment to the hinterland (9) Improve the efficiency of seaports, since having a bad port is equivalent to being 60% farther away from markets both in the hinterland and foreland (Dollar et al. 2001; Cezar-Gabriel, 2001)(10) bring a series of advantages environmentally by way of reduced carbon emissions (11) Reduce the risk of road accidents (12) Facilitate the performance of selected seaport activities.

It is in light of the foregoing that it is imperative to develop and maintain port hinterland connections in Nigeria by ensuring that rail transport services are used in order to accomplish a smooth freight flow to and from the IDPs (Bernard, 1995 cited in Eto et al. 2022). Robinson (2002) and Carbone & De Martino (2003) cited in Fall Bulletin (2012) stress that ports must be understood as a link in the value supply chain whose degree of functional and organizational integration extends beyond ship-port relationships to encompass the port-hinterland relationship as being of equal or greater importance. This underscores the significance of port- inland accessibility.

Cullinane and Wilmsmeier (2011) cited in Fall Bulletin (2012) draw from the port development concept, and argue that inland dry ports and inland load centres play an important role in the "structural transformation" of port development. This concept holds that it is vital to integrate



hinterland infrastructure with the maritime transport leg in order to extend the port development life cycle. In this arrangement, rail is seen as a major element for resolving problems of economies of scale, congestion and lack of space, which the mature stage in a port's development life cycle is associated with.

Consequently, the railway is essential for port competitiveness, as it is reputed to increase accessibility, provide more efficient and reliable services, or promote the spatial growth of ports with less adverse impact on people. However, the share of rail in the modal split of freight transport differs quite remarkably across various regions of the world. The explanation behind such differences is traceable to a number of conditions required for railways to become a source of port competitiveness (Fall Bulletin, 2012).

Inland dry ports exist to receive cargo from the seaports and this is ideally facilitated by rail freight transport services. The railway transport services represent a tremendous opportunity to improve port competitiveness once inland dry ports are functionally set to receive cargo from the port. Port-rail integration is a factor of competitiveness in the port industry (Fall Bulletin, 2012).

In order for rail freight transport services to serve as a means of boosting the competitiveness of seaports (and by extension inland dry ports), certain prerequisites must be met.

Fall Bulletin (2012) has identified the prerequisites for rail to become effective as a source of port competitiveness and these include: (i) geographical and economic considerations, which have to do with how it impacts on cargo demand; (ii) return on investment and risk aspects of the industry's competitive structure; (iii) structure of foreign trade, which influences aspects of demand as well as the types of service that can be offered; and (iv) institutional aspects and public-sector technical regulations which pertain to business development.

In agreement with Fall Bulletin (2012) which posits that the geographic distribution of production or consumer (hinterland) markets is considered to be one of the main drivers for port development based on rail connectivity, the experience in Nigeria is that rail freight transport connections to the port in Nigeria (being an import-oriented nation), are motivated by the need to decongest the ports and speed up the evacuation of inbound cargo to their hinterland destination (consumer markets) at low cost (Eto, 2022). It is the high-concentration of consuming population in Nigeria's hinterland that has the potential to create the necessary conditions for achieving the minimum efficient scale of railway operations in the absence of high-volume production. With such population located in the hinterland in Nigeria, distance from the port does not only promote the minimum efficient scale of railway operations but also triggers integration with the seaports, thereby creating a transport network (port-hinterland connections) that favours the IDPs.

A review of international experiences by Fall Bulletin (2012) highlights patterns of port development in Asia-Pacific, Europe and North America, which provides a valuable way to explore the challenges facing Nigeria's port development.

The Significance of IDPs towards Integrating Various Modes of Transport in Nigeria

The respondents interviewed were of the opinion that the significant role of inland dry ports in inland freight distribution in Nigeria is seen in the manner they integrate modes of transport, reduce border crossing and transit delays, facilitate the use of energy-efficient and lower-emission means of transport and create new opportunities for the growth and establishment of development clusters cannot be overemphasized. This is what qualifies inland dry ports to be an integral part of maritime logistics operations in Nigeria. Their integration within the various modes of transport enhances the productivity and promotes the competitiveness of seaports in the country.

METHODOLOGY

This paper was the product of desk research, which according to Beresford et al. (2012) is an essential form of social science analysis. The paper adopted the case study approach and the



three requirements in the methodology adopted in this study are defining the research topic; covering a broad range of variables and utilizing multiple primary and secondary sources of evidence. The key aspect of this approach is the use of a combination of interviews, phone calls, emails and questionnaires which was prepared for respondents (the population size of which was 1,412) in order to investigate their perception of the variables of interest in this study. The case study approach was aimed at capturing information from diverse sources such as media reports, port managers, port operators and other major stakeholders (e.g. importers and exporters) in the industry. Simple random sampling technique was used to sample 343 persons from the population of the study of 1,412 and there was a response rate of 99.42% (341), which was attributable to good selection of participants. The primary objective of the interviews used in this study was to identify the issues and challenges and to clarify the policies implemented by the Nigerian government, with a view to examining whether the approach taken was encouraging or inhibiting a competitive environment among the IDPs.

Table 2: Volume of containers transported to the inland dry ports in Nigeria between 2018 and 2021

SN	IDPs Nigeria	2018 (TEUs)	2019 (TEUs)	2020 (TEUs)	2021 (TEUs)
1	Erunmu, Ibadan	Nil	Nil	Nil	Nil
2	Isiala Ngwa, Aba	Nil	Nil	Nil	Nil
3	Heipang, Jos	Nil	Nil	Nil	Nil
4	Zawachiki, Dala - Kano	Nil	Nil	Nil	Nil
5	Zanfarawa, Funtua	Nil	Nil	Nil	Nil
6	Jauri, Maiduguri	Nil	Nil	Nil	Nil
7	Kaduna Inland Dry Port	2318	3929	4148	4802

Source: *Nigerian Shippers Council (NSC), 2022*

Method of Analysis

The objective of the study was to examine the magnitude of containers transported to the inland dry ports in Nigeria between 2018 and 2021. Data for this objective was secondary data and were collected from secondary sources such as from National Bureau of Statistics, NPA, Nigerian Shippers' Council, plus 12 other organizations.

The hypothesis for this study is "There is no statistically significant difference in the magnitude of containers transported to the inland dry ports of Nigeria from 2018 to 2021".

The data analysis used Analysis of Variance (ANOVA) to test the hypothesis.

Test of Hypothesis

H₀₁: There is no statistically significant difference in the volume of containers transported to the inland dry ports in Nigeria between 2018 and 2021

The above hypothesis was tested using the Analysis of Variance (ANOVA)

Model Specification for ANOVA

$$X_{ij} = \mu + \alpha_i + \varepsilon_{ij}$$

Where X_{ij} = is the observation of the treatment (Volume of containers)

μ = the universal mean

α_i = is the effect of the treatments (Inland Dry Port)

ε_{ij} = the random error component.

Where

α_1 = Erunmu, α_2 = Isiala Ngwa, α_3 = Heipang, α_4 = Zawachiki, α_5 = Jauri, and α_6 = Kaduna



Decision Rule

When the **P-Value** < α (**0.05**) at a given degree of freedom (df): Reject the Null Hypothesis (H_0)

When the **P-Value** > α (**0.05**) at a given degree of freedom (df): Accept the Null Hypothesis (H_0)

Table 1: ANOVA results for objective (1)

ANOVA					
	Volume of Containers Transported				
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	49489030.500	6	8248171.750	51.890	.000
Within Groups	3338070.750	21	158955.750		
Total	52827101.250	27			

Source: SPSS Output, 2021

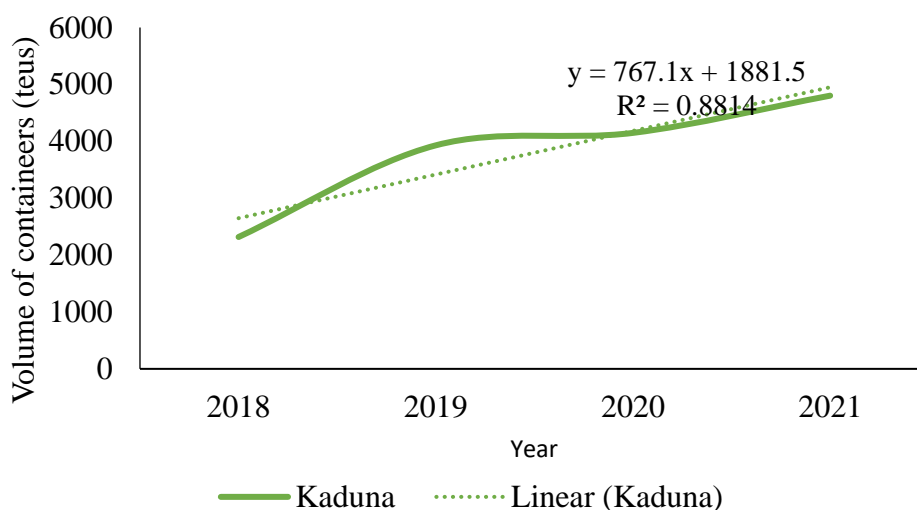


Figure 1: Volume of containers transported to the inland dry ports in Nigeria between 2018 and 2021

The result of the hypothesis tested is that a statistically significant difference exists in the volume of containers transported to inland dry ports in Nigeria from 2018 to 2021.

RESULTS AND ANALYSIS

Table 2 shows the volume of containers transported to the inland dry ports in Nigeria between 2018 and 2021. It reveals that no IDP received cargoes except the Kaduna dry port.

The volume of containers transported to Kaduna Inland Dry Port in the year 2018 was put at 2318 TEUs, it increased to 3929 TEUs in 2019 and 4148 TEUs in 2020. It maintained a steady increase as it recorded the highest figure of 4802 TEUs in 2021 (See Table 2).



Figure 1 further reveals the trend analysis for Kaduna Inland Dry Port. The linear equation ($y = 767.1x + 1881.5$) for Kaduna Inland Port shows that as the year increases the volume of containers will increase by 767.1 with coefficient of determination of 0.8814.

The study found that among the seven IDPs in Nigeria (Erunmu, Isiala Ngwa, Heipang, Zawachiki, Jauri, and Kaduna) none received cargoes except the Kaduna inland dry port between 2018 and 2021. Table 1 shows the ANOVA result of the hypothesis tested. It reveals that a statistically significant difference exists in the volume of containers transported to inland dry ports in Nigeria from 2018 to 2021 as the p-values (0.000) obtained was less than the critical level of $\alpha = 0.05$. This implies that the volume of containers transported differ across at least one of the inland dry ports.

Discussion of Findings

Findings under the objective of the study reveal that a statistically significant difference exists in the volume of containers transported to inland dry ports in Nigeria from 2018 to 2021. These findings agree with the observation by Nigerian Shippers' Council (2022) which inferred that the Kaduna IDP was about the only IDP that received containers from the seaports and sent export cargoes to the seaports among the seven IDPs in the country. The reason for this was that none of the other IDPs have attained 100% completion to warrant cargo handling operations. However, the Port Manager of the Kaduna inland dry port revealed that the port was not receiving enough containers up to the maximum capacity because the Nigerian Railway Corporation (NRC) was yet to meet demand for wagons to operate rail haulage and this affected the cargo volume at the IDP.

Challenges of Implementing Inland Dry Ports in Nigeria

The challenges associated with the operations of IDPs in Nigeria have not allowed the full actualization of their prospects (Eto et al., 2022). Some of the challenges identified by a cross section of stakeholders who were interviewed include: Poor rail freight transport services with the result of limited connectivity to and from the IDPs. This has led to over reliance on road transport, with attendant road crashes, which result in damages to goods, vehicles and injuries or death due to bad roads and long delays on roads due to deplorable road infrastructure; inadequate participation of private sector in operations of IDPs; lack of automated procedures which means complete dependence on manual procedures; and imbalanced proportion in modal split.

Challenges of Rail Freight Transport Services in Nigeria

Even though Rodrigue & Notteboom (2022) observe that there is no single strategy for an inland port in terms of modal preferences, yet rail transport is preferred in Nigeria due to the limitations associated with road transport mode. In the opinion of a cross-section of respondents who were involved in the survey, for purposes of economies of scale, the rail freight transport is considered much more efficient in terms of volume of freight that can be delivered in a single trip. Hence, respondents observed that the Nigerian Government is making conscientious effort to link the IDPs to the seaports with rail connections.

Rail freight transport is considered as vital to the efficient functionality of the IDP system in Nigeria (Federal Ministry of Transportation, 2021) and it is viewed as a major decisive factor for port competitiveness (Fall Bulletin (2012). However, in Nigeria railway freight transport has been bedeviled by challenges which have affected the overall performance of the IDPs (Eto et al., 2022).

Respondents observed that rail movement of freight to the hinterland where the IDPs are located has stopped for a while now. The current narrow gauge in use is no longer in vogue and the Federal Government is trying to improve on rail transport by upgrading to standard gauge. The halt in freight movement by rail upcountry accounts for the stockpile of containers (congestion) at Lagos ports.



To that extent, the Federal Ministry of Transportation (2021) identifies the following challenges faced by rail freight transport in Nigeria: (1) Inadequate rail network to reach IDPs (2) Over-aged and inadequate locomotives and rolling stock (locomotives, coaches, wagons) (3) Frequent breakdown and derailment. However, it is hoped that the Constitutional Amendment Bill that grants States of the Federation powers to construct railway tracks and introduce freight trains for intra-state transport would enhance port-hinterland connections and boost operations of the IDPs for effective trade facilitation in Nigeria (Ameh, 2023).

Conclusion

The study found that a statistically significant difference exists in the volume of containers transported to inland dry ports in Nigeria from 2018 to 2021. Inland dry ports in Nigeria are in place to receive cargo from the seaports and to forward export cargo to seaport terminals (but only the Kaduna IDP is functional) and this ought to be facilitated by functional rail freight transport services given the current reality of deplorable road transport infrastructure. The railway transport services are reputed to represent a remarkable opportunity to improve port competitiveness once inland dry ports are in position to forward cargo to and receive same from the port. However, the IDPs in Nigeria are performing below their optimum capacity due to poor financing scheme for investors and poor port-rail integration.

Recommendations

The study recommends that the Federal Government of Nigeria should provide an enabling environment that encourages private sector by spurring the introduction of viable financing scheme apart from investing in functional and efficient intermodal transport system (particularly rail freight service) that enhances port-hinterland connectivity. This would boost volume of trade and fast track economic activities of the hinterland considering the huge share of rail in the modal split of land freight transport.

The Federal Government of Nigeria, through the Nigerian Shippers' Council, should provide the investor-friendly environment to encourage the private sector to join the government towards developing the inland dry ports.

The Federal Government, through the Federal Ministry of Transportation, should expedite efforts towards reinstating the rail freight transport to the inland dry ports to reduce the cost of freight logistics in order to encourage hinterland-based shippers.



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