



Optimizing the Performance of Inland Dry Ports: The Role of Inland Transportation in Nigeria

Eto, G. M.^{1,*} , Okon, N. B.¹ 

¹*School of Maritime Transport Studies, Maritime Academy of Nigeria, Oron*

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ABSTRACT

The study reviews the essence of inland dry ports (IDPs) in Nigeria and the vital role played by inland transportation as performance-enhancing factor in the mutually complementary services of IDPs and seaports. The study adopts survey research design and used primary and secondary sources of data. Questionnaire and interview were the instruments used for sourcing primary data. Six objectives of the study centre on the problem and the study adopted the Taro Yamane formula to determine 343 as the sample size, out of study population of 1412. The study uses descriptive statistics and identifies the challenges faced by rail, road and inland waterways modes of transport in the quest to connect them to IDPs in Nigeria from interview, literature review, media reports, port operators and other stakeholders. It identifies the effects of poor port hinterland connectivity, and noted the high-cost element in transporting containers through deplorable roads to IDPs in Nigeria, which is taking its toll on the performance of the IDPs. The study recommends that Government should adopt a holistic national freight logistics strategy, which involves all tiers of government and industry, and make provision for enhanced coordinated national multi-modal and intermodal approaches to freight planning. This would facilitate the reduction of trade costs and enhance the optimization of the performance of inland dry ports in Nigeria.

1. INTRODUCTION

Seaports are gateways to national economy and port hinterland connection is needed for landward freight distribution to be achievable. The need for seaports to connect with their hinterland is premised on the fact that port services are no longer provided in isolation. Rather, ports now have the need to devise a way of fitting into door-to-door freight supply networks (De Langen, 2007).

They rely on inland dry ports to achieve superior performance in service delivery in the hinterland because the latter function as facilitators along supply chain corridor. Thus, inland dry ports offer a viable approach to deliver efficient port system (Nigerian Ports Today, 2019).

On the other hand, inland dry ports are particularly dependent on all modes of transport, especially rail to complement the

*Corresponding author, e-mail: etogabrielm@yahoo.com

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operations of seaports because rail freight transport over long distance is ideal for bulky freight flows to and fro inland dry ports (Wiegmans et al., 2015). Where road transport mode dominates as principal method of land freight distribution - as is the case in Nigeria (Adejumo, 2020), efficient inland dry ports can play a critical role in ensuring a modal shift from road to rail, and this contributes to improved transport connectivity while cushioning the negative externalities of the transport sector (UNESCAP, 2015).

The role of inland dry ports in facilitating container volume growth, congestion reduction, and port expansion (which according to Zeng et al., 2013 has been validated in both the United States and Europe) is enhanced by efficient inland transportation system. Inland dry ports help to enhance efficient and cost-effective transport systems, which link global supply chains in order to serve as the engine that fuels economic development and prosperity (UNCTAD, 2013).

While rail transport services can conveniently provide long distance movement of freight to the hinterland (where inland dry ports are located), road transport is suitable for the last leg of the transportation process. This calls for inland transport in which certain actors such as freight forwarders, port authorities and others play active role.

While Slack (1993) cited in Bergvist (2015) refers to the term 'hinterland' as the effective market or the geo-economic space in which the seaport offers its services, Klink and Den Berg (1998) cited in Bergvist, (2015) view the 'hinterland' as the interior region served by

the port. Therefore, by reason of its location, which is far removed from the sea, IDPs in the hinterlands require connections through transport network to the port for the benefit of hinterland-based shippers.

In order to assess the role of inland transportation towards optimizing the performance of IDPs in Nigeria, the study was therefore undertaken with the following objectives: (i) Identify the effects of poor port hinterland connectivity in Nigeria (ii) Examine the role of inland freight distribution in the implementation of IDPs in Nigeria (iii) Examine the challenges of the various modes of inland transport in Nigeria (iv) Identify the critical actors in the inland transport in Nigeria (v) Examine the logistical constraints in the inland freight distribution system in Nigeria (iv) Suggest ways to improve inland transport in Nigeria in order to optimize the performance of IDPs.

Seaports have evolved from being mere facilities for receiving ships and transferring cargo and are now concerned about providing door-to-door transportation solution in the logistics management of inland freight distribution system. For this to be realized, efficient and cost-effective inland transport system and the establishment of functional inland dry ports are vital components of the inland freight distribution system. Hence UNESCAP (2015) went a step further to posit that efficient inland dry ports can play a critical role in ensuring a modal shift from road to rail, thereby contributing to improved transport connectivity while mitigating the negative externalities of the transport sector.

Port-hinterland connectivity is the accessibility to functional inland transport system and quality inland transport-related

infrastructure which are necessary for optimizing the performance of inland dry ports for the purpose of improved logistics solutions for shippers in the port's hinterland (Roso et al., 2009). The operations of inland terminals (such as inland dry ports) are boosted by inland freight distribution activities and this is made possible through effective inland transport system.

The World Bank has recognized the role of the logistics sector as a core pillar of economic development and growth. Hence, it is committed to championing policy reforms needed to support and improve logistics to show that it is interested in how easy or difficult it is in countries around the world to transport manufactured products (UNESCAP, 2015).

Abiodun (2020) observes that the 2018 publication of the World Bank report "Connecting to Compete" contains an analysis of the logistics performance of 160 countries based on six indicators, which include the efficiency of customs and border management clearance, the quality of trade and transport related infrastructure, the ease of arranging international shipments, the competence and quality of logistics services, the ability to track and trace consignments, and the frequency with which shipments reach consignees within the scheduled or expected delivery time. Accordingly, Nigeria ranked 110 out of the 160 countries in Global Logistics Performance Index in 2018 due to crippling traffic situation, poor port and transport infrastructure among others. These factors have debilitating effect on the performance of inland dry ports in the country (Adejumo, 2020).

1.1. Inland Container Depot and Inland Dry Port

The inland dry port concept and that of inland container depot are still evolving, and thus lack unified definition (Trainaviciute, 2009; Veenstra et al., 2012; Cullinane & Wilmsmeier, 2011 and Roso et al, 2009 cited in Mwemezi & Huang (2012). However, this paper takes particular note of the definition by Leveque and Roso (2001), which states that Inland Container Depot (ICD) concept is limited to a facility dedicated to serving containers and this study also notes that the inland dry port concept, as described by Roso et al. (2009) cited in Mwemezi & Huang (2012), encompasses both general cargo and containerized freight.

However, several activities carried out at ICDs and inland dry ports are generally the same, hence the justification for the terms to be used interchangeably (Mwemezi & Huang, 2012). The functions of IDPs or ICDs generally include handling and storage of containers, cargo consolidation and distribution as well as receipt and delivery of containers. Other value-added services provided at IDPs are customs clearance and maintenance of containers (Rodrigue et al., 2010; Dadvar et al., 2011 cited in Mwemezi & Huang (2012). In order for inland dry ports to maintain their relevance in the overall port system, they need inland transport system to establish connection to seaports for purposes of receiving inbound goods from seaports and supplying outbound goods to seaports as a transit terminal. According to Mwemezi and Huang (2012), inland dry ports may be considered as extended gates which facilitate the better control and adjustment of transport flows to match conditions in the port itself. In the view of Veenstra et al. (2012) cited in Mwemezi & Huang (2012) the extended gate

function of the dry port can generate substantial benefits in terms of modal shift, logistics performance and regional development.

Mwemezi and Huang (2012) are of the view that apart from physical capacity expansion, other gains from IDPs include reduced truck congestion at the seaport gates, port yard and city roads as well as reduced CO₂ emissions especially when the inland terminal is connected to the sea terminal by rail. European ports took advantage of the economic downturn in 2008 to invest in inland ports to reduce reoccurrence of previously experienced congestion (Barnard 2009b cited in Zeng et al., 2013). In the United States, many ports have few opportunities for physical expansion at the port itself (Allen, 2008 cited in Zeng et al., 2013), thus off-site inland dry port facilities allow continued volume growth (Boyd, 2011 cited in Zeng et al., 2013). Similarly in China, inland dry ports offer opportunities to relieve problems of capacity and congestion (Cullinane & Wang 2007; Zeng & Yang 2012 cited in Zeng et al., 2013).

1.2. IDPs as Nodes and the Links

Freight transport systems of which IDPs are part are generally characterized by orderly transfers of goods between points of origin and destination and they are described as nodes. Efficient inland freight distribution system is required for seaports and IDPs to function optimally as the latter often serve as receptacles for inbound cargoes meant for inland destinations and outbound cargoes going to the seaports. Activities such as consolidation, sorting, storage and transshipment between vehicles and traffic modes, are carried out in nodes (such as seaports and inland dry ports, which are mutually dependent). Links represent inland

transportation and transfer activities connecting nodes (such as IDPs), and together with the nodes the links consist of the transportation network (UNESCAP, 2015).

In light of the evolution of terminals in the freight transport network, and following the need for seaports to be connected with their hinterlands, terminals now go by several names. These names include inland container (clearance) depots, inland dry ports, container freight stations (CFSs), or inland intermodal terminals (Mwemezi & Huang (2012), all of which are located in the hinterland.

1.3. The Concept of Hinterland as the Location of IDPs

Every transport terminal has its hinterland which represent a set of customers (distribution, manufacturing, and retailing activities) from which it derives its business. These transactions involve freight or passenger movements that the terminal will transship (Rodrigue and Notteboom, 2006).

The final destination of import cargoes or the origin of export cargoes that pass through a seaport is generally referred to as the port's hinterland. According to Slack (1993) cited in Bergqvist (2015), the term hinterland is often referred to as the effective market or the geo-economic space in which the seaport sells its services. Klink and Berg (1998) cited in Bergqvist (2015), define hinterland as the interior region served by the port. Rodrigue and Notteboom (2006) describe the hinterland as a land area over which a transport terminal, such as a port, sells its services and interacts with its users. It is made up of the regional market share that a terminal has in comparison to a set of other terminals

that service a region. The authors identify two types of hinterlands:

- (a) Fundamental (or captive) hinterland which refers to the market area where a seaport terminal is the closest or the easiest to access. The assumption is that a huge chunk of the traffic will transit through the terminal owing to its proximity and lack of competitive alternatives.
- (b) Competitive (contestable) hinterland which describes the market areas over which the terminal (seaport) has to compete more intensely with others ports for a business.

1.4. Current Approach to Transport and Logistics Management in Nigeria

Nigeria connects to the global and regional economy through international maritime and air transport while its internal connections are mostly by road and rail movements, since the inland waterway transport system is still largely undeveloped (Badejo, 2010). This is what constitutes the global supply chain network. In light of this, any freight logistics plan for the country must be seen as part of a global freight supply network. However, the country's current approach to the movement of freight is fragmented and in dire need of a single point of national accountability. The current emphasis is on road infrastructure projects, which is at the expense of an integrated freight logistics and supply chain management approach for effective and efficient freight distribution.

The nation's transport infrastructure is currently constrained by insufficient funding, an ambiguous regulatory framework, and a lack of multimodality in addition to being inadequate for the size of nation's economy (Shipping Position, 2021). As a result of the

heavy toll, which the poor transport system is putting on freight distribution, it has been suggested that an overarching and holistic national freight logistics strategy for the country could be formulated for the next few decades, as practiced in South Africa, Panama, Vietnam and Thailand (Bergqvist, 2015). The piecemeal view and approach to transport and logistics management in Nigeria is evident from the different disparate plans that have to do with transport. These include the Nigeria Integrated Infrastructure Master-plan, Nigerian Transportation Master-plan and the Economic Recovery and Growth Plan which was approved by the government in 2016 for execution in the period 2017 to 2020. The National Development Plan (NDP) 2021 – 2025 is the successor to the Economic Recovery and Growth Plan (ERGP), 2017 – 2020, which lapsed in December 2020 yet the transport system in Nigeria has not felt the impact of these regulatory frameworks and roadmaps.

In the same vein, a number of supervisory agencies exist to compound the confusion in regulatory functions. For example, the air transport sector has three agencies with overlapping functions – the Nigerian Airspace Management Agency, Nigerian Civil Aviation Authority, and Federal Airports Authority of Nigeria. The major regulatory agencies in the maritime industry, namely Nigerian Maritime and Safety Agency, Nigerian Ports Authority and Nigerian Shippers Council are often enmeshed in role conflicts within themselves and with other sister agencies. All of which contribute to confusion and undue complication of due processes in handling inland freight distribution in the country.

1.5. The Inland Dry Ports in Nigeria

The intermodal distribution centres referred to as inland dry ports are not mere hinterland locations that complement the seaports. They are supposed to be replicas of seaports in terms of facilities, customs presence and infrastructure but located in the hinterland where there is no water body (ocean). The IDPs are far removed from the seaports, and are located in the hinterland. Thus, the inland movement of imported containers or the outbound movement of export requires a functional transportation system. This calls for the development of port hinterland connectivity in order to enhance freight distribution from seaports to the inland terminals from where freight can be further transported to inland locations. Inland shipping connections to or from the IDPs depend on inland intermodal transport system.

According to Eto (2022), currently, there are seven (7) approved locations for the Inland Dry Ports (IDPs) in Nigeria (See Table 1), and they were concessioned to private sector operators by the ICD Implementation Committee of the Federal Ministry of Transport.

1.6. Inland Dry Ports and Port Hinterland Connections in Nigeria

Seaports are not isolated entities and therefore need to be linked to their hinterlands for shippers to take delivery of their goods at designated inland terminals (inland dry ports) without having to travel all the way to the seaports. IDPs are generally regarded as partners to seaport terminals since they relieve ports of capacity constraints while at the same time offering

value added services along the supply chain (Haasis, 2010; Nathan Associates Inc., 2010 cited in Mwemezi & Huang, 2012). Therefore, inland dry port performance depends on the quality and quantity of land access (inland transportation) through railway, road and inland waterways, which are connected to and from the seaport. Port hinterland connectivity enables land freight to be transshipped between seaports and inland destinations. While some of the freight or load units which arrive at seaports are transshipped to other ports, others are transported to inland destinations using the inland dry ports as inland terminals. It is when the assorted modes of transport are used based on the advantages that each provides that the transport costs can be minimized and resources can be saved (Federal Ministry of Transportation, 2021).

The competitiveness of a port depends greatly on its efficiency in terms of logistics management. Efficient freight distribution from seaports to inland dry ports and vice versa depends on port hinterland connectivity in order to enhance port competitiveness. The establishment of IDPs would result in lower transport costs and better accessibility if they are properly linked by efficient inland transportation from the seaports. For example, the energy consumption per ton kilometer of a truck is about two times higher than a train and about three times higher than that of a barge (Federal Ministry of Transportation, 2021). Distribution of freight (import and export) through the inland transportation services and final delivery to the customer (shipper) in the supply chain require functional transport system and freight logistics management, with the establishment of IDPs as inland freight distribution points. However, when imports are eventually cleared at the seaports, the absence of good roads, dysfunctional rail

connectivity and unreliable barging services create another problem. Consequently, goods are hauled over poor and congested roads to the IDPs, which are located in the northern and eastern parts of the country.

Based on the estimates of Shippers' Association of Nigeria and Lagos Chamber of Commerce and Industry (2018) cited in Eto (2021), the cost associated with ineffective and inefficient national transportation and logistics systems in Nigeria is such that the country's economy loses an estimated revenue of ₦3.46 trillion annually, which contributes to low cargo throughput at the IDPs. The performance of inland dry port reflects the amount of cargo or number of vehicles (train coaches or trucks) the IDP handles over time. Cargo tonnage is the most fundamental measure of IDP throughput. In an interview with some members of the Nigerian Association of Chambers of Commerce, Industry, Mines and Agriculture (NACCIMA), they were of the opinion that the demand for cargo handled by the IDPs, competition between IDPs, contractual arrangements with carriers, and changes in distant facilities are among the factors that affect cargo volumes and the number of vehicles that call.

In an agreement with De Langen & Van Der Ho (2008), some members of the National Association of Government Approved Freight Forwarders (NAGAFF) who were interviewed asserted that ports and their hinterland transport systems can only appear attractive to port users and attract additional volumes if the whole hinterland transport network is efficient and effective. And according to the findings of Mwemezi and Huang (2012), the insertion of dry ports in the transport corridor has significant cost reduction for container movement. For example, Lagos Chamber of Commerce and

Industry (2018) disclosed that with the establishment of IDPs in the hinterland, railway transport can offer significant cost efficiency (for shippers) for freight haulage over distances in excess of 300 km.

While rail freight transport services were in operation, it cost between ₦500k and ₦600k per TEU to transport to the hinterland as against the current ₦1.2m charged by trucks. This has significant cost implications for the movement of import and export cargoes to and from the inland dry ports respectively due to overreliance on road transport (Journal NG, 2020). Hence, an integrated freight logistics management in Nigeria calls for hinterland connectivity and the establishment of IDPs, which necessitates the coordination and cooperation between critical actors in hinterland chain. This is because the quality of hinterland connectivity would have significant effect on the overall door-to-door performance of the logistics chain and particularly on the choice of a port of call by container shipping lines (Notteboom, 2008; Wiegman et al., 2008 cited in Mwemezi & Huang, 2012).

According to a 2016 study by Siam Commercial Bank (cited in Eto et al., 2022), the reduction in tariffs on goods traded among Association of Southeast Asian Nations (ASEAN) members resulted in increased border trade and transit trade by an average of 7 per cent annually over the past five years, and with the ASEAN Economic Community now officially established, the movement of raw materials, goods and labour are expected to increase significantly. This led to increase in the demand for logistics services to manage goods and services throughout the supply chain, which spurred many countries in the ASEAN region to step up efforts to expand their existing dry port

facilities or build new ones. This is a classical case of the rationale behind the implementation of inland dry port in countries that are high on cross border trade such as Nigeria.

1.7. IDPs in Nigeria and the Need for National Freight Logistics Strategy

The main functions of IDPs include handling and storage of containers, cargo consolidation and distributions as well as receipt and delivery of containers. In addition, customs clearance and maintenance of containers are other valued added services provided at IDPs (Rodrigue et al., 2010; Dadvar et al., 2011 cited in Mwemezi & Huang, 2012). As inland dry ports are increasingly becoming extensions of the maritime terminals on the landside, they require national freight logistics strategy to make them perform optimally. It has been observed that none of the documents hitherto put together to address the transportation challenges in Nigeria has a freight distribution management in focus, and the IDPs are the worst for it. Ideally, a sustainable national transportation master-plan should have an overarching, well-thought-out and well-developed freight logistics strategy integrated into it. This would facilitate the safe and efficient movement of freight within the country. Seaports are gateways to national economy and hinterland connections are necessary for landside movement of freight with IDPs established as distribution centres. Therefore, an integrated national freight logistics policy would recognize the place for IDPs because they complement the services of seaports as essential component in the overall port system.

According to Klink (2000) cited in Mwemezi & Huang (2012), it is by investing in inland terminals such as IDPs and participating actively in their operations that a seaport can establish itself in the hinterlands. Thus, for the seaport to gain unfettered access to the hinterlands, a functional inland transport system is required. Therefore, a coherent and sustainable transport and logistics policy is necessary for the planning, implementation and monitoring of transportation infrastructure projects towards an integrated national transport system in the future. It has been established that Nigeria needs more than road transport mode to achieve effective inland freight distribution management. A holistic national freight logistics strategy would harmonize the efforts of all tiers of government and industry in order to provide a coordinated national multi-modal approach to freight planning. And it would provide useful benchmarks towards achieving optimal freight distribution to address Nigeria's freight challenges, while favourably positioning her for long term international competitiveness. The envisaged overarching national transportation master-plan that would serve the interest of the IDPs should cover railroad access, inland water port access and air cargo access to allow efficient access of bulk freight to support agricultural regions, production clusters, local industries, businesses and consumers. A national freight logistics strategy unlike previous government plans and policies on transportation would reduce transaction and coordination costs for freight operations in the country and better the economy at large.

IDPs, as mapped out across the six geopolitical zones in the country, are needed to establish freight networks and hubs. These inland freight distribution centres are the points at which shippers take delivery of their goods (import) from the seaports and deposit

export for onward movement to the seaports. IDPs in Nigeria have close proximity to the sources of major freight generation and consumption, and they are located closer to key transport corridors (rail and road). The essence and attractiveness of inland dry ports is captured by van Klink, 2000 (cited in Mwemezi & Huang, 2012) who states that “by investing in inland terminals and participating in their operations, a sea port can establish itself in inland regions”. A national freight logistics strategy would make freight transport less expensive, as freight movement would not be coming directly from Lagos ports to the hinterland-based shipper. Additionally, it would spread the burden of freight movement among the multiple transport modes in the country and ease the pressure on any single transport mode. This would in turn have positive implications for efficiency, productivity, transport emissions, noise reduction and social equity.

2. METHODOLOGY

2.1. Study Area

The Federal Executive Council (FEC) approved the commencement of Inland Dry Port (IDP) project in six locations in the country under “Build, Own, Operate and Transfer (BOOT) agreement” on March 15, 2006. The project was gazetted vide Federal Republic of Nigeria Official Gazette No.30 volume 94 on May 21, 2007 (Nigeria Shippers’ Council, 2022).

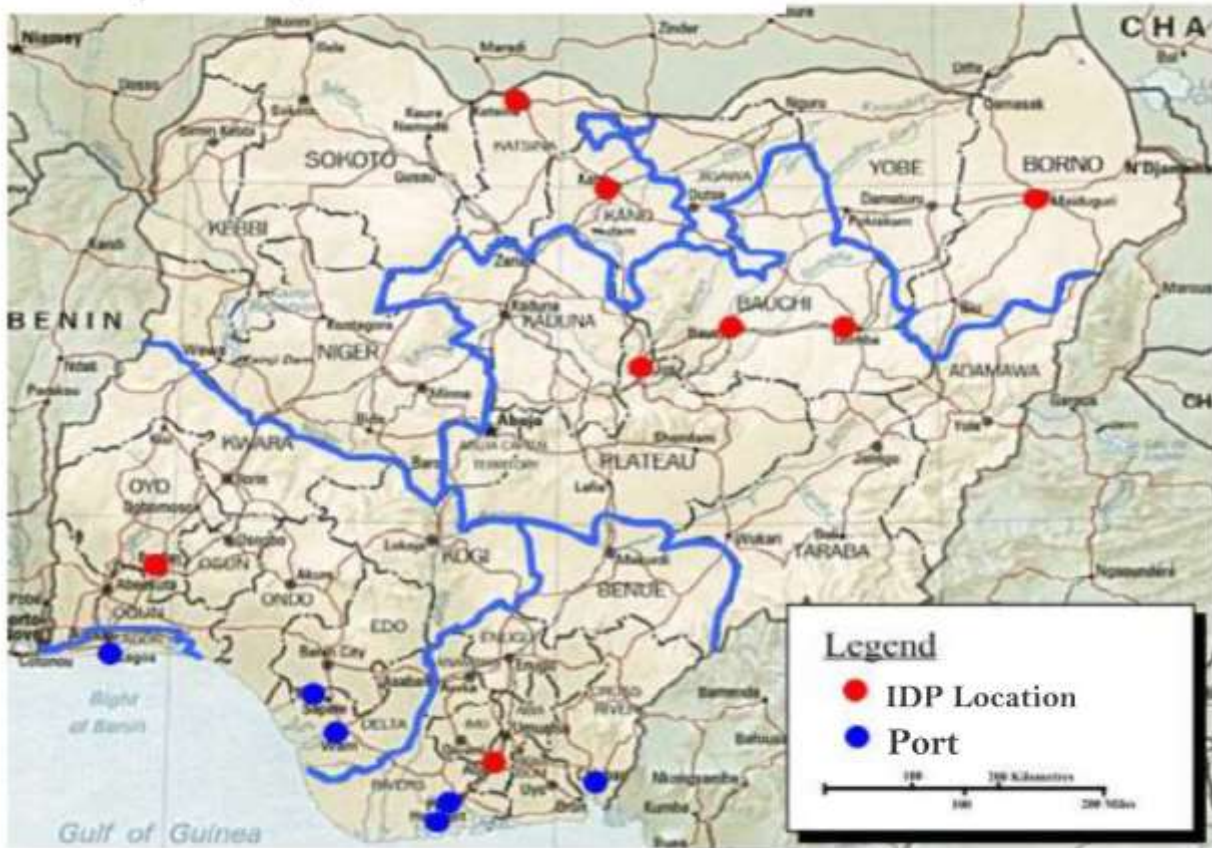
The Kaduna IDP was already in operation as bonded terminal before it was upgraded to the status of an IDP. Added to the six projected IDPs, the number became seven. Besides the seven gazetted Inland dry ports in Nigeria, the private sector is clamoring for permission to establish inland dry ports at Dagbolu in Osun State, Lolo in Kebbi State, Onitsha in Anambra and Ogwashi-Uku in Delta State (Ogunsi et al., 2019).

The Table below shows the inland dry ports locations in Nigeria, concessionaires and percentage completion.

Table 1: The Inland Dry Port Locations in Nigeria, Concessionaires and Percentage Completion

S/N	Location	Capacity (TEUs)	Concessionaire	Percentage Completion
1	Erunmu, Ibadan	50,000	Catamaran Logistics Ltd	10%
2	Isiala Ngwa, Aba	50,000	Eastgate Ltd	5%
3	Heipang, Jos	20,000	Duncan Maritime Nig. Ltd	29.70%
4	Zawachiki, Dala -Kano	20,000	Dala Inland Dry Port Ltd.	85%
5	Zanfarawa, Funtua	10,000	Equatorial Marine Oil & Gas Ltd	75%
6	Jauri, Maiduguri	10,000	Migfo Nig. Ltd	5%
7	Kaduna Inland Dry Port	5,000	Inland Container Nig. Ltd (ICNL)	100%

Source: Nigerian Shippers’ Council (2022)



(Source: Nigerian Shippers' Council)

Fig. 1: Study Area

2.2. Sampling Technique and Method of Collection

The study adopts survey research design and used primary and secondary sources of data. Questionnaire was the instrument used for sourcing primary data. The study adopted the Taro Yamane formula to determine 343 as the sample size, out of population of study of 1412.

In determining the sample size for this research, the Taro Yamane's formula given as (equ 1) was used:

$$n = \frac{N}{1+Ne^2} \tag{1}$$

Where: *n* is the sample size,

n = sample size, *N* is the population size (1,412), and *e* is the level of significance (our level of significance is chosen at 5%)

Applying the formula at significant level of 5%;

$$1 = \frac{1412}{1+1412(0.05)^2} = \frac{1,412}{4.53} = 311.69$$

Therefore, the sample size = 311.69, which is approximated to be 312. However, 31 (i.e.10%) is added to accommodate non-response and this brings the sample size to 343.

Simple Random sampling technique was used owing to its ease of use and accuracy of

representation. In order to analyze the data gathered, descriptive statistics was used.

3. RESULTS AND DISCUSSION

3.1. Summary of Questionnaire Distributed

The Questionnaire distributed and number of copies retrieved is presented in Table 2.

Table 2: Copies of Questionnaire Administered

Number of copies of Questionnaire Distributed	Number of Copies of Questionnaire Retrieved	% of Copies of Questionnaires Retrieved
343	341	99.42

Source: Eto, G.M. (2023)

A total of 343 copies of the questionnaire were distributed to various categories of respondents that are considered to be stakeholders across seven inland dry ports. Out of this number, 341 were returned to represent 99.42% response rate which amounted to 341 copies returned as shown in the Table above.

3.2. Socio-economic Characteristics of Respondents

Table 3: Demographic Analysis of Respondents

Characteristic	Frequency	Percentage (%)
Male	201	58.94
Female	140	41.06
Total	341	100

Source: Eto, G.M. (2023)

The gender distribution of the respondents is shown in the Table 3. The distribution shows

that 201 or 58.94% of the respondents were male while 140 or 41.06% were female. This shows that majority of the respondents were male.

Table 4: Age Distribution of Respondents

Age	Respondents	Percentage (%)
Less than 18	7	2.05
18-35	187	54.84
36-65	124	36.36
Above 65	23	6.75
Total	341	100

Source: Eto, G.M. (2023)

The age distribution in Table 4 shows that the number of respondents who were less than 18 years of age was 7 or 2.05%. Those whose age fell into the age bracket 18-35 years were 187 or 54.84%, which happened to be the majority. The distribution shows that respondents whose age bracket fell into 36-65 years were 124 or 36.36%. The respondents whose age was above 65 years were 23 or 6.75%.

Table 5: Educational Level

Education Level	Respondents	Percentage (%)
Primary	8	2.35
Secondary	22	6.45
Tertiary	311	91.20
Total	341	100

Source: Eto, G.M. (2023)

The formal education of respondents as shown in table 5 shows that all the respondents attained one level of formal education or another. Those who attained Primary School education were 8 or 2.35%. The respondents who attained Secondary School education were 22 in number and 6.45% and those with tertiary education were 311 or 91.20%.

Junior Management	25	7.33
Total	341	100

Source: Eto, G. M. (2023)

Table 6: Occupation Distribution

Occupation	Respondents	Percentage (%)
Admin Staff	18	5.28
Exporters	26	7.62
Importers	93	27.27
Freight Forwarders	21	6.16
Loaders/Forklift drivers	21	6.16
Local Residents	131	38.42
Operation Reach Stackers	10	2.93
Transporters	21	6.16
Total	341	100

The occupation distribution shown in Table 6 indicates that 18 or 5.28% were Admin Staff. Exporters were 26 or 7.62%. Importers were 93 or 27.27%. Freight forwarders were 21 or 6.16%, Loaders/Forklift drivers were 21 or 6.16%, Local residents were 131 or 38.42%, Operation Reach Stackers and Transporters were 10 or 2.93% and 21 or 6.16% respectively.

Table 7: Status Distribution

Status	Respondents	Percentage (%)
Top-level Management	127	37.24
Senior-level Management	189	55.43

The status distribution of respondents shown in Table 7 indicates that 127 or 37.24% were of the top-level management. Majority of the respondents (189 or 55.43%) belonged to the Senior-level management cadre and 25 or 7.33% were of the junior management level.

3.3. Discussion of Results

Objective 1: Identify the effects of poor port hinterland connectivity in Nigeria
 According to 100% of the respondents, port hinterland connectivity is a necessity in order to assure the smooth and timely evacuation of inbound goods from the ports en route inland destinations and the receipt of outbound goods from hinterland points into the port. And in agreement with the Federal Ministry of Transportation (2021), 100% of the respondents observed that poor port hinterland connections become evident when dozens of ships idle away at sea, while hundreds of trucks wait endlessly in the traffic for several days and sometimes, weeks before they can enter and exit the ports in Nigeria.

Thus, in the view of all the importers and exporters who were interviewed, the effects of poor port hinterland connectivity are more pronounced in Lagos where the port area is more crowded during the busy year-end period, and the congestion cost to the country is put at \$55 million per day in lost economic activity.

100% of the respondents observed that the inability of inland transportation to facilitate speedy cargo evacuation from the ports is a contributory factor to port congestion. Other factors, according to them include (1) ageing

port infrastructure (2) lack of rail transport, which compels 90% of cargo to be conveyed by road (3) an almost complete lack of automation which means every container must be physically inspected by customs officials.

3.3.1. Objective 2: Examine the Role of Inland Freight Distribution in the Implementation of IDPs in Nigeria

82% of the respondents noted that the development of inland freight distribution systems is an ongoing strategy to promote the hinterland of maritime gateways around the world. In agreement with Rodrigue & Notteboom (2012), they asserted that the development of dry port is receiving growing attention because of the complexity of modern freight distribution.

96% of the respondents observed that at the initial stage of the development of inland freight distribution systems, trucking always appears to be sufficient, however, with increase in the levels of activity, diminishing returns in the form of congestion, energy consumption, carbon emission, and empty movements tend to become strong incentives to be considered in setting up inland terminals in regional freight planning. In agreement with Ng & Cetin (2012), 89% of the respondents noted that the emergence of inland dry ports in Nigeria, just as in other developing economies, is geared towards facilitating the enhancement of inland logistics performance.

In agreement with the view of Notteboom and Rodrigue (2005), 82% of the respondents observed that at the initial time, the focus was on the development of seaport terminals and maritime shipping networks until recent times when transport development eventually started shifting inland and the need for inland terminals (IDPs) became apparent.

100% of the respondents were of the view that maritime shipping has achieved significant economies of scale, and this underlines its ability to transport cargo over long distances at a relatively low unit cost. And that on the other hand, economies of scale are much more difficult to achieve on the hinterland due to traffic increases, transport networks near ports usually get increasingly congested with the attendant financial implications for ship owners and shippers. Therefore, in agreement with Rodrigue & Notteboom (2012), hinterland transportation is made up of the dominant share (about 80%) of the transport cost, while maritime shipping accounts for the rest 20%. Therefore, the consensus is that since the cost burden has shifted from the seaside to the landside, inland freight distribution is about the most prominent issue in long distance freight distribution. In the view of Adejumo (2020), this explains why inland freight distribution is an important issue identified among the challenges facing the implementation of inland dry ports in Nigeria.

3.3.2. Objective 3: Examine the challenges of the various modes of inland transport in Nigeria

The Challenges faced by Rail Freight Transport in Nigeria

100% of the respondents observed that rail movement of freight to the hinterland, where the IDPs are located has stopped. They all asserted that land freight movement is now done mostly by truck on road and this has increased the cost of doing business. This agrees with Journal NG (2020), which observes that the narrow gauge in place has its limitations and the Federal Government is trying to improve on rail transport by upgrading to standard gauge.

In agreement with the Federal Ministry of Transportation (2021), 95% of the respondents identified the following as the 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. The remaining 5% of the respondents identified the following as the major challenges of rail transport in Nigeria (1) poor funding and huge operating losses, (2) loss of patronage to the road transport sector and (3) weak political commitment. This agrees with the position of Ogochukwu et al. (2022).

The Challenges faced by Road Freight Transport in Nigeria

100% of the respondents asserted that a bulk of all freight and passenger movement in Nigeria is done by road transportation, which according to Fashola (2021) accounts for 95%. In agreement with Olawale (2017) and Joseph (2018), 100% of the respondents identified the following as the problems faced by road transportation in Nigeria: (1) poor road infrastructure (2) poorly maintained roads (3) road congestion due to rapid urbanization and over population (4) Frequent road crashes (5) over reliance on road transport system due to the neglect of the rail mode (6) road encroachment.

The Challenges faced by Inland Waterways Freight Transport in Nigeria

100% of the respondents observed that the inland waterways transportation has assumed greater importance with the advent of barging operations in Nigeria. Consequently, the NPA has been issuing license for operators to streamline the movement of containers to the inland destinations. With the inland waterways in Nigeria being about 10,000 km and having total navigable length estimated

to be 3,000 km (Eto, 2021), 94% of the respondents opined that there is much room left to explore in the inland waterways as a reliable alternative and cost-effective means of transport connectivity.

87% of the respondents agreed with Badejo (2010) when they made the following observations as constituting the general constraints affecting efficient inland waterways transport service and the institutional limitations in Nigeria:

- 1) Government has not made provision for adequate funding for National Inland Waterways Authority (NIWA);
- 2) There exists institutional handicap, affecting capacity utilization, which calls for improvement of the legal framework that empowers NIWA;
- 3) Lack of policy directive that supports and encourages water transport system, which should be a credible alternative mode.

The remaining 13% of the respondents felt that the following are additional constraints that affect inland waterways transportation services in Nigeria: (1) No policy provision and incentives to encourage private sector participation in inland waterways transport service; (2) Unregulated and uncoordinated activities in the inland waterways system and haphazard infrastructure development.

The 16th Edition of the National Council on Transportation in 2017 and 2021, through Resolution 5.18 in Sokoto and Resolution 6.15 in Kano resolved that the Federal Ministry of Transportation, through the National Inland Waterways Authority should carry out light dredging of River Benue in phases and maintenance dredging of River Niger in order to reduce the pressure on roads, to promote water transportation, and reduce annual flooding with its attendant economic losses (National Council on Transportation, 2021).

On the whole, 100% of the respondents agreed that the challenges identified are capable of hampering the inland transport system from providing cheap transportation in order to decongest the seaports and deliver cargo closer to the hinterland.

3.3.3. *Objective 4: Identify the critical actors in the inland transport in Nigeria*

100% of the respondents were of the view that since seaports are only transit points, it is necessary to establish port hinterland connections in order to have timely evacuation of cargoes to inland destinations. They emphasized the need for functional and an effective inland transportation system. In agreement with Notteboom & Winkelmanns, 2004 cited in De Langen & Der Ho (2008), 100% of the respondents observed that it was the concern for seamless movement of land freight that prompted ports to aim increasingly at enhancing the quality of hinterland transport services.

100% of the respondents saw the necessity for hinterland access as a vital issue that concerns seaports, which calls for coordination and cooperation between the large group of actors in the hinterland chain. The reason for this perspective is predicated on the fact that port and their hinterland transport systems become attractive to port users and attract additional volumes of cargo if the whole hinterland transport network is efficient and effective as opined by De Langen & Der Ho (2008).

100% of the respondents agreed that IDPs in Nigeria require functional and cooperative land freight transport system actors by each having an understanding and making efforts towards achieving the common objective of an integrated freight logistics management.

Respondents identified the hinterland transport actors to include railway terminal operators, trucking industry (hinterland transport providers), third party logistics providers, shipping lines, seaport terminal operating companies, freight forwarders, industry regulators, shippers (importers and exporters) and inland terminal operators. Other public actors identified are port authority, Customs Service and infrastructure managers. Coordination between these actors is a necessity in order to create an effective integrated freight logistics management and hinterland transport chain. A total of 85% of the respondents agreed that when the actors involved in providing hinterland transport services (with the aim of achieving an integrated freight logistics management) are well coordinated, benefits would accrue.

The benefits identified by respondents for proper coordination of hinterland freight transport include: better planning at terminals, scale economies in hinterland services, more reliable services and better utilization of transport equipment. 100% of the respondents agreed that hinterland access is vital to attracting port users as well as increasing volumes of containers received. However, De Langen & Der Ho (2008) argue that to achieve effective coordination in hinterland transport chain does not happen automatically but rather requires calculated intervention due to the following reasons: (1) free riding problems; (2) a lack of contractual relations; (3) information asymmetry and (4) a lack of incentives for cooperation. A total 100% of the respondents agreed that the Nigerian Government may not be expected to drive the coordination of the actors identified. Rather, it will involve public/private partnership which entails inter-organizational coordination, involving container operators, Nigerian Shippers' Council, Nigerian Port Authority, freight forwarders and terminal

operators in order to promote functional IDPs.

3.3.4. *Objective 5: Examine the logistical Constraints in the inland freight Distribution system in Nigeria*

In an interview, 100% of the members of Shippers' Association of Nigeria observed that aside from the dire need to link the inland dry ports with rail connections from the seaports, in order to save transport cost, certain logistical constraints in the export supply chain can be addressed by introducing Domestic Export Warehouses to take care of lack of storage facilities, cumbersome export documentation procedures and designated agricultural produce at the dry port and port congestion.

According to the shippers, the establishment Domestic Export Warehouses in the IDPs would achieve its purpose if functional and efficient inland transport system is put in place. This would enable exporters to conduct their pre-export operations within the IDP facility as a one-stop entity with the assurance that the freight would move within the set timeline to the seaports. It would also eliminate the logistical constraints associated with non-oil exports in the hinterland. However, in order for the Domestic Export Warehouses situated in the IDPs to achieve their purpose, functional and efficient inland freight transport system is required.

3.3.5. *Objective 6: Suggest ways to Improve Inland Transportation in Nigeria in order to optimize the Performance of Inland Dry Ports*

On the way forward, respondents were of the opinion that in order to have an effective and

efficient inland transport system in Nigeria, for the purposes of optimizing the performance of the IDPs, they suggested as follows: (1) Government should pay equal attention to all the major modes of transporting freight (rail and road) (2) Government should work towards promoting the safety of the highways (3) develop the inland waterways to promote barging services (4) The Nigerian Railway Corporation should provide more wagons and coaches in addition to providing standard gauge for the rail freight transport system (5) The Federal Government of Nigeria should work out a holistic national freight logistics strategy involving all tiers of government and industry, and make provision for enhanced coordinated national multi-modal approach to freight planning.

4. CONCLUSION

It has been established that for seaports to be fully integrated into the supply chains (for the purpose of serving their hinterlands effectively) inland transportation is a major requirement to connect to the hinterlands where IDPs are located. Poor inland transportation that links the seaports could cause a setback with the result of crippling logistics costs, which is capable of limiting the competitiveness of the seaport. The morale of shippers would be boosted when trade costs are reduced through improved inland transport system, which would translate to optimized performance of inland dry ports. Thus, the economic success of a seaport is increasingly dependent on its ability to integrate into the flexible supply chains connecting it to the hinterland.

Thus, the attractiveness of seaports lies in investing in inland terminals (IDPs), with the guarantee of functional inland transportation system and by participating in their operations. Therefore, in order for IDPs to

serve as reliable extensions of the maritime terminals on the landside, port hinterland connections are vital. This is how IDPs emerge and it showcases how a seaport can establish itself in the inland regions and serve their hinterland effectively. Government should adopt a holistic national freight logistics strategy, which involves all tiers of government and industry, and make provision for enhanced coordinated national multi-modal approach to freight planning. This would facilitate the reduction of trade costs and enhance the optimization of the performance of inland dry ports in Nigeria.

Reference

- Abiodun, E. (2020, Jan. 10). Nigeria Ranked 110 in Global Logistics Performance Index. *thisdaylive.com*. Accessed 27 September, 2021.
- Adejumo, A.I. (2020). "Challenges of Inland Container Depots in Nigeria" *73 (1), (2020)*.
- Badejo, B. (2010). "Maritime Transportation Industry in Nigeria: Structure, Analysis, Challenges and Prospects" <https://www.academia.edu>
- Wokem, V.C., Madufuro, C. (2020). Application of cow dung and saw dust as biostimulants for enhanced bioremediation of diesel contaminated soil. *Journal of applied science, environment and management*. <https://dx.doi.org/10.4314/jasem.v24ii.7>
- Bergqvist, R. (2015). "Hinterland Logistics and Global Supply Chain" in Song, D-W & Panayides, P. (Eds.). *Maritime Logistics – A Guide to Contemporary Shipping and Port Management (2nd Edition)*. Kogan Page. Pp67-88.
- De Langen, P.E. & Van Der Ho, M. (2008). *Coordination in Hinterland Transport Chain: A Major Challenge for the Seaport Community*. <https://www.academia.edu>. Accessed 3 January, 2022.
- De Langen, P.W. (2007). "Port Competition and Selection in Contestable Hinterlands: The Case of Austria". <https://www.academia.edu>. Accessed 10 January, 2022.
- Eto, G.M. (2021). *Maritime Transport in Nigeria*. Heavens Rule Heritage Limited: Lagos
- Eto, G.M. (2023). *Appraisal of the Performance of Inland Dry Ports of Nigeria (2018 –2021)*. Unpublished PhD Dissertation, University of Port Harcourt.
- Fashola, B.R. (2021). *Investment Opportunities in Transport Infrastructure*. 2-Day National Conference on Transportation Infrastructure Development Financing In Nigeria Holding At The Shehu Musa Yar'adua Center, Abuja On The 17th – 18th August, 2021.
- Federal Ministry of Transportation (2021). *Review of Nigerian Transportation Masterplan*.
- Joseph, A. (2018). *10 Major Problems of Transportation in Nigeria*. <http://www.infoguidenigeria.com>. Accessed 7 January, 2022.
- Shipping Position (2021). *FG Blames Seaport Congestion on Absence of Dry* <https://www.shippingposition.com>. Accessed 11 January, 2022.
- Journal NG (2020). *Rail Suspension Doubled Cost of Cargo Movement to Kaduna Dry Port*. 1(7), 9-12
- Lagos Chamber of Commerce and Industry (LCCI), (2018). "Costs of Maritime Port Challenges in Nigeria", September, 2018
- Mwemezi, J.J. & Huang, Y. (2012). *The ICD Concept*. *African Journal of Business*

- Management 6(24), 7149-7157, 20 June, 2012.
- National Council on Transportation (2022). Memorandum on the Need for the Federal Ministry of Transportation to commence work on the Dredging of River Benue from Lokoja (Kogi State) to Yola (Adamawa State)
- Nigerian Ports Today (2019). African Ports and Hinterland Connectivity. The African Regional Conference of the International Association of Ports and Harbours (IAPH). Held at Transcorp Hilton, Abuja, 17th 19th September, 2018.
- Nigerian Shippers' Council (2022). Document on Investment Opportunities in Nigerian Shippers' Council Area of Operations. A presentation at Federal Ministry of Transportation in Abuja on 20th July, 2022.
- Ng, A.K.Y. & Cetin, I.B. (2012). Locational Characteristics of Dry Ports in Developing Economies: Some Lessons from Northern India. *Regional Studies* 46(6), [https://www.tandfonline.com/doi/abs/](https://www.tandfonline.com/doi/abs/https://www.tandfonline.com/doi/abs/) / . Accessed 6 January, 2023
- Notteboom, T. (n.d.). (2022). Ports and Maritime Supply Chains https://porteconomicsmanagement.org/?page_id=27 Accessed 3 January, 2022
- Ogochukwu, C.G., Ogochukwu, O.F., Ogorchukwu, I.M., & Ebuka, I.A. (2022). Assessment of the performance of railway transportation in Nigeria from 1970 to 2010. *Scientific African*. <https://www.sciencedirect.com>. Vol. 15.
- Ogunsi, B., Utulu, A. & Nzeako, I. (29 April, 2019). "The Economic Prospects of Nigeria's Dry Ports". <http://www.dredgewire.com>. Accessed 25 January, 2021.
- Olawale, J. (2017). Problem of Road Transportation in Nigeria. <https://www.legit.ng>. Accessed 7 January, 2022.
- Rodrigue J-P & Notteboom, T. (2006). Challenges in the Maritime – Land Interface-Port Hinterlands and Regionalization. *Researchgate.net*. Accessed 1 January, 2023.
- Rodrigue, J.P. and Notteboom, T. (2012). Dry ports in European and North American intermodal rail systems: Two of a kind? *Res. Transp. Bus. Management*. 5, 4–15.
- Roso, V., Woxenius, J. & Lumsden, K. (2009). The Dry Port Concept: Connecting Container Seaports with the Hinterland. *Journal of Transport Geography*. 17:338-345. <http://doi.org/10.1016/j.jtransgeo.2008.10.008>.
- UNESCAP (2015). Policies and Issues Relating to Dry Ports.
- UNCTAD (2013). Review of Maritime Transport.
- Wiegmans, B., Witte, P.E., & Spit, T (2015). Inland Port Performance: A Statistical Analysis of Dutch Inland Ports. *European Transport Conference*, 29 September – 1 October, 2014
- Zeng, Q., Maloni, M.J., Paul, J.A. & Yang, Z. (2013). Dry Port Development in China: Motivations, Challenges, and Opportunities *Transportation Journal* 2013. https://www.researchgate.net/publication/259746771_Dry_Port_Development_in_China_Motivations_Challenges_and_Opportunities.