Harnessing Natural Waterways and Canals: Unlocking the Potentials for Inland Shipping in Nigeria

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Abstract

Nigeria's extensive network of natural waterways and canals presents a significant yet underutilized opportunity for enhancing Inland Shipping and fostering economic growth. This paper explores the potential of these waterways which if properly harnessed and adequately utilized would alleviate congestions on Nigeria's Ports, roads networks, reduce transportation costs, and promote economic and sustainable development. Against the backdrop of the current state of Nigeria's Inland waterways, the paper highlights the Economic and environmental benefits and potentials of Inland Shipping, and identified challenges hindering it's the development in Nigeria. In the final analysis, the paper proposes strategic initiatives and investment priorities towards enhancing the potential development of Inland Shipping in Nigeria. It concludes that a deeper understanding of the potentials of Inland Waterways promises great deal to economic and sustainable development in Nigeria.

Keywords: Natural Waterways, Canal, Inland Shipping, Nigeria.

Introduction

The Inland waterways are made up of navigable rivers, lakes, coastal creeks, lagoons and canals. The movement of goods and services along inland waterways is one of the oldest means of transportation from point to point. This is largely due to the fact that inland water transport offers the most economical, energy efficient and environmentally friendly means of transporting all types of cargo from place to place. It also offers safer and cheaper rates in areas where water exist naturally. This facilitates commerce, promotes wealth creation, alleviates poverty, and creates job opportunities for youths within such regions. The ancillary sector of boat building industry also generates employment through active engagement of the youths in welding and fabrication process. (Abiodun, 2017).

Nigeria is endowed with an extensive network of natural waterways and canals that transverse 20 out of the 36 states within the nation and yet with a significant untapped potential for transforming its inland transportation system. Historically, these waterways have been pivotal for local commerce and community connectivity in Nigeria. However, their full potential for commercial Inland Shipping remains largely unexploited. Since the 1990s, however, the Federal Government of Nigeria has, taken a number of initiatives, including capital and infrastructure improvement, channels dredging and maintenance and installation of safety facilities to turn round the sector (Chukwuma, 2014).

Harnessing these natural assets could significantly alleviate the pressures on Nigeria's overburden road infrastructure, reduce transportation costs and enhance sustainable economic growth of Nigeria and with the efficient control system as the primary responsibility to improve and develop Nigeria's inland waterways for navigation, the Nigerian Inland Waterways Authority (NIWA) could function appropriately to make the realization of these economic fortunes a reality (NIWA, n.d).

The Inland Waterways can play a crucial role in enhancing efficiency of Nigeria's logistics network, connecting remote areas to major economic hubs like Lagos and Port-Harcourt, and further fostering economic integration. Despite these prospects, several challenges hinder the development of Inland Waterways Transportation in

Nigeria, including inadequate infrastructure, regulatory bottleneck, and limited investments among others.

This paper aims to explore the potential benefits of harnessing Nigeria's Natural Waterways and Canals for Inland Shipping. It will assess the current state of these waterways, evaluate the economic advantages, identify key challenges bedeviling this sector and by proposing strategic initiatives and investment priorities by providing a roadmap for unlocking the potentials of Nigeria's Inland Waterways and of its contributions to nations' economic development and sustainability goals.

Conceptual Clarifications and Theoretical Framework

Natural Waterways: The term 'Natural Waterways' means those areas along streams, rivers, creeks, gullies, springs, washes which are natural drainage channels and in which no buildings are to be constructed. They are water ways that are part of the natural topography, they usually maintain a continuous or seasonal flow during the year and are characterized as being irregular in cross-section with a meandering course (Insider, n.d). The term 'Waterways' may also collectively refer to rivers, wetlands and estuaries. Adjoining water bodies such as bays, oceans and groundwater are intimately connected to the waterway system (Strategy, 2018).

Canal: The word "canal" derives from the Old French word *chanel*, which means "channel". A canal is a human-made waterway that allows boats and ships to pass from one body of water to another. Canals are also used to transport water for irrigation and other human uses. Canals play a vital role as conduits for transportation and fostering global commerce (Administration, 2023).

There are two types of canals: waterways and aqueducts. The Waterways are the navigable parts of a body of water, and can be located within a bay or open sea, can connect two or more water bodies, or may even form networks within a city while Aqueducts are used exclusively to transport water for drinking, agriculture, and hydroelectric power (Administration, 2023).

Inland Shipping: Inland Shipping also known as Inland navigation, Inland barge transport or Inland waterway transport (IWT) is a transport system allowing ships, and barges to use inland waterways such as canals, rivers and lakes of a particular country or state. These waterways have inland ports, marinas, quays, and wharfs (Hunt, 2013). Modern researchers have long recognized that inland navigation is a relatively environmentally friendly option for freight transport compared to other modes of transportation such as air carriage and road transport, and similar to rail freight transport (Hunt, 2013).

Nigeria: Nigeria is a country in West Africa that spans a land area of 923,768 square kilometers between the latitudes of 4 degrees and 14 degrees and the longitudes of 3 degrees and 14 degrees. It extends to the Atlantic Ocean's coasts, which serve as its southern boundary, and shares boundaries with the Republics of Niger and Tchad to the north, the Republic of Benin to the west, and the Republic of Cameroun to the east. Nigeria has an 853 km long coastline, which offers tremendous potential for marine power. Between the highlands and the ocean, there is a coastal plain that stretches from the Benin border to the Niger Delta and is about 80 km broad (Nigeria, 2009).

The argument of this paper is anchored on 'Spatial Interaction Theory', which explains the movement and flow of goods, people, and information between different locations. It emphasizes the role of distance, accessibility, and connectivity in determining transportation patterns. There are three (3) interdependent principles of spatial interaction, as proposed by transportation geographer Edward Ullman, that exert an influence on the flows of Spatial Interaction between places which are; complementarity (Supply and Demand), transferability (Mobility), and intervening opportunity (Alternative point of Supply) (Alan, 2023).

Inland waterways and canals can be seen as crucial spatial connectors that facilitate the movement of goods across Nigeria. Through conscious harnessing and improvement of the waterways, the friction of distance is reduced, leading to more efficient and cost-effective transportation thereby enhancing economic activities by

connecting production areas and the major Sea Ports with the hinterland, cities and towns, and markets both domestically and internationally.

Methodology

This study employed content analysis as the most suitable and appropriate method of data collection to undertake and handle this research. Therefore, a qualitative method seems to be relevant for this research, as different secondary data were sourced and carefully analyzed. These include text books, journals, articles, research reports, and educational websites; it is thus considered more secure and safe to make use of such written records, as many have been published and printed. These would be supplemented with internationally published materials and educational websites from various reputable databases including Research Gate, Science Direct, Google Scholar, and Study.com as well as other sources from the internet for balanced analysis.

An overview of the Nigeria's Inland Waterways

The hydrology of Nigeria is dominated by two great river systems, the Niger-Benue, and the Chad systems. With the exception of a few rivers that empty directly into the Atlantic Ocean, all other flowing waters ultimately find their way into the Chad basin or down the lower Niger to the sea. The two river systems are separated by a primary watershed extending northeast and north-west from the Bauchi Plateau which is the main source of their principal tributaries. North-west of the plateau lies the elevated, drift-covered plains of central Hausa-land which is drained by numerous streams all flowing outwards to join the major tributaries (Kuruk, n.d).

Nigeria has over 10,000 km of inland waterways. This water resource comprises rivers, creeks, lagoons and lakes, and intra-coastal water which source is two main rivers, the Niger and the Benue, both of which form a confluence at Lokoja, in Kogi State. Although the longest is the River Niger, the most used waterway, especially by the larger watercrafts, is its tributary, the Benue River, especially for commercial activities in the delta area of Cross River and all along the coast to the Lagos lagoon (Cluster, 2022).

Nigeria is blessed with a vast expanse of inland freshwater and brackish ecosystems. Their full extent cannot be accurately stated as it varies with season and from year to year depending on rainfall. However, the water resources are spread all over the country from the coastal region to the arid zone of the Lake Chad Basin. The country's extensive mangrove ecosystem, a great proportion of which lies within the Niger Delta and found mainly in the Rivers, Delta, Cross River, Akwa lbom, Lagos and Ondo States, is estimated to cover between 500,000 and 885,000 hectares. Freshwaters start at the northern limit of the mangrove ecosystems and extend to the Sahelian region (Kuruk, n.d).

River, Imo, Kwa Iboe, Niger Ogun and Oshun Rivers. Estimated at about 10,812,400 hectares, these rivers make up about 11.5% of the total surface area of Nigeria which is estimated to be approximately 94,185,000 hectares. The inland water system includes thirteen lakes and reservoirs with a surface area of between 4000 hectares and 550,000 hectares have a total surface area of 853,600 hectares which represents about one percent of the total area of Nigeria. They include lakes Chad, Kainji, Jebba, Shiroro, Goronyo, Tiga, Chalawa Gorge, Dadin Kowa, Kiri, Bakolori, Lower Anambra, Zobe and Oyan. With the exception of Lake Chad, all the lakes are man-made (Kuruk, n.d).

According to statistics from NIWA, 28 of the 36 states of the Federation can be linked by water, though only about 30 percent of these vast resources, which is about 3,800km of waterways, are navigable. NIWA has established that at least 17 out of the 28 states are accessible and States that can be accessed either through river Niger or Benue include: Adamawa, Anambra, Bauchi, Bayelsa, Benue, Delta, Edo, Gombe, Kebbi, Kogi, Kwara, Niger, Nasarawa, Plateau, Rivers, Sokoto and Taraba and many River channels of the country also open to five neighbouring countries on the continent – Benin Republic, Equatorial Guinea, Cameroon, Chad and Niger Republic (Authority, 2024).

Several inland shipping routes existed in Nigeria; the Lagos – Port Harcourt route is a critical trade corridor connecting the commercial capital with the oil-rich Niger Delta region. It facilitates the transport of petroleum products, food supplies, and other goods (Scholar, 2024). Another major route is the Calabar – Lagos route. It

enables the movement of goods between the coastal city Calabar and Lagos, the economic hub of Nigeria. This route is significant for industries such as agriculture, manufacturing, and commerce (Scholar, 2024). The Warri – Port Harcourt route is essential for facilitating trade between the oil-rich areas of Warri and Port Harcourt. This route allows for the transportation of crude oil, petrochemicals, and other oil related products (Scholar, 2024). Furthermore, the Bonny – Onne route connects Bonny Island, which houses Nigeria's Liquefied Natural Gas (LNG) facilities, with Onne, a major port city. This route plays a crucial role in exporting LNG and petroleum products. Other significant inland shipping routes include Lagos – Brass, Onne – Warri and e.t.c. All these routes connect various coastal cities and ports, supporting trade within Nigeria and with neigbouring countries (Scholar, 2024).

Benefits of Developing Inland Shipping

Inland shipping as a means of carrying goods and persons by water (inland waters like river, lake, canals, creeks etc) supported by boats, ferries, coastal vessels, barges of less than 500 gross tonnage had some potential benefits to include the followings (Stepen, 2019): **Transportation:** The most important benefit of inland shipping is a means of moving persons and cargo from one to point to the other. This intermodal connectivity by linking various modes of transportation, such as rail, road, and waterways facilitates more efficient and flexible logistics operations, enabling smoother transitions between different transport modes and reducing the time and cost associated with cargo and persons movement.

Revenue Generation and Job Creation: Developing Inland shipping can serve as a source of revenue generation which can stimulate local economies by creating jobs in construction and building of ships, shipping, and related industries, and by improving access to different markets easily.

Trade and Commerce: Inland shipping facilitates access to global markets for landlocked and interior regions by connecting these areas to major sea Ports. Inland shipping enable businesses in the hinterland to participate in International trade more efficiently which can boost local industries by opening up new opportunities

and reducing transportation costs for exporting and importing goods (N. Calderon-Rivera, 2024).

Promotion of Tourism: improved inland shipping can also promote tourism and recreational activities, contributing to the local economy enhancing the quality of life, and of social activities for residents (Stepen, 2019).

Reduced Congestion and Enhancement of growth: Inland shipping can significantly alleviate congestion at major roads networks and coastal ports in Nigeria by serving as additional points for cargo distribution for the enhancement of economic growth. It can streamline the overall supply chain, reducing bottlenecks and improving flow of goods and services (Marsh, 2022).

Environmental Sustainability: Inland Shipping is a more environmentally friendly mode of transport compared to road, and air freight. It produces lower emissions of greenhouse gases and other pollutants. This makes it a vital component of sustainable transport policies aimed at reducing the carbon footprint of the logistics sector (Manskowska, 2018).

Challenges facing the development of Inland Shipping in Nigeria

There are many challenges bedeviling the development of Inland shipping in Nigeria. Here are some of these challenges that include: **Underutilization of River System:** one of the major challenges affecting the development of Inland shipping in Nigeria is neglecting or underutilization of the river system and navigable waterways. Many Nigeria's navigable waterways are not fully developed and maintained, which hinders the full potential of inland shipping and this limited access to ports and berthing facilities through the use of coastal shipping creates bottlenecks and delays in logistics operations thereby negating maximum productivity and economic growth to Nigeria (Scholar, 2024).

Regulatory and Bureaucratic Challenges: in Nigeria, there exist multiple government agencies in the maritime industry with duplication and similarities of functions for example, the Nigerian Maritime Administration and Safety Agency (NIMASA), the Nigerian Ports Authority (NPA), Shippers Council of Nigeria and

the National Inland Water Waterways (NIWA) all are saddled with the responsibility of regulating and enforcing maritime activities and policies in Nigeria. This inconsistent enforcement of regulations and bureaucratic inefficiencies by multiple government agencies hinders effective operations in the Nigeria's maritime industry and can deter both local and foreign investment in the sector (Lawpavillion, 2022).

Infrastructure Deficit: there is a substantial poor or lack of infrastructure necessary for efficient Inland Shipping in Nigeria. These include poorly maintained Ports and Jetties, inadequate Harbors, insufficient terminals and inadequate dredged waterways to accommodate ships and barges (Enubianozor, 2024).

Safety and Security: Safety and security is an issue confronting Nigerian waterways' use. Over-crowding of vessels, poor watercraft, and sunken wrecks above and below surface are among reasons for the many accidents on waterways in littoral states (Cluster, 2022). Although there have been improvements in maritime security, issues such a piracy, sea robbery, and illegal bunkering continue to pose significant threat to Nigerian Inland Shipping. These security challenges discourage investment and complicate operations in the maritime sector (Enubianozor, 2024).

Environmental Pollution: The effect of marine pollution on water bodies and coastal areas causes degradation to the environment and its ecosystem. Nigerian Coastal waters like all coastal and port countries in the world, had experiences the problem of marine pollution, sometimes through industrial activity at the ports. And like some other petroleum producing nations, Nigeria's marine pollution challenge is exacerbated by oil and gas exploration and production (Faith, 2019).

Funding: Maritime Industry anywhere in the world is capital-intensive, requiring substantial investment for development and maintenance. However, in Nigeria, there is persistent lack of funding to the industry which impedes economic growth and deters foreign investment. This funding gap is critical as it affects the industry's ability to expand and modernize (Lawpavillion, 2022).

Strategies towards boosting Inland Shipping in Nigeria in the Twenty First Century

This research proffers some strategic and investment priorities towards the development and enhancement of Inland shipping in Nigeria that include: **Infrastructure Development:** one of the key strategic initiatives in enhancing Inland Shipping in Nigeria involves the development and improvement of coastal and inland waterways infrastructure. These include charting and maintenance of navigation routes on major rivers like the Niger and Benue. The $750,000 grant from Afreximbank and NEXIM Bank for the hydrographic survey of the Niger-Benue River is an example of efforts to enhance navigability and develop river ports and anchorage plans in Nigeria. Regular dredging and maintenance of key waterways to ensure navigability throughout the year and expanding and modernizing existing ports, constructing new terminals, and upgrading access road and rail networks to these ports and terminals (Amadou, 2021).

Streamlined Bureaucratic Procedures: another initiative towards the improvement and development of Inland shipping in Nigeria is implementing reforms to simplify bureaucratic procedures, such as subsuming the many maritime agencies into a single agency and also enhance digitizing documentation, reducing inspection requirements, and improving customs processes can enhance the ease of doing business in the Shipping sector as a whole and this would attract local and foreign investment and facilitate trade in the sector (Scholar, 2024).

Enhanced Safety and Security Measure: implementing robust safety and security measures to protect persons, goods and vessels/ships along inland waterways. This includes increased patrol, effective surveillance systems, improved coordination and synergy among security agencies, intelligence sharing, and training for personnel on marine safety protocols and as well establishing systems infrastructure for quick response to accident and natural disaster such as search and rescue team, local divers among others to minimize disruption and ensure the maximum safety of cargo and personnel in Nigerian waters (Afdb, 2023).

Environmental Sustainability: another initiative in enhancing the development of Inland shipping in Nigeria is promoting the use of environmentally friendly

vessels/ships to reduce the carbon footprint of inland shipping operations. This can include investments in cleaner technologies and fuel alternatives in preventing oil spillage and environmental pollution (Afdb, 2023).

Conclusion

This paper concludes that, effective utilization of natural waterways and canals for the purpose of inland shipping in Nigeria presents a significant opportunity to transform the country's transportation infrastructure, thereby reducing ports and roads congestions, and fostering economic growth. Nigeria's extensive network of rivers, creeks, and lagoons, if adequately developed, utilized and maintained, could provide a cost-effective and environmentally friendly and alternative means of transportation compared to road and rail transport and would also serve as a source of revenue for the government and thereby creating jobs for the locals, it would also attract and promote tourism to many riverine communities in the hinter land of Nigeria, and facilitating robust trading and commercial activities among others. In all, harnessing, developing and improving Inland Shipping infrastructure will further strengthen Nigeria's logistics capabilities and contribute to its overall economic growth.

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