

Trade Facilitation and Port Efficiency in Nigeria: A Case-Based Review of Customs Procedures at Apapa, Tin Can, and Onne Ports

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Abstract: Efficient port operations are central to lowering trade costs and enhancing competitiveness in developing economies. This study examines how customs procedures and inter-agency coordination influence port efficiency and trade facilitation at Nigeria's three major seaports—Apapa, Tin Can Island, and Onne. Using a qualitative policy review and comparative case study design, the research analyses documentary evidence from WTO, UNCTAD, World Bank, and national regulatory agencies alongside case-based insights from port operations. Findings reveal that severe congestion, prolonged cargo dwell time, and logistical bottlenecks at Lagos ports stem from infrastructural deficits, complex documentation processes, limited scanning capacity, and inconsistent application of risk management. Inter-agency fragmentation among the Nigeria Customs Service (NCS), Nigerian Ports Authority (NPA), NIMASA, SON, NDLEA, and terminal operators further compounds delays through duplicative inspections and poor information sharing. In contrast, Onne Port demonstrates more streamlined procedures, reduced congestion, and stronger operational coordination. Assessment of Nigeria's alignment with WTO Trade Facilitation Agreement provisions shows progress in documentation transparency and electronic payment but highlights persistent gaps in coordinated border management and risk-based clearance. The study contributes to port governance literature by offering an integrated, comparative analysis of customs, logistics, and institutional dynamics across Nigeria's leading ports. It recommends targeted reforms, including process simplification, enhanced scanning and ICT systems, strengthened joint inspections, and differentiated strategies for Lagos and Onne to improve national trade facilitation outcomes.

Keywords: Trade Facilitation, Port Efficiency, Cargo Dwell Time, Customs Procedures, Coordinated Border Management, WTO Trade Facilitation Agreement (TFA).

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I. INTRODUCTION

➤ Background to the Study

Nigeria's seaport system can be considered an essential segment of the country's trade infrastructure, as it accounts for more than 90 percent of the country's international trade in merchandise. It also plays an instrumental role as an engine for fiscal revenue generation and economic integration (Adeleke & Odunuga, 2022).

In the Nigerian seaport system, Apapa, Tin Can Island, and Onne occupy crucial positions. This is because these seaports play significant roles in containerized cargo

handling, petroleum products, and regional connectivity. For instance, Apapa and Tin Can Island, which are situated on the maritime corridor of Lagos, operate as the busiest trade hubs in Nigeria, as they handle the highest volumes of trade, including imports and exports. On the other hand, Onne Port, which handles general cargoes and petroleum products, has become an efficient alternative to the congested seaports in Lagos (Ugboma et al., 2023). In light of the above, it can be concluded that the operation of these seaports has significant implications for Nigeria's trade competitiveness, as it can play an instrumental role in lowering trade costs, improving trade reliability, and enhancing Nigeria's integration into global and regional trade.

On a global scale, trade facilitation and efficiency in ports have regained center stage, and countries are working towards creating a favorable and efficient logistics landscape characterized by low transaction costs, high logistics efficiency, and a favorable ease of doing business. There is ample policy and empirical evidence suggesting how streamlined border procedures, documentation, and inspections, along with efficient border management and technology, play a vital part in cutting down cargo dwell times and boosting border efficiency (World Bank, 2023; World Trade Organization [WTO], 2021). In developing and emerging economies, efficient ports have a high and positive correlation with low trade costs, reliable modes of transport, and increased confidence among investors, thereby directly contributing to broader national and development objectives (Kamau & Otiso, 2022). In Nigeria's specific case, adherence to global best practices, particularly those outlined in the World Trade Organization's Trade Facilitation Agreement (TFA), is imperative for overcoming existing inefficiencies in its logistics landscape and increasing its competitiveness in existing and evolving trade configurations. With this backdrop, this study follows a policy review and comparative case synthesis approach to examine trade facilitation and port efficiency in Nigeria. The study is informed by an Institutional Theory, Transaction Cost Economics/Theory of Trade Facilitation, and Coordinated Border Management/The Network Governance approach. The three theories provide an integrated approach to understanding trade facilitation and efficiency outcomes. The study focuses on the 2015-2025 timeframe, during which many trade facilitation reforms were initiated in Nigeria's trade environment. The trade environment includes customs and trade facilitation reforms such as the development and implementation of Nigeria Integrated Customs Information System II, implementation of an electronic payment system and associated trade facilitation measures, implementation of truck call-up systems and upgrading of roads leading to Lagos Ports, and trade facilitation and CBM-related initiatives to enhance interagency coordination and trade facilitation outcomes. The timeframe offers an appropriate context for understanding trade facilitation and implementation challenges.

➤ *Research Problem*

Despite ongoing reforms, the port infrastructure of Nigeria continues to face a plethora of problems and challenges. Congestion of cargo at Apapa and Tin Can Island ports continues to remain a problem. Factors include the poor state of the port's access roads, truck traffic management, limited cargo handling capacity, and the urban density of the surrounding cities of Lagos (Okeke & Nwankwo, 2022). These factors contribute to the high cargo dwell times, which remain above the global average. These high cargo dwell times are costly to importers, producers, and logistics companies (Adegoke et al., 2024). On the other hand, Onne Port enjoys better cargo handling and lower congestion pressure. However, the difference between the ports of Lagos and Onne calls for closer analysis.

In terms of port operations, one of the major bottlenecks in terms of delays and efficiency in port operations arises from customs. Repetitive checks, delays in scanning and physical examination, repeated system failures, and irregularities in risk management practices are some of the major issues that have been affecting efficiency in customs clearance in Nigerian ports (Ojo & Ismail, 2023). While Onne enjoys relative ease in terms of lesser volumes of traffic, it also shows that in spite of operating in the same national system, each port may have its own set of problems in terms of efficiency in customs. The next dimension to the problem relates to the fragmented nature of the existing coordination amongst the border control agencies at the Nigerian ports. These border control agencies include the Nigeria Customs Service, Nigerian Ports Authority, Nigerian Maritime Administration and Safety Agency, Standards Organization of Nigeria, National Drug Law Enforcement Agency, and the terminal operators. These agencies are said to operate concurrently but sequentially, with a lack of interoperability amongst their respective systems and a lack of joint inspection facilities. This is according to Ezenwa & Chidinma (2021). Based on empirical and policy studies, the fragmented nature of the border control institutions at the Nigerian ports is said to undermine the effectiveness of coordinated border control, which is in contrast to the cooperative and harmonized border control regime provided for in the WTO Agreement on the Trade Facilitation Agreement. In spite of the Nigerian government's compliance with the TFA, there are some aspects to the implementation of the Agreement which are yet to be addressed. This provides the background for the study's aim to undertake a comparative analysis of the customs procedures, border control institutions' coordination, and port efficiency at Apapa, Tin Can Island, and Onne Ports.

➤ *Aim and Objectives of the Study*

Based on the overarching aim of this study is to critically examine how customs procedures and inter-agency coordination influence port efficiency and trade facilitation outcomes in Nigeria, using a comparative case analysis of Apapa, Tin Can Island, and Onne Ports within the context of ongoing reforms and Nigeria's commitments under the WTO Trade Facilitation Agreement (TFA).

To achieve this aim, the study pursues the following specific objectives:

- To analyse the impact of customs documentation, scanning, and examination procedures on port congestion and cargo dwell time at Apapa, Tin Can Island, and Onne Ports.
- To examine logistics and hinterland connectivity challenges—such as truck call-up systems, access roads, holding bays, and terminal interfaces—and their implications for trade facilitation across the selected ports.
- To assess the nature and effectiveness of collaboration among the Nigeria Customs Service (NCS), Nigerian Ports Authority (NPA), Nigerian Maritime Administration and Safety Agency (NIMASA),

Standards Organisation of Nigeria (SON), National Drug Law Enforcement Agency (NDLEA), and other border agencies in streamlining clearance processes.

- To compare trade facilitation practices and port efficiency outcomes between the Lagos ports (Apapa and Tin Can Island) and Onne Port, identifying institutional and operational factors underlying observed differences.
- To evaluate Nigeria's implementation of selected WTO TFA provisions relevant to seaport operations, particularly those relating to transparency, release and clearance of goods, border agency cooperation, and documentation simplification; and to identify remaining implementation gaps.

➤ *Research Questions*

In line with the stated objectives, the study is guided by the following research questions:

- How do customs documentation, scanning, and examination procedures affect port congestion and cargo dwell time at Apapa, Tin Can Island, and Onne Ports?
- To what extent do logistics and hinterland connectivity constraints influence trade facilitation and clearance efficiency across the selected ports?
- How effective is inter-agency collaboration among customs and other border agencies in streamlining cargo clearance and reducing procedural duplication at Nigerian seaports?
- How do trade facilitation practices and port efficiency outcomes differ between Lagos ports and Onne Port, and what institutional and operational factors explain these differences?
- To what extent has Nigeria implemented key WTO Trade Facilitation Agreement provisions at its major seaports, and where do significant gaps remain?

➤ *Scope of the Study*

The boundaries of this research are defined in terms of its spatial, temporal, and thematic scope. In terms of its spatial scope, this research focuses primarily on Apapa Port, Tin Can Island Port, and Onne Port. The reason for choosing these ports is their level of importance, trade volumes, and their varying degrees of port congestions. The ports of Lagos, such as Apapa and Tin Can Island, represent high-density port environments that are often associated with high degrees of port congestions, while Onne Port is chosen for its low level of port congestions.

From a temporal point of view, the study covers the period 2015-2025, a decade that has seen major reforms undertaken in the management of customs and port operations in Nigeria, including the development of digital customs solutions like NICIS II, the introduction of electronic payment solutions, risk management solutions, dispatch of trucks, intervention on access roads to ports, and the drive to strengthen coordinated border management through national trade facilitation structures.

From a thematic perspective, the focus areas of this study are customs procedures, port congestion, cargo dwell times, logistics performance, coordination, as well as WTO TFA requirements. Though this study relies on policy documents as well as case studies, it does not aim to econometrically measure times or costs, but rather focuses on gaining insights qualitatively.

➤ *Significance of the Study*

The significance of this study lies in its theoretical as well as practical contributions. From a theoretical perspective, this study contributes to trade facilitation theory, as well as port performance theory, through its novel integration of Institutional Theory, Trade Facilitation Theory, as well as Coordinated Border Management/Network Governance, all in one single framework. By employing these theories to analyze port performance, this study contributes to further theoretical knowledge regarding how institutional factors, procedural factors, as well as coordination factors, combine to impact port performance in developing countries.

Empirically, the current paper contributes comparative case-based evidence for three of Nigeria's most strategically vital ports, thus emphasizing how variations in customs processes, logistical conditions, and collaborative efforts among agencies have an impact on differing degrees of congestion and associated dwell time. The analysis thus fills an important gap in extant literature that often tends to rely on aggregate national or single-port studies.

In terms of the implications for policies and practice, the study provides actionable insights for various stakeholders, including the Nigeria Customs Service, the port authorities, the maritime regulators, and all the border control agencies. In terms of the implications for policies and practice, the study provides actionable insights for various stakeholders, including the Nigeria Customs Service, the port authorities, the maritime regulators, and all the border control agencies. In terms of the implications for policies and practice, the study provides actionable insights for various stakeholders, including the Nigeria Customs Service, the port authorities, the maritime regulators, and all the border control agencies. In terms of the implications for policies and practice, the study provides actionable insights for various stakeholders, including the Nigeria Customs Service, the port authorities, the maritime regulators, and all the border control agencies.

II. THEORETICAL AND CONCEPTUAL FRAMEWORK

A. *Conceptual Review*

➤ *Trade Facilitation*

It refers to "the simplification, modernization, and harmonization of import, export, and transit procedures with the aim of facilitating trade, which encompasses procedures, formalities, and requirements under customs, as well as other relevant regulations, with the overall goal of simplifying, modernizing, and harmonizing import, export,

and transit procedures to reduce administrative costs, as well as to increase predictability in trade” (World Trade Organization, 2021). Recent trade facilitation discourse, as discussed in recent trade theories, identifies trade facilitation as including procedures such as “streamlining documentation, transparency of regulatory requirements, electronic data submission, advance rulings, and risk management as critical trade facilitation tools to reduce trade costs” (Organisation for Economic Co-operation and Development, 2023; United Nations Conference on Trade and Development, 2022). In relation to WTO TFA, trade facilitation, therefore, refers to “the implementation of procedures, formalities, and requirements under customs as well as other relevant regulations with the aim of facilitating trade, which encompasses procedures to expedite the movement, release, and clearance of goods, as well as to promote cooperation among relevant agencies, as well as to build trade competitiveness, particularly for developing countries” (World Trade Organization, 2021). In Nigeria, trade facilitation, therefore, refers to “the degree to which customs as well as relevant agencies at Apapa, Tin Can, as well as Onne Port have simplified, modernized, as well as harmonized procedures to expedite

In the study, trade facilitation is measured based on the existence and effectiveness of simplified procedures, digital submission systems, advance processing, and inter-agency cooperation mechanisms at the selected ports.

➤ *Port Efficiency*

On the other hand, port efficiency can be defined as the ability or capacity that a port has to use its facilities, labor force, and technology to handle vessels and cargoes without any wastage or delay. Recently, the concept has been defined by scholars with a multidimensional nature that consists not only of operational efficiency factors but also service quality and financial factors (Nguyen, 2025; Wang, 2023). In the context of a wider world comparison, the World Bank's Container Port Performance Index has been using a series of factors that include the waiting times for ships, crane intensity, and the overall port hours per ship call to measure the efficiency of ports worldwide (da Silva et al., 2024; World Bank, 2022). In the context of developing countries or regions, the assessment would include the determination of the technical and scale efficiency of the port to find out whether the port has reached optimal efficiency or not (Matekenya, 2025). In the context of the Nigerian economy, the overall efficiency levels that the ports of Apapa, Tin Can, and Onne have would depend on the overall functioning levels that the customs have.

➤ *Cargo Dwell Time*

Cargo dwell time is an essential micro-level performance measure for measuring and evaluating port and clearance efficiency. The measure essentially indicates the total elapsed time between a container's arrival at a terminal and its departure after completing all customs and other regulatory and commercial formalities. Recent literature points to an increased cargo dwell time as an indication of systemic inefficiencies in documentation, scanning, inspection methods, space management, and truck

scheduling activities (Nwokedi, 2022; Lee, 2024). In an empirical analysis of Nigerian ports, researchers Olanrewaju et al. (2024) found that increased repetition in customs and scanning activities, scanner queues, gate queues, and terminal handling times are responsible for increased cargo dwell times. International experience shows that increased cargo dwell times have a direct and adverse effect on logistics and inventory carrying costs and hence reduce supply chain and manufacturing system competitiveness (Chhetri, 2025). In this study, we have used the concept of cargo dwell times as an essential outcome of customs and clearance formalities.

➤ *Port Congestion*

The occurrence of port congestion can be defined as the situation whereby the demand for port services exceeds the available capacity of the port (World Bank, 2022). In other words, it can be explained as the situation whereby the available capacity of the port cannot meet the demand for the services offered by the port. In the literature on ports and their efficiency, it was indicated that the occurrence of congestion was attributed to the insufficient infrastructure and traffic management systems, insufficient digitalization of the ports, and poor coordination of the ports (Hezekia, 2025; Nwokedi et al., 2022). In the ports of Lagos, the occurrence of congestion, particularly at the Apapa and Tin Can ports, was attributed to insufficient truck parks, poor call-ups, poor road infrastructure, and poor clearance of cargo, which are some of the central issues of the reform of the ports of Nigeria.

The study proposes the concept of port congestion through qualitative parameters, including gridlocks, truck queues, yard pressures, and their interactions with customs clearance operations.

➤ *Logistics Performance*

This includes the efficiency, dependability, and quality associated with the flow of goods across the supply chain, starting at the entry points at the port and ending at inland destinations. For the port, the performance can be attributed to factors such as accessibility, procedural efficiency, storage capacity, and the efficiency and coordination between the stakeholders (Nwokedi et al., 2022; Satria et al., 2023). For the macro environment, the world logistics indicators have shown that the efficiency of the custom processes, infrastructure, logistics competence, tracking and tracing, and the timely nature are critical factors that define the competitiveness between different economies (World Bank, 2023). For the Nigerian economy, the performance at the Apapa, Tin Can, and Onne ports can be attributed to the efficiency at the port, inland infrastructure, and the extent of digitalization. This study aims to evaluate the performance of the logistics system through evidence on hinterland connectivity, management of trucks, information flows, as well as coordination between port authorities and transport operators.

➤ *Coordinated Border Management (CBM)*

Coordinated Border Management (CBM) describes a ‘governance approach that promotes structured cooperation

among customs and other border agencies to improve the efficiency and/or effectiveness of border control measures.’ The World Customs Organization describes CBM as ‘the systematic coordination of policies, procedures, and administrative processes among border regulatory agencies to produce an integrated border outcome’ (World Customs Organization, 2022). Trade facilitation literature identifies that CBM plays an essential role in Trade Facilitation Agreement (TFA) implementation, allowing border agencies to ‘simplify and reduce unnecessary costs for traders’ through ‘simplifying procedures and reducing unnecessary duplications’ (World Trade Organization, 2020). With regard to Nigerian ports, ‘Coordinated Border Management involves cooperation among customs, Nigerian Ports Authority, Nigerian Maritime Administration and Safety Agency, Standard Organization of Nigeria, National Drug Law Enforcement Agency, and other operators in Nigerian ports aimed at enhancing efficiency in customs clearance and resolving institutional bottlenecks.’

In addition, CBM in this research will be defined through the level of joint inspections, information sharing, harmonization of procedures, as well as coordination mechanisms in the target ports.

➤ *Single Window for Trade*

The Single Window is a digital trade facilitation tool that allows trade actors to present all regulatory documents that are essential for trade, either for import, export, or transit, through one digital window. The main purpose of the Single Window is to facilitate, standardize, and automate trade actors’ interactions with various government agencies through the presentation of regulatory documents (UNCTAD, 2023). The World Customs Organization points out that when effectively operational, the Single Window can strengthen the level of information sharing, joint decision-making, and integrated risk management, thereby increasing the level of coordinated border management (World Customs Organization, 2022). On a global level, the implementation of Single Window technology has facilitated trade through pre-arrival processing, payment, approval, and monitoring of cargoes, especially at the national level. With regard to Nigeria, the development of an operational national Single Window is essential to improve clearance at Apapa, Tin Can, and Onne ports. This research will assess the single window system with regards to the extent of digitalization, interoperability between agencies, and the reduction of procedural duplication.

➤ *Risk Management in Customs and Port Operations*

Risk management involves identifying, evaluating, and rating risks linked to revenue leakage, security risks, and legal compliance. The World Trade Organization Trade Facilitation Agreement (WTO TFA) encourages customs administrations to adopt a risk-based approach to selectivity, which involves allocating more attention to high-risk shipments while expediting lower-risk shipments. The recent initiatives adopted by the World Customs Organization and United Nations Conference on Trade and Development emphasize the importance of utilizing data analytics, advance knowledge of shipments, and

interoperable ICT technologies in enhancing risk-based approaches while reducing physical checks. Therefore, an efficient approach to risk management plays an essential role in strike-balancing control and facilitation needs. In this study, risk management is defined through existing research findings on the use of risk channel, inspections, scanners, and consistency in selective controls among the three ports.

Thus, the above concepts form a cohesive analytical model that can be utilized to evaluate the port performance in the Nigerian context. Trade Facilitation tools such as Risk Management, Single Window, and Coordinated Border Management ease the complexity, transactional costs, and waiting times. This would directly impact the dwell times and congestion levels within the port. In turn, it would enhance the overall port efficiency. The above tools and their interactions form the conceptual model that has been utilized to evaluate the port performance among the three ports, namely, Apapa, Tin Can, and Onne.

B. Theoretical Foundation

The theory base that has been utilized to examine the impact of trade facilitation and port efficiency consists of a combination of several interrelated theories that describe operational efficiency, institutional factors, transactional costs, and inter-agency collaboration within the context of the maritime supply chain. For instance, the use of the theory of queues and port efficiency provides a quantitative and operational view of congestion levels within the port. According to the theory of port efficiency, the arrival rate of vessels or containers that enter the port would determine the levels of congestion. When the arrival rate exceeds the capacity within the port or any node within the port's supply chain—for example, the number of vessels that can be accommodated within the port or the capacity within the scanning facility or the gate—there would be a build-up or a backlog or a series of queues that would develop within the port. This would lead to a series of inefficiencies or delays. According to Nguyen (2025) and Wang (2023), the theory of port efficiency would suggest that the longer the queues or the greater the congestion within the port or any node within the port's supply chain, the greater the probability that there would be a build-up or a backlog or a series of queues that would develop within the port. In the context of the Nigerian port industry, the theory would suggest that the longer the queues or the greater the congestion within the port or any node within the port's supply chain—for example, the scanning facility or the gate or the yard—the greater the probability that there would be a build-up or a backlog or a series of queues that would develop within the port.

The Institutional Theory further develops this concept of operation by considering how institutions, which comprise rules, regulatory systems, norms, or practices, impact actor behaviour or performance in port environments. For example, institutions, which comprise rules, regulatory systems, norms, or practices, impact how customs, port, or regulatory authorities perceive their roles, implement regulations, share information, or adapt to changes or reforms, as discussed by Scott (2021). In

environments with intricate actor networks, institutional inflexibility, which incorporates bureaucratic practices, conflicting roles, reluctance to adapt, or low levels of regulatory enforcement, may negatively impact the implementation of efficiency-enhancing practices, as discussed by Adeleke & Odunuga (2022). In recent years, this theory has been widely used to explain recent developments in port governance, considering how institutional factors impact the success or failure of reforms, including digitalization or single-window practices, as discussed by Ugboma et al. (2023). In relation to Nigeria, this theory may be used to explain how institutional factors impact seamless collaboration between relevant actors, including NCS, NPA, NIMASA, SON, NDLEA, or terminal operators.

Transaction Cost Economics, as well as current trade facilitation theory, offer further guidance in understanding the manner in which simpler procedures help to cut costs, time, and unpredictability in international trade. TCE, for example, asserts that economic entities face costs that are not merely related to producing, but also to activities such as search, negotiations, surveillance, and enforcement (Williamson, 2020). In international maritime trade, for example, there are complexities that range from documentation to inspections, which might have been carried out redundantly, thereby raising transaction costs for economic entities. On the other hand, simpler customs procedures, harmonisation of documentation, transparency, and risk assessment help to cut costs and improve predictability for international trade. As such, trade facilitation theory highlights the significance of simplification, digitalisation, and cooperation to cut costs for international trade, particularly with regards to non-tariff trade barriers. In Nigeria, TCE theory would help to comprehend the manner in which trade procedures, such as repeated physical examination or slower operation of scanners, might have resulted in trade costs. These perspectives are complemented by the Coordinated Border Management (CBM) and Network Governance framework, which highlights the role and importance of cooperation, exchange of information, and collective decisions among multiple agencies at the border. CBM, for example, highlights the role and importance of border agencies such as customs, port authorities, maritime authorities, and standards agencies, which have to coordinate and cooperate with each other for effective border outcomes (WCO, 2022). More recent research findings have shown that effective cooperation between agencies at the port results in faster clearance times, reduction in duplicated inspections, and better outcomes (Satria et al., 2023). Network Governance theory also highlights the role and importance of relationships, trust, and norms between agencies and actors, which are critical for effective outcomes at the port, and not control hierarchies (Kamau & Otiso, 2022). This, therefore, makes the CBM framework critical for understanding the failure and fragmentation that exist at the Nigerian port system, which comprises multiple agencies at the Apapa, Tin Can, and Onne ports. Collectively, the aforementioned theories form a comprehensive analytical basis. For instance, the Queuing and Port Efficiency Models are useful

for understanding the operational bottlenecks, the Institutional Theory provides an understanding of the organisational and institutional limitations, the Transaction Cost Economics and the Trade Facilitation Theory help to clarify the economics behind the necessity for easy procedures, and the CBM/Network Governance provides an appreciation for the role played by effective inter-agency collaboration. In terms of the choice of the appropriate analytical basis for a study focused on customs procedures, inter-agency coordination, and trade facilitation outcomes, the appropriate analytical basis would appear to be a hybrid approach drawing on the Transaction Cost Economics, the Institutional Theory, and the Coordinated Border Management Theory, which are the appropriate analytical basis for an appreciation of the role played by the efficiency at the major seaports in Nigeria.

C. Empirical Review

The body of research on trade facilitation and port performance is consistent in its finding that there is a strong relationship between trade facilitation measures, port performance, and trade outcomes in developing and emerging economies. Cross-country studies covering countries in Africa, Asia, and Latin America have shown that improving customs transparency, public agency cooperation, digitalization, and transport connectivity is positively correlated with lower trade costs, clearance times, and export performance (Takpara et al., 2024). Similarly, worldwide maritime and logistics assessments have shown that trade facilitation measures, particularly those involving the use of digital technologies for documentation, advance cargo notification, and public-private processes, are becoming increasingly important for port performance instead of physical infrastructural capacity (UNCTAD, 2025). Evaluations of the effectiveness of the Trade Facilitation Agreement (TFA) of the World Trade Organization (WTO) have shown that countries that have successfully implemented measures for the expedited release of goods, risk management, and documentation simplification have improved their clearance times and competitiveness, although the extent of these effects varies (Peterson, 2020; WTO, 2024).

Within the African continent and the West African subregion, port efficiency and cargo dwell times have received particular attention in the study of the logistics challenges affecting the region. From the comparative study undertaken, it has been observed that container dwell times in a number of West African ports have consistently exceeded global standards, averaging higher than the global norms of 3-5 days, reaching as high as an average of over 10 to over 20 days in a number of ports (World Bank, 2022; UNCTAD, 2025).

With a focus on the Nigerian ports, Nwokedi (2022) observed that the dwell times at the Apapa and Tin Can Island ports exceed the regional averages at ports like Durban, Tema, Lomé, and Mombasa, thus leading to increased storage, demurrage, and inventory holding charges. The study further observed that the dwell times at the ports have averaged around two to three weeks at the

Lagos ports, while the ports like Onne have lower cargo clearance times. The comparative study undertaken on the Nigerian ports also observed that the Apapa and Tin Can ports consistently underperform the Onne port on parameters like cargo dwell times, ship turnaround times, and gate efficiency, thus attributing these inefficiencies to the issues faced at the ports (Nwaogbe et al., 2024).

Significant research has also shown that the gaps in port performance can be attributed to customs procedures such as documentation requirements, the functionalities of information technology (ICT), risk management practices, and inspections. For instance, research on Nigerian port performance has shown that there are high correlations between the increased dwell times and repetitive processes such as the verification of documents, manual interventions within a partially digitalized environment, downtimes within the system, and the scanning and physical examination processes (Nwokedi, 2022; Ojo & Ismail, 2023). In the context of developing countries within other regions, research has shown that the use of partially digitalized environments results only in marginal benefits unless they are accompanied by the use of a holistic risk management approach that can facilitate the use of interoperable information technology (ICT) tools among the respective institutions within the region (UNCTAD, 2023; World Bank, 2023). In the context of policy interventions within the global community, research has shown that the use of modern risk management practices and non-intrusive inspections can significantly reduce the volume of consignments that require physical inspections while maintaining compliance with the respective regulations. This would not only reduce the respective dwell times but would also minimize the overall costs; yet again, the success would depend on the quality of the respective information technology tools that can facilitate the use of interoperable information technology tools within the respective institutions.

Another prominent theme identified by the empirical literature pertains to inter-agency collaboration and coordinated border management (CBM). In this respect, the literature on the subject defines CBM as the “orchestrated coordination of all agencies with border-operating functions to ensure efficient, secure, and predictable trade flows” (Africa CDC, 2023). In the Southern and Eastern regions of Africa, the empirical literature confirms the efficacy of the introduction of one-stop border posts and CBM models involving joint inspection and analysis of risks, harmonized processes, and the use of integrated ICT systems to expedite the reported time of customs clearance and compliance at borders and ports (Desiderio, 2025; World Bank, 2024). In this respect, it becomes evident that the efficiency of ports cannot be explained by the efficiency of customs agencies alone. Rather, the literature confirms the significance of the nature of the interface between customs agencies, port authorities, maritime authorities, and other relevant

agencies. In the Nigerian context, the relevant literature on the subject confirms the efforts of the authorities to improve the nature of the interface between the Nigeria Customs Service, the Nigerian Ports Authority, the Nigerian Maritime and Safety Agency, SON, the NDLEA, and other agencies. However, the literature on the subject remains limited.

Useful contextual information can be derived from the available literature on Nigeria's engagement and implementation of the WTO Trade Facilitation Agreement. According to notifications and analytical reviews, Nigeria has registered an impressive level of implementation of the WTO Trade Facilitation Agreement, as it has been reported to be around or above 90 percent as of mid-2025, particularly on issues such as the publication of procedures, establishment of enquiry points, appeal facilities, and initial implementation of risk management (WTO, 2024). However, some of the measures, such as the operationalization of the National Single Window, wider use of international standards, and the use of advance rulings, are reported to require additional time, capacity, or technical assistance. Studies conducted on Nigeria, particularly on the experiences of small and medium-sized traders, revealed that despite the impressive developments in terms of legislation and institutions, the experience of traders in Nigerian ports still reflects complexity, inconsistencies, and disparities in terms of digital engagement (Ugwu, 2022). Mini-synthesis of the dominant findings and gaps. The literature shows that one of the major findings across various pieces of literature is that trade facilitation, especially in digitalization, risk management, and cooperation in agency borders, shows consistent correlation to better performance in ports and shorter clearance times. There seems to be consensus that congestion and dwell times in Nigerian ports, especially Apapa and Tin Can, are structurally higher than those in regional and global peers. The extent to which digitalization can provide solutions to these problems, especially in the absence of significant change in existing institutions, seems to be up for debate. The literature seems to agree on CBM but does not provide significant data on its practical operation at individual ports. The literature seems to be particularly deficient in case study analysis of individual ports, especially in Nigeria, where elements such as customs, logistics, and WTO TFA are analyzed as part of a single entity. Review the logic and position of the study. The structure of this empirical review follows a global overview of trade facilitation and port efficiency, then regional analysis of Africa and West Africa, national analysis of Nigeria, and finally port operational mechanisms. This structure is chosen to progressively narrow the level of analysis, from overall reform results to the operational dynamics that underlie port performance at Apapa, Tin Can, and Onne Ports. As identified, this study on trade facilitation and port efficiency adopts a policy review approach to provide an integrated analysis of port operations on the impact of customs procedures on trade facilitation results at the port level.

D. Conceptual Framework

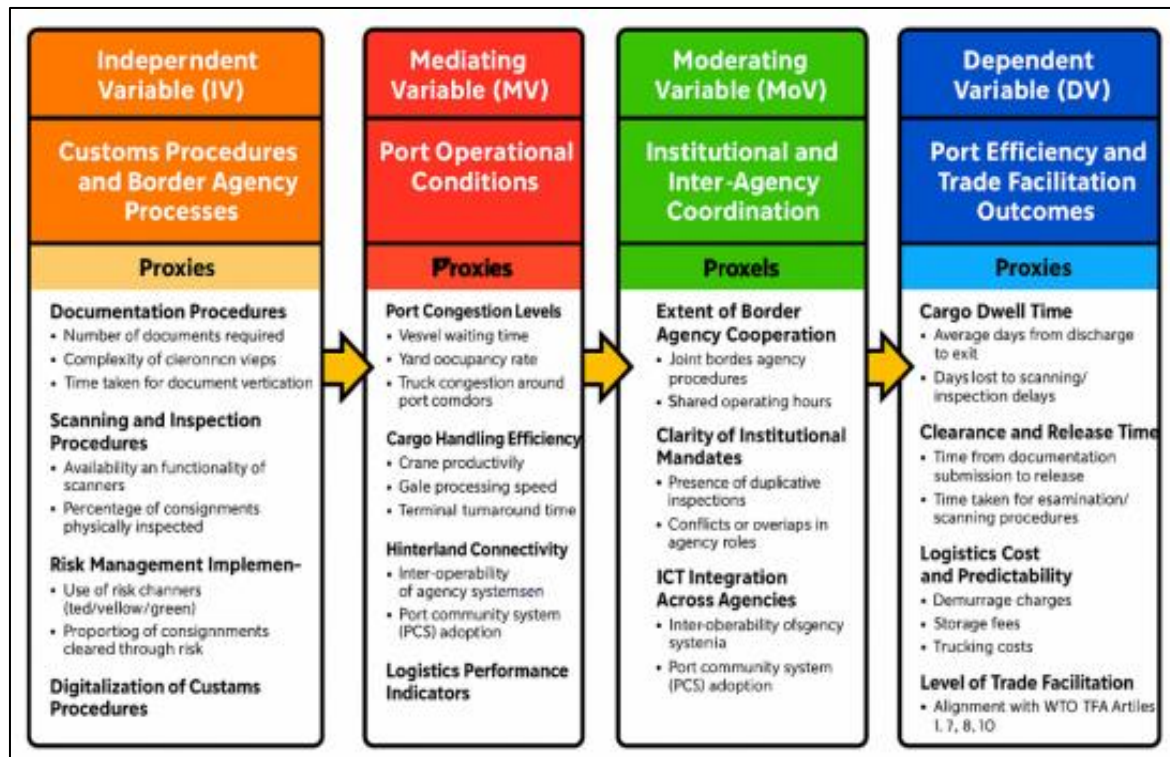


Fig 1 Conceptual Framework Linking Customs Procedures, Port Operations, Institutional Coordination, and Trade Facilitation Outcomes

This diagram illustrates the causal pathways through which customs procedures (IV) influence port efficiency and trade facilitation outcomes (DV), mediated by port operational conditions (MV) and moderated by institutional

and inter-agency coordination (MoV). The proxies under each variable highlight the specific operational, procedural, and governance elements shaping performance across Nigerian ports.

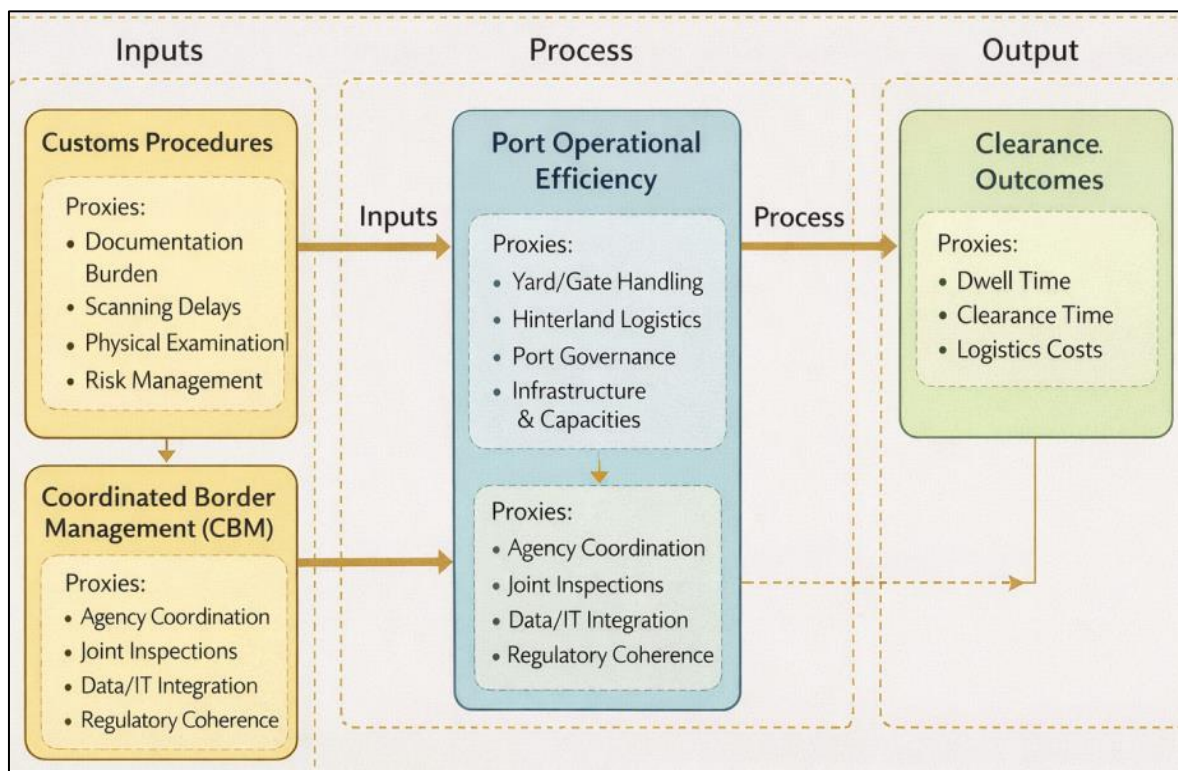


Fig 2 Conceptual Framework for Trade Facilitation and Port Efficiency in Nigeria

This conceptual framework illustrates the relationships among customs procedures (independent variable), port operational conditions (mediating variable), and port efficiency and trade facilitation outcomes (dependent variable), with coordinated border management and inter-agency collaboration acting as a moderating influence. The associated proxies capture key procedural, operational, and institutional mechanisms through which trade facilitation reforms shape clearance efficiency, cargo dwell time, logistics costs, and overall port performance at Apapa, Tin Can, and Onne ports.

- *Explanatory Note on the Conceptual Framework*

The dynamic of the conceptual framework shows the relationships between customs procedures, port operating conditions, coordinating mechanisms, and port efficiency. The foundation of the conceptual framework's structure is based on the idea that improvements in customs and border agency practices have a significant impact on port operating efficiency. By defining customs procedures as part of the Independent Variable (IV), it means that these are documentation practices, inspections, levels of digitalization, risk management, and coordinating practices that influence the efficiency of port operating conditions. All of these practices, therefore, provide a foundation for all subsequent practices in the port.

The framework postulates that the effect of customs procedures on port performance is conditional or filtered through the mediating role of Port Operational Conditions, or the Mediating Variable (MV). This is based on the principle that changes in customs procedures alone do not have a direct effect on port performance or efficiency; instead, these changes are seen as being channeled through or being manifested in observable changes in port performance, as exemplified by reduced waiting times for vessels, improved occupancy rates, quicker gate operations, effective cargo handling, etc.

Additionally, the model includes a Moderating Variable (MoV), that is, Institutional and Inter-Agency Coordination, that mediates the relationship between the effectiveness of customs procedures and port operations. For example, strong institutional coordination, clear agency mandates, harmonization of inspection procedures, common operating hours, and integration of ICT platforms can strengthen the implementation of customs reforms, whereas weak institutional coordination, duplication of inspection procedures, and lack of regulatory alignment can weaken the relationship between procedural improvements and operational effectiveness.

Ultimately, this framework produces the Dependent Variable (DV): Port Efficiency and Trade Facilitation Outcomes. This is determined using criteria such as cargo dwell time, clearance and release time, costs, predictability of procedures, alignment with WTO TFA requirements, and port competitiveness. The framework recognizes that port efficiency is generated from an accumulation of reforms, including procedures, operational conditions, and institutional coordination. All things considered, the

conceptual model represents a comprehensive representation of the role of administrative processes, the realities of operation, and the governance of institutions on the efficiency of the port systems of Nigeria. It defines the points of congestion and the avenues for making sustainable progress.

III. METHODOLOGY

The methodological framework for this research is based on a qualitative research paradigm that combines aspects of policy analysis and comparative case study research. It is an appropriate methodological framework for examining the role that customs procedures and interagency coordination have on facilitating port efficiency within the ports of Apapa, Tin Can, and Onne. It is an effective research method for exploring the multifaceted dimensions of these issues that may not be sufficiently addressed through other research approaches. It enables an in-depth understanding of these issues through its combination of documentary research.

This study adopts a qualitative research design combining policy review and comparative case study analysis to examine how customs procedures and inter-agency coordination influence port efficiency and trade facilitation outcomes in Nigeria. The approach is well suited to capturing institutional dynamics, procedural practices, and governance interactions that are not easily observable through quantitative indicators alone. By synthesising policy documents, regulatory frameworks, and case-based evidence, the study provides an in-depth understanding of operational realities across Nigeria's major seaports within the context of WTO Trade Facilitation Agreement (TFA) implementation.

The unit of analysis in this study is the port clearance and border coordination process at each of the selected ports—Apapa, Tin Can Island, and Onne. Specifically, the analysis focuses on how customs documentation, scanning and examination procedures, logistics arrangements, and inter-agency interactions unfold in practice within each port environment. These processes constitute the primary locus through which trade facilitation reforms are operationalised and through which port efficiency outcomes—such as congestion levels, cargo dwell time, and clearance speed—are ultimately realised.

The case selection follows a “most similar systems” logic with varying outcomes, enabling explanatory comparison. All three ports operate within the same national institutional, legal, and policy framework governing customs administration, port regulation, and TFA commitments. However, they exhibit markedly different operational outcomes, particularly between the Lagos ports (Apapa and Tin Can Island) and Onne Port. Apapa and Tin Can are characterised by high cargo volumes, severe congestion, and dense urban constraints, while Onne operates within a less congested logistics environment with comparatively smoother clearance processes. This configuration allows the study to isolate how differences in

customs procedures, logistics conditions, and inter-agency coordination contribute to divergent efficiency outcomes under broadly similar national rules and reform agendas.

Data for the study are drawn primarily from documentary and secondary sources, including international trade and port policy instruments, national regulations, institutional reports, and published case evidence. The policy and document review follows a structured data extraction protocol to enhance transparency and replicability. Documents were included based on the following criteria: (i) relevance to customs administration, port operations, logistics performance, coordinated border management, or WTO TFA implementation; (ii) applicability to Nigeria's seaport system or comparable developing-country contexts; and (iii) publication within the period 2015–2025, reflecting the major reform phase under examination.

Each document was systematically reviewed and coded along predefined analytical fields, including: document type (e.g., legal text, policy report, evaluation study); issuing

institution (e.g., WTO, UNCTAD, World Bank, NCS, NPA); thematic focus (customs procedures, logistics infrastructure, inter-agency coordination, digitalisation); port relevance (Apapa, Tin Can Island, Onne, or national-level); and TFA linkage, indicating correspondence with specific WTO TFA articles (notably Articles 1, 7, 8, and 10). This coding framework facilitated thematic analysis and enabled consistent cross-case comparison across ports and policy domains.

Analytically, the study employs thematic analysis to identify recurring patterns and divergences in customs practices, logistics constraints, and coordination mechanisms, followed by comparative cross-case synthesis contrasting the Lagos ports with Onne. To enhance analytical rigor, evidence is triangulated across multiple document types and institutional sources, allowing convergence and divergence in reported practices to be systematically assessed. Where secondary case studies and industry investigations are used, findings are cross-validated against official policy documents and international benchmarks to minimise bias.

IV. CASE STUDY FINDINGS AND ANALYSIS



Fig 3 GIS-Style Port Location and Logistics Corridor Map for Apapa, Tin Can, and Onne Ports

This map illustrates the geographic distribution of Nigeria's major seaports—Apapa, Tin Can, and Onne—highlighting key logistics corridors linking Lagos and Rivers State. The shaded congestion zone identifies the chronic traffic and infrastructural pressures around Lagos ports, while the cleaner Onne corridor shows comparatively smoother hinterland connectivity. The map visually situates the operational and logistical contrasts that shape national trade facilitation outcomes.

➤ Port Congestion, Cargo Dwell Time, and Logistics Challenges

Through a comparative study across ports, congestion and long cargo dwell times have been identified as most

prominent in Apapa and Tin Can ports, due to high volumes, geography, and inadequate support infrastructure. Empirical studies have consistently identified Lagos ports' average cargo dwell times ranging between 18 and 21 days, which far exceeds global standards below 7 days (Nwokedi, 2022; Adegoke et al., 2024). Quantified data have identified long queues of awaiting trucks, spanning over a few kilometers, due to inadequate access roads, holding bays, and poor compliance levels for electronic call-up systems (Olanrewaju et al., 2024). The hinterland connectivity for Apapa Port, specifically along the Apapa-Oshodi and Ijora axes, remains a key chokepoint, characterized by resultant gridlocks, which negatively impacts cargo evacuation for both imports and exports.

Tin Can Island also shows similar characteristics, although the level of congestion differs depending on the level of operations in each terminal. Both ports in Lagos also experience yard congestions, stacking constraints, and gate efficiency issues, which all add up to systemic delays. On the other hand, Onne Port shows lower levels of congestions compared to other ports. The lower level of congestions in Onne Port can be attributed to better planning and design of port access roads, lower population densities around the ports, and better gate efficiency and yard

operations compared to other ports in Nigeria. The average level of congestions for Onne Port varies between 8 and 10 days, which may still be considered high compared to other ports globally. The level, however, is lower compared to what happens in other ports in Lagos. The analysis shows that both ports in Lagos have systemic challenges that may have contributed to delays. These systemic challenges may have been brought about by a combination of population densities, traffic congestions, and a higher concentration of regulatory agencies.

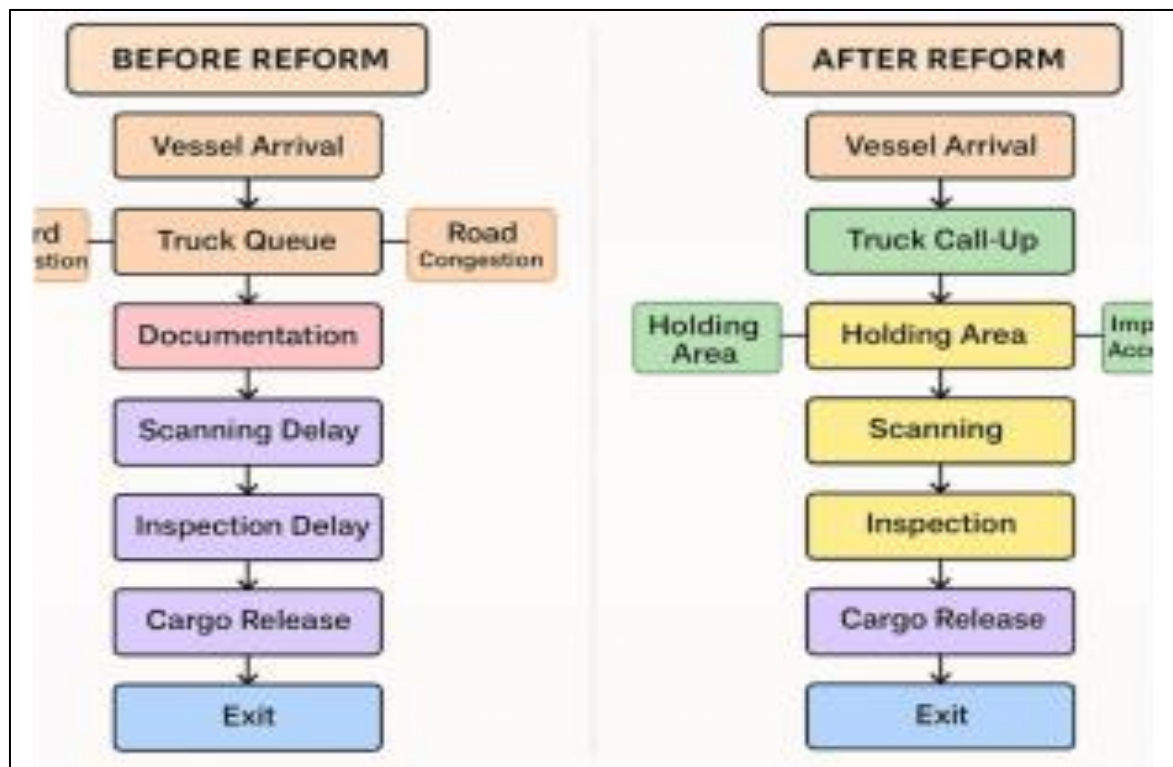


Fig 4 Port Congestion and Cargo Flow Process Map (Before vs. After Reform)

This diagram compares the cargo clearance process prior to and after port reforms. The “Before Reform” pathway highlights bottlenecks such as truck queues, road congestion, documentation delays, scanning delays, and repeated inspections. The “After Reform” process illustrates streamlined cargo flow enabled by truck call-up systems, holding bays, improved scanning procedures, and more efficient inspections, ultimately reducing dwell time and congestion.

➤ Customs Bottlenecks in Documentation, Scanning, and Examination

Across the three ports, the role that customs procedures play in the clearance speed has continued to remain critical. Nigeria’s use and application of ICT tools, such as NICIS II, e-payment, and the partial automation of documentation, have shown tremendous inconsistencies, with the Lagos ports continuing to experience system downtime, slow processing, and the delayed generation of assessment notices (Ojo & Ismail, 2023). The complexity associated with documentation has continued to remain the most predominant problem, with the need for multiple documents

and the risk of duplication and increased costs, which have been well documented in the literature (UNCTAD, 2023).

Similarly, scanning and examination processes also show significant levels of inefficiencies. There are limited scanning machines available for the ports of Lagos, resulting in long periods of time spent on the docks and the use of fallback methods such as manual checks when machines are out of order or long queues are present (Nwokedi, 2022). Physical checks continue to be common, contrary to Trade Facilitation Agreement (TFA), which emphasizes the need for selectivity based on risk. There are complaints of repetition of checks, inconsistent advice to importers by customs officials, and delays caused by verification checks. On the other hand, Onne ports are served by a relatively consistent scanning schedule and lower traffic density, making it easier to ensure consistent allocation to the risk channel and scanning efficiency (Wang, 2023). Some of the pain points identified by the agents include delays caused by the need for signatures, inconsistent valuation methods, and long periods of time taken to settle discrepancies—problems faced by the ports of Lagos.

➤ *Collaboration with NPA, NIMASA, SON, NDLEA and Other Agencies*

Collaboration at the institutional level is an essential factor for port efficiency. While Nigeria has developed a legal basis for Coordinated Border Management, the effectiveness of the implementation varies. For instance, at both Apapa and Tin Can ports, the multiple mandates shared between agencies such as the SON, NDLEA, NAFDAC, and plant/animal quarantine control result in duplicated efforts rather than coordinated control (Adeleke & Odunuga, 2022). Issues relating to operational jurisdictions, nonsynchronous working hours, and lack of information sharing have previously challenged the effectiveness of the implementation (Ugboma et al., 2023).

The harmonization of processes via the adoption of Standard Operating Procedures and the utilization of port community systems have shown some gains, especially at Apapa with the introduction of joint inspection teams. However, the absence of a fully functioning single window for the country undermines the full potential of such efforts (UNCTAD, 2023). From the interviews with the users of the ports, it was evident that the meetings and MOUs between agencies were present on paper, yet the practical manifestation of such was wanting. On the other hand, the Onne port appears to show better streamlined collaborations due to the lower number of agencies physically present and the clarity of the structure of the operation with customs, terminal operators, and the shipping companies (Mbachu et al., 2024).

	NCS	NPA	NIMASA	SON	NDLEA
NCS	Joint Ops	Joint Ops	Joint Ops	Joint Ops	Joint Ops
NPA	Joint Ops	Duplicative inspections	Duplicative inspections	Duplicative inspections	Duplicative inspections
NIMASA	Duplicative inspections	Joint Ops	Info gaps		SW participation
SON	Duplicative inspections	Duplicative inspections	Joint Ops	Info gaps	
NDLEA	Duplicative inspections	Duplicative inspections	SW participation	Joint Ops	

Fig 5 Multi-Agency Coordination Matrix for Customs, NPA, NIMASA, SON, and NDLEA

This matrix illustrates the operational relationships among key border agencies at Nigerian seaports. Green cells indicate areas of effective joint operations, red cells show duplicative inspections or overlapping mandates, orange cells highlight information-sharing gaps, and blue cells represent emerging cooperation through Single Window participation. The matrix visually reveals coordination strengths and weaknesses affecting clearance efficiency and trade facilitation.

➤ *Lagos Ports vs. Onne Port: Cross-Case Synthesis*

Cross-case synthesis reveals significant disparities in operations, governance, and efficiency. Lagos ports are marked by high volume, sophisticated institutional settings, and significant infrastructural shortcomings. These dimensions combine to characterize congestion periods, dwell time, and variability in customs clearances. These are particularly significant for Lagos, considering the inherent

complexities of the city's logistics. In Lagos, for example, the inherent complexities of the city's logistics cause additional congestion resulting from customs and inter-agency procedures. On the other hand, Onne ports have a designed facility, low density, and tightly regulated trucking, resulting in more consistent customs clearances.

From a procedural perspective, fragmentation is more visible, manual handling is more prevalent, and repetitive documentation checks are more common. In contrast, more consistency is seen in the procedures at Onne, and handling is quicker for both imports and exports. In terms of interagency working, more significant frictions are seen at Lagos, while at Onne, interagency working is less challenging. In addition, reform impacts, particularly for digitalization, risk management, and gate automation, seem more marked at Onne, driven by lower system stress and more manageable cargo sizes.



Fig 6 Comparative Port Efficiency Dashboard for Apapa, Tin Can, and Onne Ports

This dashboard visually compares key performance indicators across Nigeria's major seaports. Metrics such as dwell time, vessel turnaround time, congestion levels, risk management usage, digital system uptime, and clearance time highlight substantial differences between Lagos ports (Apapa and Tin Can) and Onne. The color-coded indicators provide a quick assessment of operational efficiency and bottlenecks affecting trade facilitation outcomes.

➤ Alignment with WTO Trade Facilitation Agreement (TFA)

If current practices are measured against the major principles of the WTO TFA, it becomes clear that there is partial, if uneven, implementation in Nigeria's ports. In respect to Article 1, Publication and Availability of Information, Nigeria's customs procedures and trade regulations have been improved with regard to online accessibility, although there have been complaints with regard to the lack of clearness and inconsistencies. In respect to Article 7, Release and Clearance of Goods, there have been clear improvements with regard to risk management, electronic payment, and prearrival procedures,

although high rates of physical examination and systems failure in Lagos suggest that Nigeria's customs have not completely adhered to TFA principles.

Article 8 Border Agency Cooperation is still one of the challenging sections. Although the formal mechanisms for coordination have been established, the level of cooperation between the agencies at the ports in Lagos is still low, and the agencies operate independently instead of in concert. On the other hand, Onne has shown a higher level of conformity in terms of the number of agencies and the level of harmonization. Under Article 10 - Formalities and Documentary Requirements, the Nigerian government has made efforts to simplify the documentation process, although the process still seems cumbersome for traders, especially at the ports in Lagos.

These findings suggest that while Nigeria may have operationally implemented a large part of its TFA obligations, there are gaps, particularly at the ports in Lagos. In contrast, the situation is better at Onne due to its structural and institutional advantages.

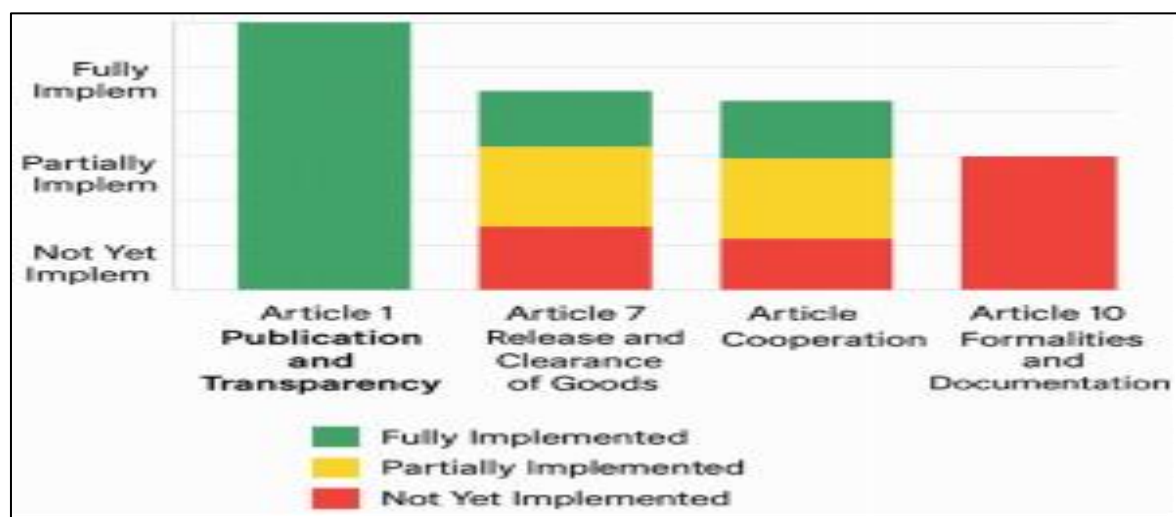


Fig 7 Nigeria's Compliance Alignment with Key WTO Trade Facilitation Agreement (TFA) Articles

This compliance alignment map illustrates Nigeria's progress toward implementing core TFA provisions—Article 1 (Publication and Transparency), Article 7 (Release and Clearance of Goods), Article 8 (Border Agency Cooperation), and Article 10 (Formalities and Documentation). The green, yellow, and red bars denote fully implemented, partially implemented, and not-yet-implemented measures respectively, highlighting areas of strength as well as outstanding reform gaps across the trade facilitation spectrum.

V. DISCUSSION

The findings have implications for the broader literature and scholarship on trade facilitation, port efficiency, and institutional arrangements in developing economies. This research corroborates the findings and arguments in the most recent literature and research, which suggest that the issues associated with congestion, increased dwell times, and logistics problems at Nigerian ports, such as Apapa and Tin Can, are largely caused by the complex and multifaceted problems associated with infrastructure, efficiency, and institutional arrangements (Nwokedi, 2022; Adegoke et al., 2024). This research also corroborates the findings and arguments in the most recent literature and research, which suggest that the issues associated with port efficiency and performance are largely caused by the complex and multifaceted problems associated with infrastructure, efficiency, and institutional arrangements, and that the improvements required to improve the performance and efficiency of the Nigerian maritime industry are not only associated with the infrastructure and efficiency at the ports, but also with the institutional and logistics arrangements (UNCTAD, 2023; Wang, 2023). The relative performance and efficiency at the Onne port compared to the Lagos port are also consistent with the findings and arguments in the most recent literature and research, which suggest that the relative performance and efficiency at the Nigerian maritime industry are largely caused by the complex and multifaceted problems associated with infrastructure, efficiency, and institutional arrangements, and that the relative performance and efficiency at the Nigerian maritime industry are also influenced by the relative institutional and logistics arrangements, with

From a theoretical point of view, Institutional Theory provides an effective analysis of the identified procedural and behavioral issues. For example, the duplication of inspections, inconsistent implementation of risk management, and use of manual processes at the Lagos port can all be attributed to institutional inertia, lack of enforcement of standard operating procedures, and agency mandates, all of which are characteristics of institutional theory on port governance, as identified by Adeleke and Odunuga (2022) and Scott (2021). The inconsistencies between stated intentions to address these issues and actual implementation highlight the disconnection between rule adoption and institutionalization. Onne's easier coordination and clearance processes highlight the positive impact of institutionalization on port operations.

Transaction Cost Economics (TCE), as well as the Theory of Trade Facilitation, also offer a compelling perspective on the effect that procedural intricacy and fragmented coordination have on the broader landscape. The study shows that the submission of multiple documents, the posing of frequent queries, the incidence of high volumes of physical inspections, as well as the experience of regular system downtimes all contribute to higher transactional costs for both traders and shipping lines—thus vindicating the TCE thesis that non-production-related costs that result from uncertainty have the potential to skew the flow of trade (Williamson, 2020).

However, as the study also shows, the application of digital tools, as well as risk management approaches, as witnessed in Onne, also resulted in a decrease in these kinds of costs, thus facilitating the achievement of the WTO Trade Facilitation Agreement (TFA), as supported by global evidence that the simplification as well as the digitalization of customs procedures present the most powerful tools to attain the TFA (OECD, 2023; WTO, 2021).

The study findings have also shown strong evidence for the relevance of Coordinated Border Management (CBM) and Network Governance. For example, the disjointed interaction patterns among the Nigeria Customs Service (NCS), Nigerian Ports Authority (NPA), NIMASA, Standards Organization of Nigeria (SON), National Drug Law Enforcement Agency (NDLEA), plant quarantine services, and terminal operators in Lagos have shown that the fears of the World Trade Organization (2024) that the lack of coordinated controls and systems among these agencies hinders trade facilitation have some basis. For example, the duplicated inspection activities, conflicting operation instructions, and non-synchronized working hours seen in Apapa and Tin Can terminals are indicative of poor network governance. This is in agreement with Satria et al. (2023), which concluded that the effectiveness of the overall supply chain or logistics is not just dependent on the performance of individual agencies but is equally dependent on the effectiveness of their interaction. In contrast, the coordinated operation environment seen in the ports of Onne is indicative of CBM.

The implications of the study are far-reaching for both the policy and practice domains. For the Nigeria Customs Service, the study highlights the significance of streamlining documentation, enhancing risk management, and minimizing the role of physical examination. There is a necessity to invest in the training and competencies of customs officials to ensure the effective implementation of technology solutions like the NICIS II and minimize the role of discretionary practices to clear cargo. There is a necessity to strengthen the monitoring systems to ensure greater alignment with the TFA standards and minimize the dwelling time.

For the NPA, NIMASA, SON, NDLEA, and other border control organizations, the research emphasizes the need to achieve a form of institutional harmonization that would enable joint inspections and the use of a single

information technology infrastructure. For instance, the adoption of port community systems that facilitate the sharing of information among organizations would minimize the fragmented nature of their operations. This has already been successfully done in other emerging countries (UNCTAD, 2023). The organizations would need to change their modus operandi from a fragmented approach to a cooperative model with a shared list of performance indicators. In addition, better traffic management and the effective implementation of the truck call-up system by the NPA would ease traffic congestion. For traders, freight forwarders, and shipping companies, increased clarity and transparency can help reduce compliance and uncertainty issues and hence save costs. From the findings, it is seen that the major causes for the bottleneck are the unpredictabilities, which include system failures, demands for documentation, discretionary inspections, and rulings. Increased clarity and

transparency can help the planners coordinate the movement and save on demurrage and storage charges. Finally, in relation to Nigeria's compliance level in respect of its WTO Trade Facilitations Agreement, it was found that, while at a policy level, Nigeria has good levels of compliance, at operational levels, especially in Lagos, Nigeria could improve in terms of consistency. Not only are procedure-driven elements of TFA compliance required, but also significant levels of institutional reform, capacity building, and modernization of its existing ICT infrastructure are required in order to support Nigeria in enhancing its regional competitiveness, especially in relation to its ambition as a maritime trade hub. The above summary of the above arguments, therefore, illustrates that the problems facing the ports of Nigeria are not just infrastructural problems, and the necessary changes and reforms to ensure the achievement of the envisaged efficiency are also not just infrastructural.

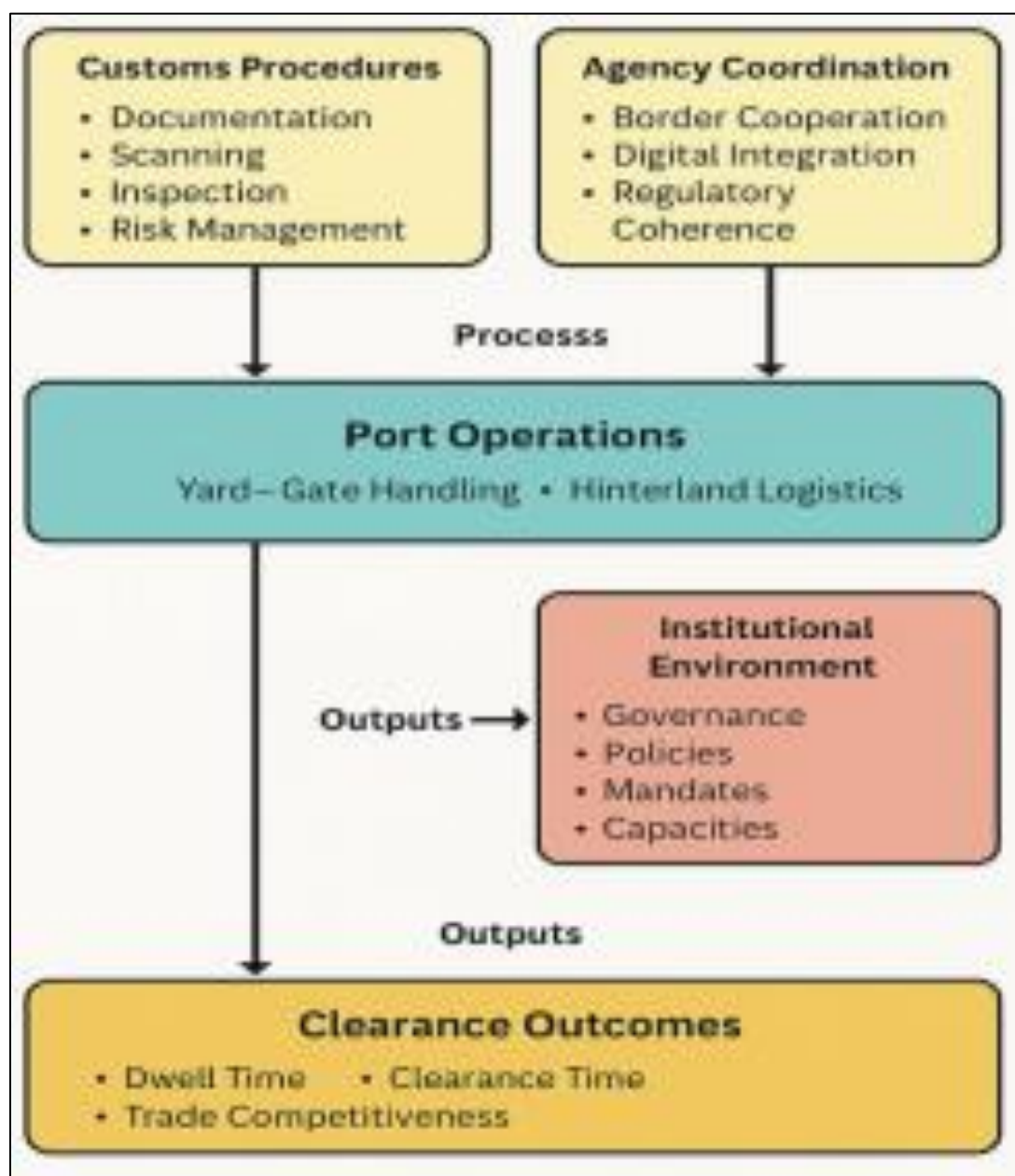


Fig 8 Integrated Port Efficiency and Trade Facilitation Impact Model

This model illustrates how customs procedures and inter-agency coordination jointly influence port operations, which in turn shape clearance outcomes such as dwell time, release time, and trade competitiveness. By linking inputs, processes, and outputs, the diagram highlights the interconnected institutional, procedural, and logistical factors that determine overall port efficiency and trade facilitation performance in Nigeria.

VI. CONCLUSION AND RECOMMENDATIONS

A. Conclusion

The purpose of this study is to examine the impact of customs procedures and interagency coordination on port efficiency and trade facilitation at the major seaports of Nigeria, namely Apapa, Tin Can, and Onne Ports. From the study, various constraints appear to interact with one another, resulting in congestion and long cargo dwell times at these ports, especially at the Lagos Ports. For instance, Apapa and Tin Can Ports are currently facing critical truck gridlocks, congestion, and long delays associated with the evacuation of cargoes due to poor hinterland connectivity and inefficient traffic management systems. On the other hand, Onne Port is reportedly enjoying efficient port operations, low cargo dwell times, and few process delays, suggesting that improvements to port infrastructures and better interagency coordination between major port players contribute to port efficiency and trade facilitation.

Procedures of customs have been highlighted as an important factor that affects the speed of customs clearing operations for all ports. Documentation issues, recurrent cases of downtime, high rates of physical examination, and risk management inconsistencies have been cited as significant contributing factors to customs clearing operations. There have been recurrent complaints from both traders and freight agents, particularly in Lagos, that there have been redundancies in customs procedures, with repeated procedures being encountered. There have been recurrent instances of inter-agency cooperation, with the operational procedures of Apapa and Tin Can ports showing overlaps, redundancies, and poor collaboration between the Nigeria Customs Service, the Nigeria Ports Authority, the Nigeria Maritime Administration and Safety Agency, the Standards Organisation of Nigeria, the Nigeria Drug Law Enforcement Agency, and other agencies. Onne, however, shows a more coordinated operational environment.

In assessing Nigeria's compliance with the World Trade Organization Trade Facilitation Agreement (WTO TFA), the study finds that while several measures have been agreed upon, notably regarding the publication of procedures, payment through electronic means, and appeal mechanisms, other areas regarding risk management inspection, agency cooperation, and documentation simplification have yet to be fulfilled. These areas are essential for Nigeria's overall objectives regarding improved competitiveness, reduced logistics costs, and becoming an efficient maritime hub within the region.

B. Recommendations

Based on the findings, the following short-, medium-, and long-term reforms are recommended:

➤ Short-Term Reforms

- Process Simplification and Documentation Reform
- Reduce redundant documentation steps and harmonize forms across agencies.
- Implement standardized inspection protocols to minimize repetitive checks.
- Strengthen NICIS II stability and reduce downtime through enhanced technical support.
- Enhanced Risk Management
- Increase the use of data-driven selectivity to reduce physical inspection rates.
- Expand pre-arrival processing for compliant traders.
- Strengthen Inter-Agency Coordination
- Operationalize joint inspection teams at Lagos ports.
- Update and enforce MOUs among NCS, NPA, NIMASA, SON, NDLEA, and quarantine agencies.

➤ Medium-Term Reforms

- Upgrade Scanning and Inspection Systems
- Deploy more functional non-intrusive inspection equipment in Lagos.
- Establish redundancies to avoid operational paralysis when a single scanner fails.
- Integrated ICT and Port Community Systems
- Implement a national trade single window that links customs, NPA, NIMASA, SON, NDLEA, and terminal operators.
- Introduce real-time data dashboards for cargo tracking and inspection timelines.
- Logistics and Traffic Management Improvements
- Enforce truck call-up systems with automated monitoring.
- Expand holding bays outside the port area and improve port access roads.

➤ Long-Term Reforms

- Strategic Port Decongestion and Infrastructure Development
- Accelerate development of deep-sea ports (e.g., Lekki) to redistribute cargo away from congested Lagos terminals.
- Improve multimodal transport connectivity—rail, barge, and inland dry ports.
- Institutional and Governance Reforms
- Establish a unified Port Efficiency Task Force with clear authority over coordination.
- Embed performance benchmarks aligned with WTO TFA obligations.

➤ *Strategies Tailored to Lagos vs. Onne*

- Lagos Ports (Apapa and Tin Can): Priority on traffic decongestion, ICT and systems stability, expansion of inspection capacity, and strict enforcement of joint inspection protocols.
- Onne Port: Maintain governance coherence, strengthen risk management, and position the port as a model for TFA-aligned operations.

C. *Contributions to Knowledge*

This study makes two major contributions:

➤ *Empirical Contribution*

It provides one of the few comparative, case-based examinations of Nigeria's three leading ports, integrating customs procedures, logistics challenges, and multi-agency coordination into a unified analytical framework. This offers a granular understanding of why performance varies across ports.

➤ *Policy Contribution*

The study delivers actionable guidance for improving Nigeria's alignment with the WTO Trade Facilitation Agreement and identifies priority reforms that can significantly enhance port efficiency, reduce trade costs, and support Nigeria's competitiveness in regional and global markets.

D. *Limitations of the Study*

The study is limited by its reliance on secondary data for some operational indicators and by incomplete access to internal performance reports and confidential documents. Primary interviews were limited in scope, which may restrict the depth of stakeholder insights. The findings therefore reflect the available evidence but may not capture all operational nuances across terminals.

E. *Suggestions for Further Research*

Future research should adopt quantitative approaches, including time-series or panel data, to measure the impact of specific reforms on clearance times, costs, and throughput across ports. Studies comparing Nigeria's port performance with other West African ports—such as Tema, Lomé, or Abidjan—would help situate Nigeria's progress within a regional context. Additionally, field-based ethnographic studies could provide deeper insights into behavioural and institutional constraints affecting frontline officers and port users.

REFERENCES

- [1]. Adeleke, T., & Odunuga, S. (2022). Institutional dynamics and port governance reforms in Nigeria. *Journal of Maritime Policy Studies*, 14(2), 45–60.
- [2]. Adegoke, Y., Olanrewaju, O., & Musa, T. (2024). Cargo dwell time and logistics inefficiencies in Nigerian ports. *African Journal of Transport & Logistics*, 11(1), 22–38.
- [3]. Africa CDC. (2023). Cross-border collaboration and risk management framework. African Union Publications.
- [4]. Chhetri, P. (2025). Container dwell time and global logistics costs: A supply chain analysis. *International Journal of Logistics Management*, 36(3), 112–130.
- [5]. da Silva, R., Martinez, J., & Lopez, A. (2024). Evaluating port efficiency using performance indices in developing economies. *Maritime Economics and Logistics*, 26(1), 78–94.
- [6]. Desiderio, M. (2025). Border agency coordination in African trade corridors: Lessons for port reforms. *Journal of Development Logistics*, 9(1), 55–74.
- [7]. Hezekia, K. (2025). Port congestion and digital transformation in African maritime gateways. *Journal of African Maritime Studies*, 18(1), 33–49.
- [8]. Kamau, P., & Otiso, K. (2022). Network governance and port performance in East Africa. *Maritime Governance Review*, 5(2), 38–57.
- [9]. Lee, J. (2024). Determinants of cargo dwell time in emerging market ports. *Journal of Supply Chain Performance*, 33(4), 211–225.
- [10]. Mbachu, C., Okoro, P., & Ibe, F. (2024). Comparative performance analysis of Nigerian ports. *Nigerian Journal of Maritime Transport*, 12(1), 88–105.
- [11]. Matekenya, W. (2025). Technical efficiency of African ports: A frontier analysis. *African Maritime Economics Review*, 7(3), 99–121.
- [12]. Nguyen, T. (2025). Operational performance models for modern container terminals. *Journal of Port Operations & Engineering*, 19(1), 1–17.
- [13]. Nwokedi, E. (2022). Cargo dwell time and customs performance in Nigerian ports. *Journal of African Logistics & Trade*, 8(2), 14–32.
- [14]. Nwaogbe, O., Ezekwe, C., & Iheanacho, N. (2024). Congestion patterns at Lagos ports: An infrastructure and governance perspective. *Journal of Transport Infrastructure in Africa*, 6(2), 48–67.
- [15]. Ojo, Y., & Ismail, A. (2023). Digital customs systems and clearance outcomes in Nigeria. *West African Journal of Customs Studies*, 4(1), 59–75.
- [16]. Olanrewaju, D., Akinyemi, T., & Lawal, S. (2024). Truck traffic management and port congestion in Lagos. *Journal of Urban Logistics & Mobility*, 9(1), 14–30.
- [17]. Organisation for Economic Co-operation and Development. (2023). Trade facilitation and customs modernization: Global trends and policy directions. OECD Publishing.
- [18]. Peterson, L. (2020). WTO TFA implementation and clearance time reduction in developing countries. *World Trade Review*, 19(4), 455–478.
- [19]. Satria, D., Yuniarto, H., & Rahman, T. (2023). Inter-agency collaboration and port community systems in Southeast Asia. *Maritime Systems & Governance*, 17(3), 202–219.
- [20]. Scott, W. R. (2021). *Institutions and organizations: Ideas, interests, and identities* (4th ed.). Sage Publications.

- [21]. Ugwu, K. (2022). Trade facilitation reforms and SME participation in Nigeria's import system. *Journal of Development Policy & Practice*, 12(3), 99–118.
- [22]. United Nations Conference on Trade and Development. (2022). *Trade Facilitation and Development Report*. UNCTAD Publishing.
- [23]. United Nations Conference on Trade and Development. (2023). *Single window implementation guide for developing countries*. UNCTAD Publishing.
- [24]. United Nations Conference on Trade and Development. (2025). *Review of Maritime Transport*. UNCTAD Publishing.
- [25]. Wang, X. (2023). Digitalisation and port turnaround efficiency in emerging economies. *Journal of Maritime Transport Technology*, 15(1), 66–84.
- [26]. Williamson, O. E. (2020). Transaction cost economics and organizational governance. *Journal of Institutional Economics*, 16(2), 231–248.
- [27]. World Bank. (2022). *Container Port Performance Index*. World Bank Publications.
- [28]. World Bank. (2023). *Logistics Performance Indicators Report*. World Bank Publications.
- [29]. World Bank. (2024). *Trade facilitation and coordinated border management in Africa*. World Bank Group.
- [30]. World Customs Organization. (2022). *Coordinated Border Management Compendium*. WCO Publications.
- [31]. World Trade Organization. (2021). *Trade Facilitation Agreement: Implementation progress report*. WTO Publications.
- [32]. World Trade Organization. (2024). *Nigeria Trade Policy Review*. WTO Publications.
- [33]. I., Johnson, C., & Satterthwaite, D. (2022). Urban poverty, climate risk and adaptation in coastal African cities. *Environment and Urbanization*, 34(1), 45–67. <https://doi.org/10.1177/09562478221077345>
- [34]. Ajala, T. (2021). Urban poverty and spatial exclusion in Lagos, Nigeria: A geospatial perspective. *Habitat International*, 117, 102414. <https://doi.org/10.1016/j.habitatint.2021.102414>
- [35]. Alvarado, M., & González, R. (2021). Remote sensing for urban poverty mapping: A case study of informal settlements in Mexico City. *International Journal of Applied Earth Observation and Geoinformation*, 99, 102342. <https://doi.org/10.1016/j.jag.2021.102342>
- [36]. Bhan, G., & Jana, A. (2022). Slum redevelopment and the reproduction of urban poverty in India. *Urban Studies*, 59(5), 897–914. <https://doi.org/10.1177/0042098021996965>
- [37]. Boamah, E., Walker, J., & Nyantakyi-Frimpong, H. (2021). Peri-urban spatial inequality and urban poverty in Accra, Ghana. *Cities*, 108, 102964. <https://doi.org/10.1016/j.cities.2020.102964>
- [38]. Chambers, R., & Conway, G. (1992). Sustainable rural livelihoods: Practical concepts for the 21st century. IDS Discussion Paper 296. Institute of Development Studies.
- [39]. Davis, J., & Henderson, V. (2020). Urban poverty dynamics and policy responses in Africa. *World Development*, 130, 104915. <https://doi.org/10.1016/j.worlddev.2020.104915>
- [40]. De Sherbinin, A., Van den Hoek, J., & Borkovska, O. (2023). High-resolution poverty mapping using satellite imagery and geospatial models in Africa and Asia. *Nature Sustainability*, 6(3), 231–239. <https://doi.org/10.1038/s41893-022-00944-5>
- [41]. Fox, S. (2019). Understanding the role of urban governance in slum formation: Evidence from Sub-Saharan Africa. *Urban Research & Practice*, 12(2), 131–152. <https://doi.org/10.1080/17535069.2018.1496026>
- [42]. Fox, S., & Goodfellow, T. (2021). Cities and development in Africa: The spatial politics of poverty. *Development and Change*, 52(3), 431–456. <https://doi.org/10.1111/dech.12646>
- [43]. Heynen, N., Kaika, M., & Swyngedouw, E. (2006). *In the nature of cities: Urban political ecology and the politics of urban metabolism*. Routledge.
- [44]. Hwang, J., & Lin, J. (2021). Urban renewal and spatial inequality in U.S. metropolitan areas. *Urban Affairs Review*, 57(4), 1203–1230. <https://doi.org/10.1177/1078087419895561>
- [45]. Karuri-Sebina, G. (2020). Spatial data governance for inclusive African cities. *Environment and Urbanization*, 32(2), 453–470. <https://doi.org/10.1177/0956247820901542>
- [46]. Kühn, M. (2020). Housing policy and spatial inequalities in Berlin: Mapping accessibility to services. *Urban Planning*, 5(2), 69–81. <https://doi.org/10.17645/up.v5i2.2748>
- [47]. Lawhon, M., Ernstson, H., & Silver, J. (2020). Urban political ecology in the Global South: Insights and debates. *Progress in Human Geography*, 44(6), 1006–1027. <https://doi.org/10.1177/0309132519839616>
- [48]. Mengistu, A., & Gebeyehu, A. (2022). Urban growth, displacement, and slum dynamics in Addis Ababa, Ethiopia. *Habitat International*, 121, 102517. <https://doi.org/10.1016/j.habitatint.2022.102517>
- [49]. Mkhize, N., & Ncube, P. (2020). Post-apartheid spatial segregation and urban poverty in South Africa: A GIS-based study. *Urban Forum*, 31(4), 483–501. <https://doi.org/10.1007/s12132-020-09387-2>
- [50]. Otieno, A., & Makau, J. (2020). Community mapping and spatial justice in Nairobi's informal settlements. *Environment and Urbanization*, 32(1), 123–140. <https://doi.org/10.1177/0956247820901540>
- [51]. Pérez, M., & Cardona, O. (2020). Evaluating slum upgrading programs in Brazil and Colombia: A spatial equity perspective. *World Development*, 131, 104965. <https://doi.org/10.1016/j.worlddev.2020.104965>
- [52]. Satterthwaite, D., Archer, D., & Dodman, D. (2022). Participatory GIS and urban poverty mapping: Evidence from Kenya, Uganda, and Bangladesh. *Urban Studies*, 59(8), 1549–1566. <https://doi.org/10.1177/00420980211017921>

- [53]. Scoones, I. (2015). Sustainable livelihoods and rural development. Practical Action Publishing.
- [54]. Sietchiping, R., Permezel, M., & Ngoms, C. (2020). Urban planning, land markets, and spatial inequality in Africa. *Urban Studies*, 57(12), 2524–2543. <https://doi.org/10.1177/0042098019883112>
- [55]. Soja, E. (2010). Seeking spatial justice. University of Minnesota Press.
- [56]. Swyngedouw, E., & Ernstson, H. (2019). Political ecology beyond the urban. *Antipode*, 51(1), 3–16. <https://doi.org/10.1111/anti.12493>
- [57]. Turok, I., & Bailey, D. (2020). Devolution and spatial inequality in the UK. *Regional Studies*, 54(1), 1–13. <https://doi.org/10.1080/00343404.2019.1602398>
- [58]. Turok, I., & Borel-Saladin, J. (2019). Spatial inequalities and urban policy in South Africa. *Journal of Urban Affairs*, 41(5), 615–635. <https://doi.org/10.1080/07352166.2018.1501083>
- [59]. UN-Habitat. (2021). Cities and pandemics: Towards a more just, green and healthy future. United Nations Human Settlements Programme. <https://unhabitat.org/cities-and-pandemics>
- [60]. UN-Habitat. (2023). World cities report 2023: Envisaging the future of cities. United Nations Human Settlements Programme. <https://unhabitat.org/wcr>
- [61]. Wiesel, I., & Liu, E. (2021). Affordable housing and spatial disadvantage in Australian cities. *Urban Policy and Research*, 39(3), 229–244. <https://doi.org/10.1080/08111146.2020.1861023>
- [62]. Yuliani, S., Susilo, R., & Darmawan, A. (2021). Spatial dynamics of informal settlements in Jakarta: A geospatial analysis. *Habitat International*, 113, 102381. <https://doi.org/10.1016/j.habitatint.2021.102381>
- [63]. Abdullahi, M., & Sieng, L. (2023). The impact of infrastructure.