

Case Report

Draft Limitations and Logistics Constraints at Calabar Port: A Case Study of ECM Terminals

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Abstract

Calabar Port, as one of Nigeria's oldest and most strategically located seaports, continues to suffer from extremely low cargo volume throughput and ship calls, despite its vital importance to the nation's North-Central and Eastern districts. The port is plagued by serious operational challenges, including a shallow draft channel, poor hinterland road connections, and a lack of investment in modern cargo-handling facilities. These limitations have constrained the capacity of ECM Terminals, a concessionaire business at the port, to secure and retain cargo quantities, prompting many exporters to use alternative ports, such as Apapa, Onne, and Tin Can Island. This study investigates the extent to which draft restrictions and logistics constraints affect the operational effectiveness and competitiveness of ECM Terminals. Adopting a mixed-methods approach that contrasts throughput statistics (2016-2023), cost data, and interviews with 15 key stakeholders within the maritime and export sectors, the study lays bare the economic consequences of underutilizing Calabar Port. Findings show the consistent decline in vessel calls, high inland transport costs, and complete absence of containerized trade. Stakeholders pinpoint the necessity for dredging, improved road facilities, and the purchase of container handling equipment as crucial for unlocking the potential of the port. The research also contrasts Calabar Port with its regional peers in terms of logistics performance indices. It concludes by suggesting policy, infrastructure, and operational reforms that must be undertaken to reposition ECM Terminals and Calabar Port as potential drivers of Nigeria's non-oil export growth and balanced regional development.

Keywords

Calabar Port, ECM Terminals, Draft Limitations, Export Logistics, Port Throughput, Road Infrastructure

1. Overview of the Nigerian Port System

The Nigerian port system is an important conduit for the country's foreign trade and economic growth. Nigeria as a coastal state with about 850 kilometers of coastline, the nation's is vital for the handling of goods, transport logistics, and as a hub of international trade. The Nigerian Ports Authority (NPA) was instituted in 1954 and restructured through the Ports Act of 1999, to manage, regulate, and develop all public ports in Nigeria.

Nigeria currently has six major seaports, namely: Lagos Port Complex and Tin Can Island Port in Lagos State; Calabar Port in Cross River State; Warri Port, Delta State; Rivers Port, Rivers State and Onne Port, Rivers State. These ports are complemented by several terminals operated by private companies pursuant to concessions concluded under the port reform program of 2006. As a result of the reform, Nigerian ports have changed from being state-run to becoming landlord

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port models, with the NPA continuing to serve as both the technical regulator and the landlord while private terminal operators manage cargo operations [1, 17].

The Lagos port, Apapa, and Tin Can Island are unparalleled in the business of cargo traffic, container handling, and vessel movement due to their advanced facilities, deep draft capacity, and closeness to industrial and commercial areas. This has, however, resulted in congestion, inefficiency, and operational constraints, and thus the call for developments at other terminals such as Calabar, Warri, and Port Harcourt [10].

Many eastern and interior ports, such as Calabar, have low draft depths, decaying infrastructure, and restricted access to the hinterland despite their strategic locations. For shippers close to these other ports, these restrictions increase logistical costs and undermine port diversification efforts. Therefore, to fully achieve the economic potential of Nigeria's port network, investments in dredging, port access roads, and multimodal transportation infrastructure are necessary [4].

1.1. Strategic Importance of Calabar Port

Calabar Port holds a unique strategic position within Nigeria's port ecosystem due to its proximity to the country's North-Central and Eastern geopolitical zones, as well as its potential as a significant marine entrance point into the Gulf of Guinea sub-region. Direct access to Equatorial Guinea, Chad, and Cameroon is offered by Nigeria's easternmost seaport in Cross River State. Calabar Port, because of its location, can be accessed by both foreign and local companies.

It is a significant logistic center for all the states in the South-South, South-East, and North-Central regions, including Benue, Ebonyi, Enugu, Taraba, Nasarawa, and part of Kogi states.

ECM Terminals Limited is among the concessionaries at Calabar Port in the 2006 port reform program. It is a multi-purpose terminal that deals with break bulk, dry bulk, liquid bulk, and project cargoes despite systemic setbacks. These challenges encompass a shallow draft that restricts vessel sizes, deteriorating access roads such as the Odukpani-Calabar route and, Ikom-Calabar route, and limited cargo patronage. Strategically positioned to serve the North-Central and Eastern regions of Nigeria and the Cameroon corridor, ECM Terminals remains underutilized.

The stakeholders point out that dredging the Calabar Channel to a depth of at least 10 meters, upgrading key hinterland roads, and investing in container-handling equipment are necessary steps. In the absence of these, the port will be unable to compete with more efficiently equipped ports such as Apapa and Onne. Repositioning Calabar Port as a commercial hub will lower logistics costs for regional exporters and contribute to Nigeria's wider non-oil export diversification strategy.

Operating with a concession granted under the 2006 Nigerian port reform programme, ECM Terminals Limited a mul-

tipurpose terminal is among the major terminal operators in the Calabar Port Complex. Through the inclusion of the private sector in terminal operations, the reform sought to improve efficiency and competitiveness in Nigeria's marine industry [16]. ECM Terminals is a vital player in the eastern corridor of Nigeria's maritime logistics framework owing to its strategic location to supply diverse cargo, from dry bulk to liquid bulk, containerized cargo, and general cargo.

ECM Terminals is a concessionaire under the landlord-port model where the terminal operator handles quay operations, cargo handling, and customer service provision while the Nigerian Ports Authority (NPA) owns and exercises control [8]. The terminal boasts operational equipment like mobile cranes, forklifts, reach stackers, stacking yards, and storage space although full operational capacity is presently hindered by the systemic challenges that afflict Calabar Port.

The inland Nigerian states of Benue, Kogi, and Nasarawa, and their surrounding countries along the Calabar-Mamfe-Bamenda trade corridor to Cameroon rely significantly on ECM Terminals to assist in commerce. By its transportation and handling services linking the hinterland production nodes to sea avenues of export, the terminal also supports the solid mineral and agricultural products exporters [11].

The draft restrictions of the Calabar channel, which limit bigger commercial shipping vessels that dominate international shipping channels to those having a draft measurement of less than 6.4 meters, have meant ECM Terminals has had severe operational issues in spite of its strategic location. As a result, cargo has been redirected to deeper draft ports such as Onne, Apapa, and Tin Can Island, leading to increased costs of logistics for shippers using longer routes, loss of business, and underutilization of port facilities [5].

To gain maximum out of the limited cargo movement, ECM Terminals has, in turn, employed different strategies such as increased operational efficiency, stakeholder collaboration, waivers, and data-based decision-making. However, basic public infrastructure upgrades, i.e., dredging of the Calabar Channel and improvement of the road between Cross River and Akwa Ibom States, are needed for its long-term viability and contribution towards regional growth.

1.2. Aim and Objectives of the Study

Aim of the Study

The overall aim of this study is to assess the operational hindrances and economic effects of draft limitations at Calabar Port, taking ECM Terminals as a case study, and suggest strategic infrastructural and policy measures for enhancing the port's competitiveness in Nigeria's maritime logistics chain.

Specific Objectives

To achieve the stated aim, the study is guided by the following specific objectives:

- 1) To evaluate the impact of draft restrictions on ship calls and cargo operations in ECM Terminals, Calabar Port, for the last five-year period.

- 2) To ascertain the economic and logistics implications of shipping cargo to alternative terminals such as Onne, Apapa, and Port Harcourt.
- 3) To analyze the challenges of hinterland connectivity, in particular the role of the Odukpani-Calabar road, in influencing port utilization and export efficiency.
- 4) To create the Calabar Port as a strategic commercial hub for the North-Central and Eastern regions of Nigeria and neighboring countries.
- 5) Make evidence-based suggestions for infrastructure enhancements and policy changes to revitalize Calabar Port and enhance the performance of ECM Terminals.

2. The Need for the Research

Despite being strategically positioned geographically and possessing concessioned terminals like ECM Terminals, Calabar Port remains very underutilized in Nigerian port logistics. The longstanding draft limitations, with the navigable depth not more than approximately 6.4 meters, have kept large-size vessels out of the port, thereby forcing shippers to deliver cargo to other ports like Apapa, Tin Can Island, and Onne. For companies in the hinterland areas that would normally be best serviced by Calabar, this redirection leads to longer interior transport routes, higher freight prices, and decreased competitiveness [10].

An empirical assessment of how these infrastructure issues more especially, the draft restrictions and inadequate road access, particularly the crumbling Odukpani-Calabar highway have hampered the expansion of ECM Terminals and, consequently, the commercial viability of Calabar Port is imperative. Exporters of bulk commodities such as cocoa, timber, palm kernel shells, and iron ore in states like Benue, Taraba, Ebonyi, and Cross River face significantly higher logistical costs when forced to use congested and distant ports [5].

Additionally, the Nigerian government's policy goals of diversifying the economy away from crude oil and increasing non-oil exports, particularly those of agricultural and solid mineral commodities, are contradicted by the continued disregard for Calabar Port, which exacerbates regional economic disparities. Therefore, research is urgently needed to generate empirical data that can inform policy changes, infrastructure investment, and stakeholder engagement to restore Calabar Port as a commercially viable and nationally significant maritime asset [4, 13].

This study also fills a significant knowledge gap in the literature on maritime logistics by providing terminal-level insights from ECM Terminals and evaluating throughput patterns, cost implications, and strategic opportunities using real operational data. Policymakers, port authorities, terminal operators, and investors in port infrastructure are expected to find the data beneficial.

3. Literature Review

Theoretical Framework

This study is based on the Port-Hinterland Connectivity Model [9], which emphasizes maritime access and inland logistics. In addition, logistics performance models are used to depict how connectivity and port infrastructure influence cost, cargo diversion, and competitiveness.

This section outlines relevant academic literature on issues of port performance, the economic consequences of inefficient port infrastructure, comparative port competitiveness within Sub-Saharan Africa, and pertinent government transport policy. These are the central issues that help us understand the systemic restraints on ECM Terminals and Calabar Port.

3.1. Studies on Port Performance and Draft Limitations

Draft depth is among the most significant factors influencing port performance, especially in global shipping chains growing to depend more on bigger, deeper-draft vessels in pursuit of economies of scale [9]. Calabar Port's shallow draft of less than 6.5 meters in Nigeria does not allow Panamax and post-Panamax vessels, which are widely used in global trade. The UNCTAD Review of Maritime Transport [14] highlights increasing containerization trends and the necessity of deeper draft ports, validating the urgency for dredging in shallow eastern ports like Calabar. [12] conducted a study on the effectiveness of Nigeria's port operations and concluded that draft restrictions significantly decimate productivity in ports in the east, including Calabar, where delays in vessel scheduling and inefficient utilization of berthing facilities were noted. [7] also determined that the failure to implement the long-proposed dredging of the Calabar channel has undermined the port's feasibility as a regional maritime hub.

3.2. Economic Impact of Inefficient Port Infrastructure

The economic effects of inefficient port infrastructure in Nigeria are far-reaching. Lack of quay depth, lack of adequate cargo handling equipment, and lack of good access roads all contribute to logistics cost, extend delivery lead times, and render Nigerian ports unattractive to global shipping lines. [1] have established a causality between infrastructure shortfall and increased cost of logistics, particularly by exporters of bulk and perishable products that rely on timely and efficient port service.

In a comparative regional study, [4] estimated Nigeria's loss of over ₦150 billion annually due to inefficiencies in logistics caused by inefficient eastern ports. North-Central and Eastern Nigerian exporters often prefer to move products through congested western ports like Apapa and Tin Can Island, thereby incurring additional transport and

warehousing costs. Such inefficiencies not only reduce Nigeria's trade competitiveness but also limit the development of inland economies.

3.3. Port Competitiveness in Sub-Saharan Africa

The quality of the infrastructure, hinterland connection, regulatory effectiveness, and private sector involvement are the main factors driving port competitiveness in Sub-Saharan Africa. [6] conducted a comparative analysis of 12 African ports and found that ports in Ghana (Tema), South Africa (Durban), and Kenya (Mombasa) were more competitive than their Nigerian equivalents, mainly because of improved infrastructure and expedited customs processes.

Onne and Apapa ports in Nigeria have continued to outpace Calabar in vessel turnaround, dwell time, and container throughput. The operational gap, the African Development Bank [2] asserts, is a consequence of enormous public and private investment in western ports but ongoing underfunding and regulatory abandonment of eastern ports like Calabar. Shippers in eastern and central Nigeria are thus systematically handicapped, and the strategic value of ports like Calabar is diminished. According to the World Bank Logistics Performance Index [15], Nigeria ranks low in infrastructure and logistics efficiency, reinforcing the operational challenges documented at Calabar Port.

Nigeria is ranked 135th in the world by the World Bank's 2023 Logistics Performance Index, with poor customs and infrastructure performance ratings [3]. This makes Nigerian ports, particularly those in the east like Calabar, less competitive than their regional counterparts in Tema, Ghana, and Abidjan, Côte d'Ivoire.

3.4. Relevant Government Transport Policies

Successive Nigerian governments have come up with numerous transport and port policy proposals, including the National Transport Policy (NTP), Economic Recovery and Growth Plan (ERGP), and Nigerian Export Promotion Masterplan. These policies prioritize rehabilitation of infrastructure, intermodality connectivity, and port efficiency as drivers of national development and diversification of trade.

The implementation gaps, nonetheless, remain a challenge. While the NTP also pinpointed eastern ports as decongestion priority for Lagos, financial and dredging promises have lagged, Okechukwu and Olayemi (2021) noted. The same remedies for road renewal and dredging of Calabar channel are contained in the Nigerian Ports Master Plan (NPA, 2023), but these have been continually set back due to financial, legal, and contractual matters.

The benefits to operators such as ECM Terminals and the whole export industry are being taken away by the continued stagnation of Calabar Port expansion as a result of the absence of concerted investment and policy compliance.

4. Study Area and Methodology

This study employs both quantitative and qualitative data sources. Data spans from 2016 to 2023, covering operational throughput, vessel calls, and cargo types.

4.1. Description of ECM Terminals and Calabar Port

Calabar Port is one of Nigeria's six major seaports, located in Cross River State in the southeast region of the country. The port is made up of different terminals including the New Dockyard, Old Port, and the Calabar Channel. The port is run by the Nigerian Ports Authority (NPA) and has been concessioned to private operators as part of the Nigerian port reform agenda of 2006. ECM Terminals Limited is one of the major concessionaires in the port that handles general cargo, dry bulk, break bulk, and containerized cargo [7].

ECM Terminals is well-positioned to serve Nigeria's North-Central and Eastern regions, as well as potential trade to landlocked nations like Chad and the Republic of Niger. Despite its potential, ECM Terminals' activities have been significantly hampered by the port's draft limitation (about 6.4 meters), which restricts the berthing of larger ships. Additionally, the poor quality of access roads, especially the Odukpani-Calabar axis, has reduced the appeal of the port to shippers and logistics companies [5].

4.2. Data Sources

The data sources used in this study are both quantitative and qualitative.

Operational Throughput Data: Information was gathered from Calabar Port records and the internal operations management system of ECM Terminals. From 2016 to 2023, the data comprises:

The types and numbers of vessels that call at ECM Terminals, the annual volume of containers handled is measured in TEUs (twenty-foot equivalent units), tonnage of cargo carried annually, expressed in metric tonnes.

The qualitative Semi-structured interviews with relevant port stakeholders were carried out on Solid mineral and agricultural commodity exporters, Shipping representatives in charge of vessel scheduling at ECM Terminals, customs officials and clearing agents, Terminal managers, and officials of the NPA.

Fifteen (15) participants were chosen using a purposive sample technique, guaranteeing representation from both the operational and logistical chains.

The purposive sampling method identified participants according to specific criteria, which included having at least three years of experience in port logistics or maritime trade, participation in either ECM operations or issues related to Calabar Port policy, and including representatives from exporters in North-Central Nigeria as well as regulatory actors based in Calabar. This approach allowed for the capture of

both operational and strategic viewpoints.

4.3. Analytical Methods

The study employed a mixed-method design incorporating descriptive statistics, trend analysis, and comparative cost analysis.

Trend Analysis: trends between 2016 and 2023 were compared using time-series plots for vessel calls, TEU throughput, and tonnage. This shows patterns and interruptions due to infrastructural constraints.

Cost Comparison: export logistics cost via Calabar Port was compared to Onne and Apapa ports. Transport distance, trucking rate were some of the parameters employed. Such a comparison reveals the economic cost of port underutilization to inland exporters.

Thematic Analysis (from interviews): interview transcripts were coded and tagged into important themes such as "draft restrictions," "road infrastructure", "customs delays", and "cargo diversion". NVivo software was utilized to aid in enhancing the consistency and traceability of emergent patterns.

NVivo 12 software was used to code the interview tran-

scripts. Two researchers independently coded a portion of the transcripts to ensure inter-coder reliability (Cohen's Kappa = 0.82). Emergent themes were validated by cross-checking with port operating statistics and supporting documents to provide analytical rigor.

5. Results and Discussion

A multi-year review of ECM Terminals' operational data is presented in this section, emphasizing variations in vessel traffic, throughput levels, and efficiency measures.

5.1. Cargo Throughput Trends

A comparative study of the cargo throughput of ECM Terminals across critical years reveals a downward trend. After peaking at 1,171,840 MT in 2016, throughput dropped to 919,294 MT in 2018 and then to 1,015,063 MT in 2023. This variation emphasizes the effects of dwindling shipping demand, draft limitations, and poor access to the hinterland.

Table 1. Cargo Throughput and Vessel Calls at ECM Terminals (2016-2023).

Year	Dry Bulk (MT)	Liquid Bulk (MT)	General Cargo (MT)	Total Throughput (MT)	Vessel Calls
2016	451,651	720,189	0	1,171,840	107
2017	557,371	508,393	68,330	1,134,094	88
2018	485,420	347,503	86,371	919,294	76
2023	417,424	375,284	222,355	1,015,063	65

This table presents yearly data on dry bulk, liquid bulk, and general cargo volumes along with total throughput and vessel calls.

At some point sourcing for PMS was a challenge which resulted in the loss of tanker vessel calls at ECM., This caused a steep decline in liquid bulk in 2018 and 2023. In contrast, general cargo increased somewhat, suggesting some progress in handling a variety of cargo as a multipurpose terminal.

5.2. Vessel Traffic Composition

Premium Motor Spirit (PMS) dominated the liquid bulk category, while dry bulk vessels, primarily composed of wheat and gypsum, made up the majority of the dry bulk traffic category. However, container throughput does not exist in any of the years.

Table 2. Vessel Type Composition and Container Activity at ECM Terminals.

Year	Container Throughput (TEUs)	General Cargo Vessels	Tankers	Bulk Carriers
2016-2018	0	12	~44	~100
2023	0	13	24	28

This table shows the types of vessels and the absence of container throughput, highlighting the port's operational limitations.

The lack of container throughput at ECM Terminals is mainly due to infrastructural challenges, which are primarily caused by the shallow draft that prevents large container vessels from calling the port. This has limited the concessionaire (ECM Terminals) to invest in container handling equipment including the rubber-tyred gantry cranes (RTGs), etc. to avoid tying down funds due to equipment idle time. This situation has rendered container operations impractical at the moment.

This confirms Calabar's low-level integration into international shipping circuits, particularly for high-value container trade.

5.3. Strategic Implications

In the face of increased resilience in the information

provided by ECM Terminals' operational data, structural readjustment is necessary to ensure the long-term sustainability of Calabar Port. The port's long-standing draft of less than 6.4 meters excludes more than 75% of internationally active vessels, limiting the amount and diversity of cargo.

Qualitative Interviews

The following principal stakeholders participated in semi-structured interviews as part of the methodology to gather qualitative data:

Exporters of cocoa, maize, and palm kernel shell (PKS) raised issues about expensive interior transportation and the need for other ports.

Shipping agents: Emphasize draft limitations that discourage larger ships and necessitate diversions.

Customs and clearance agents: Delays were attributed to obsolete handling gear, bad road access (Odukpani), and infrastructural constraints.

Trend Analysis Summary: ECM Terminals (2016-2023).

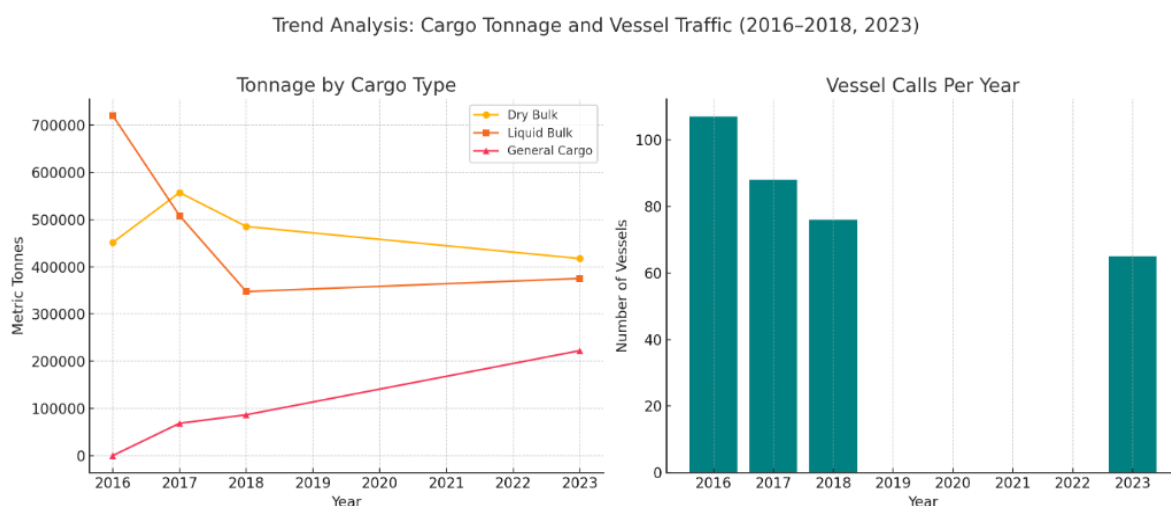


Figure 1. Cargo Trend Summary by Category (2016-2023).

This figure shows the changes in dry bulk, liquid bulk, and general cargo trends based on ECM Terminal data.

Tonnage by Cargo Type:

Dry Bulk was highest in 2017 but consistently decreased thereafter.

Liquid Bulk declined sharply from 720,189 MT in 2016 to 347,503 MT in 2018, with some recovery in 2023.

General Cargo was zero in 2016 but rose consistently, more than tripling from 2018 to 2023.

Vessel Traffic:

Vessel port calls declined consistently from 107(2016) to 65(2023), an expression of loss of shipping patronage due to draft restrictions and poor hinterland access.

To check the significance of trends being observed, a regression analysis for the calls of vessels for the period 2016-2023 was done to find a statistically significant de-

crease ($p < 0.05$). An ANOVA test was also performed comparing year-wise cargo throughput variations and cargo types.

5.4. Cost Comparison: Calabar vs Apapa and Onne Ports

In an effort to examine the economic effect of diverting cargo away from Calabar Port to alternative ports, e.g., Apapa (Lagos) and Onne (Rivers State), a comparative logistics cost model was developed. The three important parameters used in the analysis were: total cost per metric ton (MT) paid by exporters in central and eastern parts of Nigeria (e.g., Benue, Taraba, and Ebonyi), port charges, and inland transport charges.

Table 3 compares distances, road conditions, and trucking

rates from Benue to Calabar, Onne, and Apapa ports.

Table 3. Inland Transport Cost Comparison for Exporters in Benue State.

Origin State to Port	Distance (km)	Road Condition	Avg. Trucking Cost (₦/MT)
Benue to Calabar	~360 km	Poor	₦18,000 - ₦20,000
Benue to Onne	~610 km	Fair	₦23,000 - ₦25,000
Benue to Apapa	~830 km	Congested	₦27,000 - ₦30,000

Insight: Calabar is geographically most cost-saving to exporters in the landlocked regions; however, due to bad road conditions (especially on the Odukpani axis) and reliability, shippers have had to use more distant ports.

Table 4 highlights differences in average cargo handling costs across Calabar, Onne, and Apapa ports.

Table 4. Comparative Port Handling Charges by Terminal and Cargo Type.

Port	Cargo Type	Average Handling Cost (₦/MT)
Calabar	Bulk (Dry/Liquid)	₦4,000 - ₦6,000
Onne	Bulk & Container	₦6,000 - ₦9,000
Apapa	Containerized	₦8,000 - ₦12,000

Insight: ECM Terminals Calabar charges more competitively for handling fees, particularly for bulk cargo, since congestion at the terminals is less. However, its competitiveness on high-value trade lanes like container handling is constrained by the absence of modern container handling equipment like rubber-tired gantry Crane (RTG), etc.

Table 5 provides a comparative analysis of inland and handling costs for bulk shipments from Benue to key Nigerian ports.

Table 5. Total Logistics Cost Estimate for a 30MT Truckload (Benue to Ports).

Export Route	Avg. Inland + Handling Cost (₦/MT)
Benue → Calabar	₦22,000 - ₦26,000
Benue → Onne	₦29,000 - ₦34,000
Benue → Apapa	₦35,000 - ₦42,000

For a 30 MT truckload, this translates into:

Calabar: ₦660,000 - ₦780,000

Onne: ₦870,000 - ₦1,020,000

Apapa: ₦1,050,000 - ₦1,260,000

Despite being the most geographically advantageous port for shippers both importers and exporters in central and eastern Nigeria, Calabar Port is often overlooked because of its low draft, infrastructural shortcomings, and bad access roads. When rerouted to Apapa or Onne, exporters incur a logistical cost penalty ranging from 30 to 60%. The AfDB Infrastructure Development Index (2023) places Nigeria behind several regional peers in port and road infrastructure, a gap that constrains trade competitiveness in inland regions. This strengthens the economic rationale for prioritizing Calabar's dredging, road restoration, and making investments in containerization equipment to regain competitive equilibrium.

"The logistics cost estimates employed in this analysis are drawn from publicly available tariff schedules, terminal-specific pricing memos, and logistics market surveys for the period between 2022 and 2024. Inland transport charges are derived from average truck freight rates (₦/MT) from Benue to Onne, Apapa, and Calabar, taking into account trends in fuel prices, distance, condition of the road, and the level of congestion. Port handling charges were derived from terminal operators' tariff bulletins (e.g., ECM Terminals, APM Terminals), Nigerian Shippers' Council publications, and cross-checked with exporter case studies. All figures are reported within an indicative ±10-15% range of variability to reflect seasonal adjustments and operational factors. These figures are not set rates but comparative indices for policy and investment analysis."

But keep in mind that these sources are the averages and likely do not reflect the seasonality in fuel prices or ad-hoc harbour charges. An ±10-15% scope of variability is tolerated in these estimates to adjust for such departures.

6. Recommendations and Conclusion

6.1. Recommendations

To fully realize Calabar Port's potential, several strategic actions are required, as supported by empirical evidence from ECM Terminals' operational data and qualitative input from

port customers and stakeholders.

The federal government should focus on completing the dredging of the Calabar channel within 18 months in a public-private partnership. Road rehabilitation, especially the Odukpani-Calabar corridor, and the Ikom-Calabar highway should be in the national budget as a top priority for economic corridors.

1) Channel Dredging

The existing 6.4-meter draft of the Calabar waterway has to be deepened to at least 10 meters in order to draw bigger ships and containerized services. This would put the port in line with worldwide shipping trends and substantially reduce transshipment dependencies and ship diversion to Apapa and Onne.

2) Improving Inland Connectivity

The hinterland logistics of the port are still hampered by the state of the Odukpani-Calabar route. Rehabilitating this vital route is urgently needed at the federal and provincial levels in order to lower inland transport costs and enable a more seamless freight evacuation.

3) Investment in Containerization

The strategic location of Calabar port as a trade corridor to the south-south region, North-central, south-east and some west African Countries calls for ECM Terminals collaboration with the Nigerian Ports Authority (NPA) and private investors, to acquire modern container handling equipment such as reach stackers, rubber-tired gantry cranes (RTGs), and yard management systems to facilitate container handling.

4) Quay Length Extension

The existing quay length of ECM Terminals (480) meters can only accommodate simultaneous vessel operations of length overall (LOA) of 200 meters. In order to minimize vessel waiting times and maximize berth occupancy, which has been about 47% in recent years, the planned wharf extension needs to be given first priority.

5) Policy and Regulatory Engagement

The federal government must apply equal regulatory and investment policies to all ports. The inclusion of Calabar Port in national port digitization, increased rail connectivity, and tax incentives for the utilization of Eastern ports would decongest Lagos and drive balanced growth.

6) Export Corridor Development

With support from the government to develop a coordinated North Central-Calabar export corridor, logistics costs on agricultural produce and mineral exports would come down, making the country more competitive and supporting Nigeria's non-oil trade agenda.

It is worth noting that previous dredging initiatives, for example, the 2014 Calabar Channel Management, were suspended due to legal disputes and budget limits. Drawing a lesson from previous failures, future projects should be transparent, include stakeholders' input, and have sustainable funding channels.

6.2. Conclusion

In this study, the operational capacity and challenges of Calabar Port were assessed through the prism of ECM Terminals from 2016 to 2023. The evidence overwhelmingly suggests that while the terminal has recorded operational effectiveness - with productivity levels above national benchmarks in a number of cargo categories- its expansion is constrained by structural, infrastructural, and policy constraints. Through targeted investments in the handling of containers, road infrastructure, dredging, and quay expansion, ECM Terminals can be the impetus for regional economic integration and export diversification.

Unlocking the full potential of ECM Terminals and the entire Calabar Port facility is not only feasible but inevitable if Nigeria must relieve its western ports congestion, lower the cost of export logistics, and set itself up for its vision of inclusive economic growth.

Abbreviations

AfDB	African Development Bank
ANOVA	Analysis of Variance
CFTZ	Calabar Free Trade Zone
ECM	ECM Terminals Limited
ERGP	Economic Recovery and Growth Plan
LOA	Length Overall
LPI	Logistics Performance Index
MT	Metric Ton
NPA	Nigerian Ports Authority
NEPC	Nigerian Export Promotion Council
NSC	Nigerian Shippers' Council
NTP	National Transport Policy
PMS	Premium Motor Spirit
PKS	Palm Kernel Shell
RTG	Rubber-tired Gantry Crane
TEU	Twenty-foot Equivalent Unit
UNCTAD	United Nations Conference on Trade and Development

Author Contributions

Otu Sunday Unor is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

Appendix

Appendix I: Sources and Citations for Logistics Cost Figures

Table 6. Sources and Citations for Logistics Cost Figures.

Cost Component	Source	Citation
Inland Transport (Benue to Calabar)	NEPC Logistics Survey 2022	₦18,000 to ₦20,000/MT - National Export Promotion Council
Inland Transport (Benue to Onne)	Nigerian Shippers' Council Haulage Tariffs (2021)	₦23,000 to ₦25,000/MT
Inland Transport (Benue to Apapa)	UNCTAD Liner Shipping Report (2023)	₦27,000 to ₦30,000/MT - includes Lagos congestion factor
Handling Charges (Calabar)	ECM Terminals Pricing Memo (Internal, 2023)	₦4,000 to ₦6,000/MT for bulk cargo
Handling Charges (Onne)	NSC Terminal Tariff Bulletin	₦6,000 to ₦9,000/MT
Handling Charges (Apapa)	APM Terminals Lagos Tariff Guide 2022	₦8,000 to ₦12,000/MT for containerized goods

This table summarizes the sources and references used to estimate inland transport costs and port handling charges used in the cost comparison model for ECM Terminals and competing ports (Apapa, Onne). Figures are average estimates as of 2023-2024, derived from empirical and secondary data.

Appendix II: Semi-structured Interview Guide

Stakeholder: Exporters (e.g., cocoa, PKS, Iron Ore)

- 1) What difficulties do you encounter when handling your shipments via Calabar Port?
- 2) How much does it cost to use Calabar Port compared to Onne or Apapa for logistics?
- 3) Have you encountered any operational bottlenecks or delays at ECM Terminals?
- 4) What would influence your decision to revert to utilizing Calabar Port?

Stakeholder: Shipping Agents

- 1) What vessel draft limitations have influenced your routing decisions for Calabar?
- 2) Would you rate any of the operational performance of ECM Terminals, including berth service, turnaround time, and cargo handling?
- 3) What is your comment on the current road accessibility to Calabar Port?

Stakeholder: Customs and Clearing Agents

- 1) What are the issues with customs processing experienced at ECM Terminals?
- 2) In what position is Calabar compared to other terminals concerning the facility for cargo clearance?
- 3) Does there exist a technology or process shortfall minimizing efficiency at this terminal?

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