The Challenges Of Calabar Sea Port Operations, Calabar, South-South Nigeria

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Abstract: The paper identified the impact of marine services on port efficiency in the study area, the effectiveness of terminal and support base services in the Calabar port, among others. Data collection involved the use of both open and closed ended questionnaires administered on port agents, importers, exporters and other port workers and users with a success rate of 87%. The result revealed that container terminal efficiency is measured by the level of increase in inputs and throughput. It further indicated that the volume of container handled at the Calabar port is low compared to other ports and thus was revealed that expansion of the current terminal as well as depth of the quay will certainly increase the volume of container inputs and throughput to meet international standards. The findings also revealed that the performance of container terminal at the Calabar Port is on average. Chi-square statistics was used to test the hypothesis in SPSS (Statistical Package for Social Sciences. The Chi-square (3) = 13.370, $p< 0.05$ shows that there is statistically significant association between cargo handling operation and availability of cargo designated area in Calabar port. It is recommended that the Government of Nigeria invests in expanding port physical infrastructure such as adequate berthing facilities, wharves, yard capacity, quayside depth, railway, as well as expanding the hinterland road network.

Keywords: Sea port; marine services, port efficiency, challenges, maritime transport.

1. Introduction

Seaports are major gate-ways to the economy of a nation and represent a complex structure in a country's transportation system. They also provide ship harbours' interface service such as pilotage, dredging, provision of berths, maintenance of navigational channels, ship-port interface (loading and unloading of cargoes), and port land interface in delivering cargo to and from the hinterland. Apart from being major gate-ways, seaports play a strategic role in the economy of a country. In Nigeria for example, all imports and exports move through its seaport. Thus, the efficiency and effectiveness of the port affect profoundly the costs of imports and the competitiveness of exports. Seaports are large employers of labour. According to [1], seaports provide employment from related services in insurance, customs, haulage, clearance, storage, free zone activities, industrial other value added activities, and other major labour markets. Sea ports have boosted socio-economic development worldwide. The close link between seaports and the economic growth of developing areas is well acknowledged in the works of [2, 3, 4]. Unlike the case of seaports in Asia and Western Europe, Nigerian ports are unattractive to shippers as a result of several crises such as congestion of both vessels and cargoes, insecurity of cargoes, excessive charges and corruption. A report at the end of 2005 indicated that Nigerian ports are among the slowest and the most expensive ports in the world [5]. Olukoju [6] also acknowledged the inadequacy of cargo-handling equipment, maintenance and improvement of harbors and approaches, as part of the Nigerian seaport challenges. Nigeria is undergoing tremendous changes and reforms on both the political and economic fronts. With its enormous human and material resources and with its long-established and significant influence across the African continent, Nigeria stands on the edge of achieving more substantial economic growth in the years ahead. The Nigerian Port Authority (NPA) can arguably claim to be one of the most important organizations in Nigeria. Approximately 99 per cent by volume and 95 per cent by value of Nigeria's total imports and exports are sea borne. The global figure in contrast is significantly lower, with only 35-40 per cent of total world trade being carried out via sea routes [7]. An efficient, secure, cost-effective port system is, therefore, vital for the economy as a whole [8]. By provision of the Nigerian Ports Act 1999, the Nigerian Port Authority is mandated to provide infrastructure and support services to Nigeria's ports and her maritime industry. These services include channel management, dredging, pilotage, towage, construction, rehabilitation and maintenance of the breakwater, berth structures, quay apron and stacking areas. Others include sheds, warehouses, roads and sidings, water supply and distribution, power supply, management of the information system, and estate management. Moreover, all other capital and maintenance works of port development, in addition to efficiency, quick turnaround time of vessel and cargo traffic at the port, less dwell time of cargo are also part of marine services. The NPA has been unable to perform these services efficiently due largely to infrastructural and institutional deficits. However, this makes it unable to fulfill a core element of its mission, which is, 'to deliver efficient port services in a safe, secure and customer friendly environment. A recent report by PORTCON International, Durban, South Africa in 2012, on container handling procedures and flows in the Nigerian ports of Apapa, Tin Can Island, Port Harcourt, Calabar and Onne revealed that, 'the current performance levels at the terminals in all the ports (with the exception of Onne port) were failing to facilitate trade efficiently'. It is particularly significant that the report singled out Onne port, the only Nigerian port currently run by private operators (Intels Nigerian Limited), as the only efficient port in the country. It creates a strong argument in favor of private sector control of port operations in Nigeria. The problems of Nigerian ports are multifaceted. Some of these problems are institutional, caused by poor administration and management of the ports, while others are caused by a lack of modern infrastructure and equipment. The current facilities in Nigeria's ports and, indeed Calabar are not sufficient to cope with the demand and needs of a modern maritime industry. Nigeria's economic loss to the

neighboring ports of Cotonou in Benin Republic, Freetown in Sierra Leone, Tema in Ghana and Douala in Cameroon continue to stifle economic gains from this sector. This project thus seeks to examine a multi-pronged strategy capable of increasing port efficiency and productivity in Calabar port.

2. The Research Problem

Over the years, marine transportation has become a significant feature of the commercial and socio-economic interaction among nations. Ports are, therefore, major channels of international trade. It is obvious that the efficiency of seaports directly affect the economic survival and viability of a nation. Therefore, there is need to compete for high cargo traffic by offering more efficient port operations at the most competitive cost. Productivity is a measure of efficiency of a port or terminal operations and accounts for the amount of resources usually required to perform a given task in a given time. Despite several governmental initiatives aimed at restructuring the ports and increasing efficiency, Nigerian ports still face a host of challenges, some of which borders on infrastructures, wreck removal, dredging of channel, congestion of vessels and cargoes, security, navigational aids, maritime labor unrests, and so on. The root causes identified can be broadly classified under four categories, namely, technical factors, organizational factors, human resource factors, and systemic factors. Technical factors relate more to infrastructures and port operational system. Author's reconnaissance survey revealed that dilapidated warehouses occupying an area of about 12,960m^2 were underutilised. Paved stacking area of 75 per cent and unpaved 25 per cent are grossly inadequate for efficient port operations as well as cargo handling equipment in addition to access route in and out of the Calabar Port. For instance, the total paved access route in the Calabar Port area is about 7km compared to Port Harcourt port and Lagos port with about 30km and 45km respectively [9]. This gives an indication of a poorly networked port in its domain also considering the fact that there is hardly any 'trunk A' highway serving the port area. This causes congestion at ports which results in less economic reward. In terms of pilotage, Calabar port presently uses speedboats instead of pilot quarters, tugboats that are equipped with compass, whose primary function is to assist in berthing and sailing of vessels within the port approaches. Port operations on the other hand include, terminal and support base operations such as discharging and loading of cargo, delivery operations, storage of cargo, and stacking of cargo. Challenges to efficient port management include draft limitation, navigational buoys and equipment. Unavailability of the aforementioned services has caused hindrance to successful port operations. Also the Optimum radio communication and signals for effective transmitting and receiving radio and wireless with the vessels are inadequate in the Calabar port. The Calabar navigational channel measuring 45 Nautical Miles from the fairway buoy to the port is the longest in Africa and has seriously become one of the biggest challenges to vessels movement due to the shallow draft along the channel. The draft limitation of the Calabar channel had made it impossible for bigger vessels to come to Calabar. This has affected bigger vessels to partly discharge or lightens their cargo at other ports, thereby increasing tariff in shipping their cargoes to Calabar port. The other problems include turnaround time for ships, though now reduced from 30 hours in the pre-concession era to about 18 hours in the post-concession era. But it varies in terms of container, liquid and dry bulk vessels operations. The government's continued control and ownership of the NPA, despite its commercialisation, became a major setback to private sector involvement. At the same time, the inability of successive governments to provide the huge amount of capital needed for the smooth and efficient running of Nigeria's seaports left the NPA unable to perform many of its statutory obligations, let alone compete at an international level. Some of these obligations include policy formulation to provide necessary guidelines on port operations. Consequently, Nigerian ports are widely believed to be inefficient and unattractive to shippers. It is therefore against this backdrop that this thesis is aimed at identifying the challenges of seaport operations in Calabar port.

3. Study Area

The history of Calabar port located in Calabar municipality (figure 1) is traceable to the medieval merchants' venture of the 15th century. It served as an important focus of trade with the outside world in the Eastern States and a natural port for the eastern and northern states of Nigeria. The old port was privately administered and operated by various shipping companies amongst which were M/S Palm Line Agencies Limited and Elder Dempster Agencies Ltd until December 1969 when the Federal Government took over the inadequate Calabar port facilities from the erstwhile operators and vested it on the Nigerian Port Authority [10]. The development, modernization and expansion of the Calabar ports was embarked upon under the 3rd National Development plan 1975-1980, to make the port facilities cope with the ever increasing demand of our economy. The Calabar port occupies an area of approximately 38 hectares of lands. The port also has berthing length of 860 meters facilities and is divided into 6 berths as well as three transit sheds and two warehouses, which are permanently used for storage of dry bulk, oil well and project cargos. The new Calabar port complex has facilities to accommodate RORO (roll-on roll-off) vessels. In addition, large stacking area for containers of 20ft equivalent units or 40ft equivalent units (Twenty Foot or Forty Foot Equivalent Units) and other general cargos. There are also port devices of various brands and capacities ranging from 3-50 tons with availability rate of 80 per cent. The new port complex was commissioned on the 9th June, 1979 and consists of the following major operational areas:

1. (a) The Milleno for petroleum operations; (b) Jackson Wharf; (c) Calcemco Wharf operated by Calabar Cement Company; (d) The Mclver Wharfs for ferries operating to Doula (Cameroun), Libreville (Gabon) and Malabo (Equatorial Guinea).
2. The crude oil terminal Eket, Antanadudu.
3. The new port-forms the main shipping area
4. Ikot Abasi Abasi Aluminium Smelter Company of Nigeria (ALSCON).

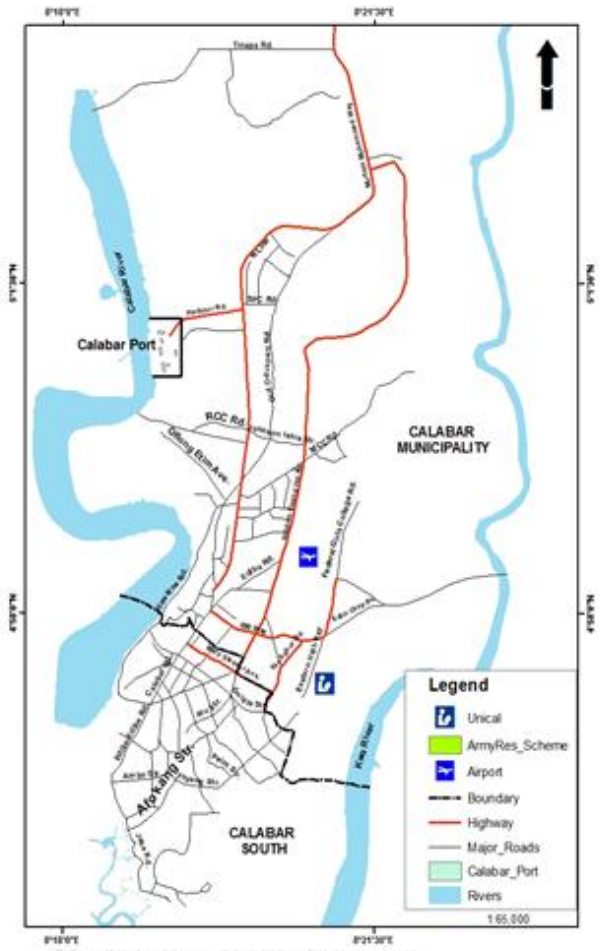

FIG. 1: Calabar Metropolis showing Calabar port area

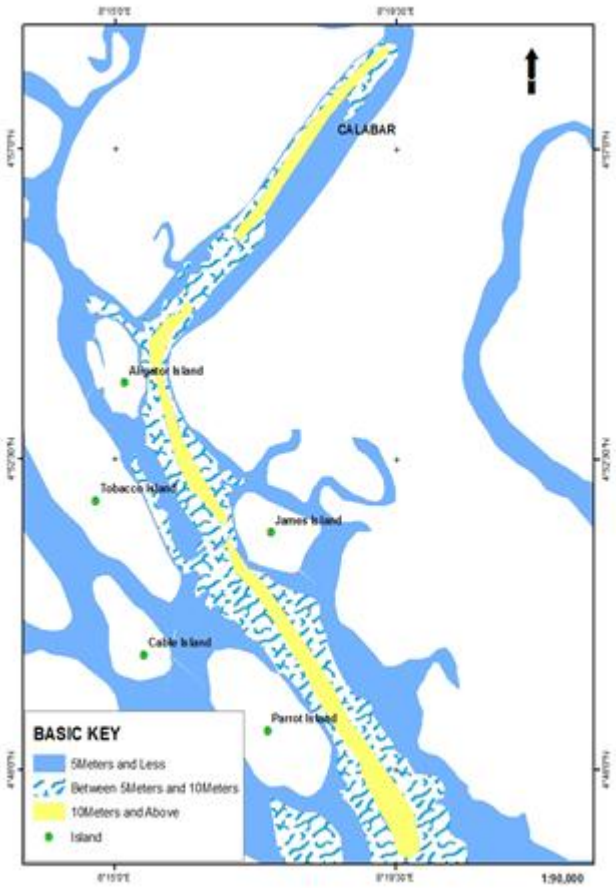

FIG. 2: Calabar port channel from Parrot Island to Duke Town.

The Calabar port is located in Calabar by the Calabar River along longitude 08^0 05^1 E to 08^0 25^1 E and latitude 04^0 48^1 to 05^0 01^1 N as shown in figure 1. It is 45n.Mls (nautical miles) from the fairway to the berth. Anchorage is at Parrot Island between buoys number 24 and 25 with depth of 8m (figure 2).The port has channel width of 150metres and depth at bar of7.2m. The port has a mean high water spring (MHWS) of 3.1m and a mean low water spring (MLWS) of 0.6m, with a tidal variation of 0.6 to 3.2m. Maximum/minimum depth at new port quay is 11m on high tide and 9meters at low tide. The port has an approach maximum draft of 6.6m, with a certified bollard capacity of 50tonnes. The port is located in the Cross River channel and has the potential of trading with her neighbouring states of Akwa Ibom, Abia, Benue, Ebonyi and countries of Cameroun, Sao Tome, Equatorial Guinea, Gabon and Congo Republic.

Calabar new port has a total of six berths each measuring 215m long x 40m wide. Maintenance dredging is on-going at the port (2016/2017). There are 3 transit sheds in the port, each measuring 175m x 40m; 2 warehouses measuring 150m x 40m and 175m x 40m; and stacking area of about 70,000sq.m (NPA, 2008). This data implies an adequate port facility in this respect with the potential for efficient operations if other infrastructures such as channel depth and transport within the port's catchment area are addressed. Varying depths ranging from less than 5metres, 5-10metres to above 10meters at different points of the channel is shown in figure 3. Passenger ferries are now a regular feature at the port thereby boosting the interregional trade between the West and Central African countries of Cameroun, Equatorial Guinea and Gabon. More shippers are now interested in shipping their goods through the port due to the quick turn-around time of vessels and the customer-friendly environment Calabar port hinterlands include Abia, Akwa Ibom, Anambra, Enugu and Imo States in the Eastern states and particularly Adamawa, Bauchi, Benue, Borno, Taraba and Yobe States in the north eastern part of Nigeria. These states immensely benefit or should benefit from the facilities provided by the New Calabar Free Port Complex, for their imports and exports. The extension of the Calabar-Ikom-Ogoja Road to Katsina-Ala to link up with Maiduguri at far north and bordering the landlocked Republic of Chad provides further extension of hinterland for the port (Figure 4)

FIG. 3: Calabar port showing chanel depth and facilities.

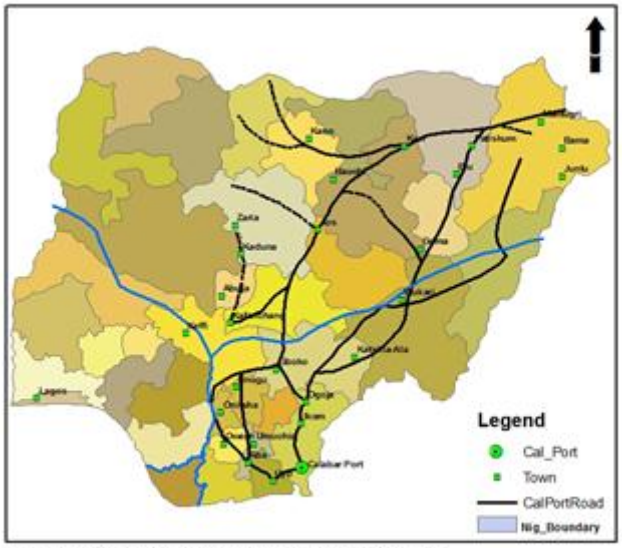

FIG. 4: Nigeria showing road network to south and north eastern markets.

Ships from Europe and the Mediterranean regions which carry cargo for Far East will discharge their cargo at Calabar port. Similarly, ships from Far East and South Africa with cargo for Europe and Mediterranean will discharge their cargo at Calabar port for transshipment. The ships from Europe and Mediterranean will then load the cargo that was discharged from the ships from Far East and Southern Africa and sail north, while the ships from Far East and Southern Africa will load cargo available for South Africa and Far East and sail south (Figure 5). Feeder services would be operated from Abidjan, Takoradi, Tema, Lome and Cotonou to Calabar port.

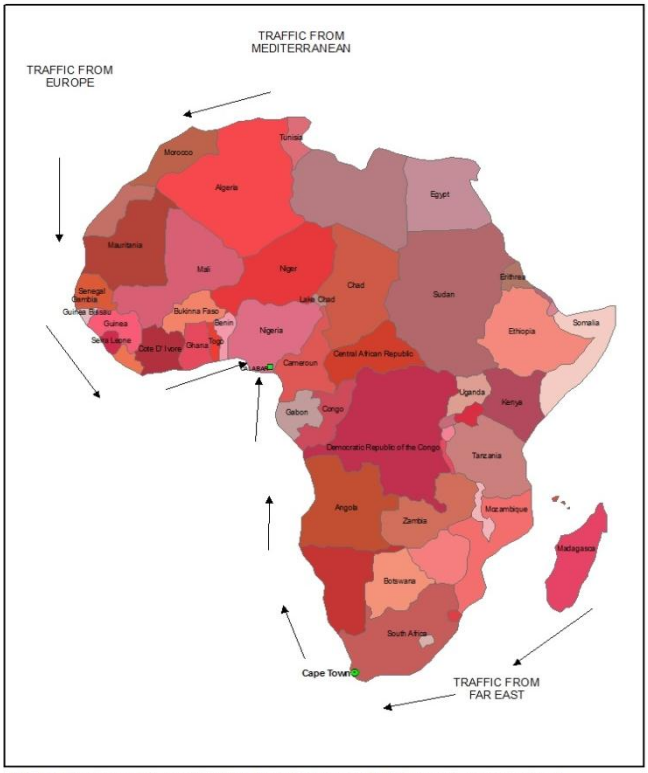

FIG 5.: Feeder service originating from Calabar to link the main containerised traffic from Far East-South Africa and Europe-North Africa

4. Literature Review

Although there has been little contribution by scholars on the challenges of sea port operations in Nigeria, it has been demonstrated that the insufficient investment in maintenance, dredging, port equipment and facilities can lead to direct or indirect losses in trade and investment [11]. This could be the reason most African countries continue to depend on external trade which makes them competitors for oversea markets rather than natural trade partners. Throughout Africa, the degree of modern economic growth has been preconditioned to the function and of the capacity and degree of sophistication of the port facilities available [12]. From the above, it is clear that inadequate sea port capacity which directly leads to the interruption of the smooth flow of foreign trade could have drastic repercussion on the other sectors of the economy. This particular effect was demonstrated during 1970s Port Congestion in Nigeria. In 1975 alone, Nigeria lost well over N300 Millions of demurrage payments to ships, surcharges of freight rates, cost of cargo delays and inland transport [11]. Despite all these merits, port development policy had only a passing reference in the 1965 statement on transport policy by the Federation of Nigeria in 1965. The need for well articulation among the various transport mode through which emphasis on maintenance dredging, rail and road problems was stressed in the Second National Development Plan of 1970. The Third National Development Plan (1975), was aimed at creating excess port facilities as a means of avoiding the expensive and frustrating increase to N1,043 Billion without any due regard to the amount of traffic that would be attracted to these port. Such investment policy was unprecedented in the history of sea port development in Nigeria. Pitifully, some of these ports were not sufficiently utilized. Ogundana [13] described sea ports as dynamic phenomena, changing not only in their morphology but also in their function and status. He went further to say that a set

of ports which are related can be referred to collectively as a port complex such as found in Lagos Port Complex where four ports exist though with one administrative structure. These ports are Quays, Third Wharf Extension, Apapa, and Fishing Jetty. The relationship of these ports may be competitive or complementary. In a competitive setup, the related ports vie for traffic in common hinter lands and development as any port fortunes of the other ports in the complex affect each other. But when the complement one another, a particular port may be devoted to the handling of a particular commodity from the common hinterland. Example, in Lagos Port Complex, Container Terminal Port is devoted to containerized goods, Ijora and Bullnose concentrated on fishing jetties while Quays deals on general goods. In the nineties, new methodologies for measuring efficiency were introduced in the port studies, but there was an enormous discussion about which method best identified the complex interactions among players within the port industry. The studies have focused on the relationship between efficiency and port reforms, port ownership, size, transshipment, investment, hub ports [14] and efficiency over the years [15]. Therefore, evidence suggests that several performance indicators have been used to evaluate port performance. Among the key performance indicators used in several studies, port total throughput in tons or TEU (Twenty-feet Equivalent Unit) and the number of vessels calling a port by type of cargo, roll-on roll-off, break-bulk, containerized cargo, dry bulk and liquid bulk stand out, since all ports aim to move more cargo and more vessels. Several authors used port total throughput in absolute value as an output variable for models of performance analysis, such as [16, 17, 18, 19, 20, 21, 22]. Another performance indicator is the level of revenue per ton or employee of the Port Authority, assuming a public perspective. This reflects the value of the services offered and what customers are willing to pay in terms of rates for calling a port, regarding the infrastructure conditions or location [18, 21, 23]. The performance of a port has a multivariable behavior, which suggests the use of operational performance indicators, such as the number of vessel calls and cargo handled per year, and also financial performance indicators of port authorities and port efficiency data envelopment analysis (DEA) index to measure the relationship between outputs and inputs. The determinants of water borne transport costs, with particular emphasis on the efficiency at port level have been examined by [24]. The variables include the following: hourly container load rate; general turnaround time; bureaucratic turnaround time; ship waiting time (congestion period); general ship waiting time; average containers per vessel; container handling capacity at port; and yearly congestion time. Principal component analysis (PCA) was used to incorporate different port efficiency measures from the survey. Their estimations showed that the specified variables in the PCA model explained a great proportion of the change in waterborne transport costs. With regard to port efficiency, the result is especially important for one of the port efficiency measures obtained through PCA with an estimated elasticity equivalent to that of distance. The study provided conclusions that are relevant for policy makers as they show and quantify that port efficiency is a relevant determinant of a country's competitiveness. Unlike most other relevant variables, port efficiency can be influenced by public policies. The study of [25] confirms that not only is port activity a multidimensional factor, but also that port characteristics determine performance. This is also consistent with the results of [23]. Its emphasis is on the measurement methodologies, the variables used and the results in terms of the various port activities as well as on the relevance of dimensions such as the size of the port, its ownership, location, etc. Port size, location, infrastructure and maritime services were identified as the main determinants of port performance; also taking into account the importance of port specialization. All explanatory models show that size is the most significant attribute when explaining port performance at operational level. In other words, ports with insufficient terminal surface or quay length cannot accommodate increasing traffic growth. Following port size, the results show that the port‘s geographical location is another significant factor when determining port performance as proposed by [26, 27], since it is driven by the development and performance of the hinterland, regardless of its dimension or economic importance. The proximity to Rotterdam port and to Europe’s logistic and economic centers is of great importance for port‘s operational performance. This is expressed in tons of cargo but was not proven that the importance of proximity to the central axis of the Mediterranean Sea, where the main global seaborne traffic flows in round-the-world routes. The study shows that distance from urban centers has relationship with port financial performance and that ports situated close to urban areas have better financial performance. But port location near the sea or the city is not significant when trying to explain port operational performance and the port efficiency. Nevertheless, location is an important characterizing factor of port performance and there is no doubt that two ports with similar characteristics have different performance levels whether they are or not strategically close to main consumption and production centers or to main trade routes. Few studies have analyzed efficiency, productivity and performance of ports [23]. Won Lee, Kwon, and Severance [28] made an extensive review on numerous studies on port performance and inter-port competition and drew attention to several unanswered questions, such as the influence of privatization on port performance and competitiveness and how to measure differences in relative efficiency between competing ports. Many authors studied the issue of port performance merely comparing ports and terminals, without explaining their differences or understanding the reasons why some ports are more efficient and have better performance than others [23, 2826, 27, 25].

5. Methodology

Method of data collection involves both qualitative and quantitative approaches. Both open and closed ended questionnaires geared towards acquiring numerical data. Data was obtained using stratified random sampling technique. Samples were drawn from amongst the ten port agents, twenty-five port users (importers and exporters), two port operators and the Nigerian Port Authority (NPA), all operating in the Calabar port. The justification for this technique stems from the fact that the choice of who to participate in the survey is independent of the research outcome since all port operators experience similar port conditions and responses only constitute averages for the entire survey. From the list of 31 port agents (Table 1) in the Calabar port, 20 are importers and 11 are exporters. We therefore adopted a simple probability for the choice of survey participants where each operator in the port has a

50:50 chance of being selected. Accordingly, 10 importers; 3 exporters; 2 port operators; and the Nigeria Port Authority were interviewed. This was gave a total of 15 port operators participating in the survey. A sample size of 200 questionnaires was purposely adopted considering that about 49 questionnaires already accommodates about 50 per cent of port stakeholders with adequate knowledge of the functionality of port infrastructure. And an added 150 instruments administered to port workers in all sectors mentioned above. Hypotheses were tested using multiple regression analysis and Chi-Square statistics in SPSS (Statistical Package for Social Sciences).

TABLE 1: *List of Port agents and terminal operators in Calabar Port*

S/N	PORT AGENTS AND OPERATORS
1	Raynald Integrated Services
2	ICA Logistics
3	MFC International Sipping Agency
4	Sun Logistic Maritime Services
5	Compass Shipping
6	DADDO Maritime Shipping Agency
7	Bluestar Shipping Agency
8	Blueseas Maritime Shipping Agency
9	Tiger Shipping Agency
10	Maritime Gulf Shipping Services
11	Eze Shipping Agency
12	OAN (Overseas Shipping Agency)
13	Corporate Shippers Agency
14	Fountain Shipping Agency
15	Deino Maritime Agency
16	Maylon Ports Shipping Services
17	West African Ports Services
17	VIN Oil And Gas Shipping Agency
18	Integrated Shipping Agency
19	Doris. O. Shipping Agency
20	DALS Shipping Agency
21	Danie Shipping Agency
22	KAT/LINKS Global Shipping Agency
23	ST Jerome Shipping Agency
24	Fairdeal Shipping Agency
25	(EGL) Express General Logistics
26	PEEJAY Shipping and Logistics
27	Deep Ocean International Global Services Limited
28	ALLRAY Maritime Services Limited
28	Poron Oil And Maritime Limited
30	Peak Shippinglinc Nigeria Limited
31	ECM Terminal Limited
32	INTELS (Nig) Limited

Source: *NPA (2009)*

6. Results and Discussion of Findings

6.1 Evaluation of the impact of marine services on port efficiency

6.1.1 Cargo handling

In considering whose responsibility it is for cargo handling in the port, 39.1 per cent of the respondents indicated it is the port authority/owner/operator. However, majority of respondents (58 per cent) indicated that it is the responsibility of private contractor /terminal operator to handle cargo in the port. This is realistically true as cargo handling operations in Calabar port now rest more on port operators such as Intels, ECM, etc., since the privatization exercise. Others (about 2.9 per cent) yet believed it is port users who handle cargo. This is hardly the case since the present model of port operation took effect in the early 2000. Average volume of cargo handled by the port in 2015 is 140790.4mt, 114742.6mt and 72426.9mt for bulk (liquid), bulk (dry) and general cargo respectively. Bulk liquid cargo volume is due largely to the activities of the port as a hub of oil mineral resource importation into the catchment area.

6.1.2 Cargo handling personnel

The positions/skills and number of cargo handling personnel available in Calabar port was considered. All identified equipment operators have mostly secondary education (90.7 per cent) as minimum educational qualification sufficient for forklift, reach stacker, RTG, straddle carrier, mobile crane, trailer, truck/wheel loader operators. Respondents indicated about 10 per cent average tertiary education with straddle carrier operator accounting for highest number of tertiary education (figure 6). Different port workers including Stevedore (3), Winchman (2), Signalman (2), Tallyman (3), Foreman (2) and Timekeeper (2) were also identified in the port. In terms of how equipment operators and port workers acquire their skills for cargo handling, 85.1 per cent of them acquire their skills through experience through on-the-job training, while only 14.9 per cent acquire their skills through formal training such as the universities and other marine-related institutions. Both port workers and equipment operators show a weak response rate (11.5 and 5.2 per cent respectively) when asked if there is a continuing skills enhancement program for them. Overwhelming 88.5 per cent and 94.8 per cent respectively for port workers and equipment operators responded yes to the presence of continuing skills enhancement program such as short refresher courses held every year to re-train workers in compliance with their positions/skills. New technologies on equipment maintenance and operations are often introduced to equipment operators in the occasion of the procurement of new equipment and re-training courses held by the port.

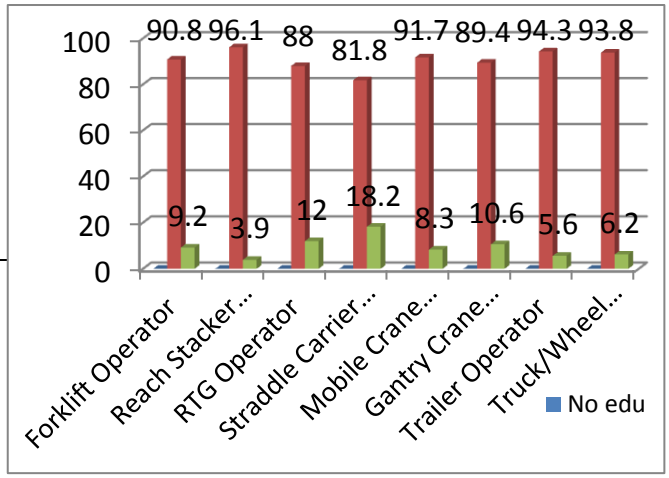

FIG 6: *Educational level of equipment operators in Calabar port.*

6.1.3 Compensation for port workers/equipment operators in Calabar port

The basis for compensation of port workers/equipment operators in Calabar port as indicated by respondents shows collective bargaining (78.2 per cent) and existing law (20.1 per cent). Expert's opinion however suggests solidly rooted guidelines in the form of legislation as fundamental for effective deep seaports development and operations. The present system of compensation therefore leaves the port workers/equipment operators at the absolute mercy of their

employers. There is need for benchmarks to be set and operational issues that concerns licensing, environmental review criteria, pipeline safety and operation, marine environmental management and navigation, to be clarified. This compensation comes in different forms for workers in terms of monetary and non-monetary forms. The study further revealed that salary is paid mostly (about 81 per cent) to port workers/equipment operators in monetary terms while uniform allowance is paid to workers in non-monetary form (59.8 per cent) (see comparison of both methods of compensation is in figure 7.

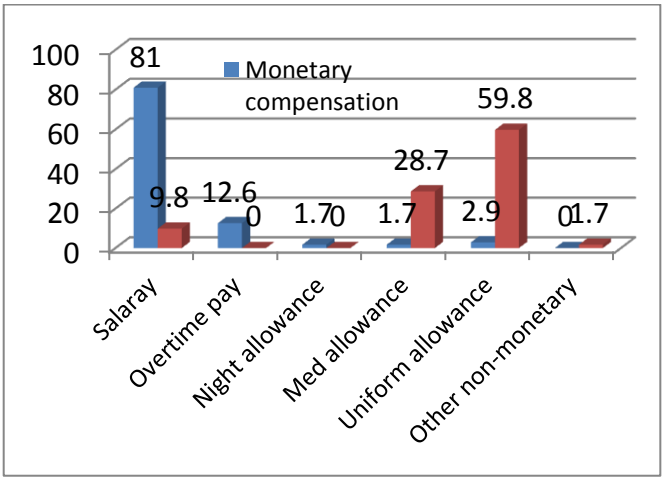

FIG 7: *Monetary and non-monetary benefits for port workers/equipment operators.*

6.2 Effectiveness of terminal and support base services

6.2.1 Equipment in Calabar port

The quality and quantity of both physical and soft infrastructure play a major role in terminal operation. This enhances the quality of services that the port can offer to its users. Table 2 shows the existence of this equipment in the Calabar port. The quantity of this equipment is indicative of not only the volume of work that the port handles, but also the patronage level of the port. For example, only about 3 '60-100MT' mobile cranes exists in the Calabar port. This is in addition to about 8 other forklifts of varying capacity (<10 and > 10tons). The existence of little crane equipment in the port reflects low activities and indeed revenue base of port operators and other users. In terms of yard equipment, Table 3 further shows that there are a total of about 30 pieces of yard equipment in Calabar port, ranging from reach stacker, forklift, front-end loader and mobile cranes. Some of these equipment are own and operated by ECM and Intels.

TABLE 2: *Equipment in Calabar port*

S/N	Frequency	%
Gantry Cranes	100 ~ 500 MT	0
Mobile crane	60 ~ 100 MT	3
Crawler crane	60 ~ 90 MT	0
Floating crane	100 MT	0
Primer movers		0
Trailers/chassis	20'/40' container	0
Forklift	Below 10 Tons	5
Truck/Dozer/Trimmer	10 Tons & above	3
Others (Please specify)		0

Source: *Author's field survey, 2017*

TABLE 3: *Yard equipment in Calabar port*

S/N	Frequency	%
Straddle Carrier		
Reach Stacker	>20 Tons	0
Forklift	3-15tons	5
	15-40tons	6
Front-end Loader	Below 50 Tons	4
	50 Tons & above	0
Top Loader	Below 45 Tons	12
	45 Tons & above	0
Mobile Crane	Below 60 Tons	0
	60 Tons & above	1
Rubber Typed Gantry	Below 35 Tons	2
	35 Tons & above	0

Source: *Author's field survey, 2017*

6.2.2 Lead time for requesting port worker and/or equipment

Lead time for requesting port worker and/or equipment was considered in terms of number of days, hours and/or minutes. Table 4 shows that 67.2 per cent of participants agreed that request for port worker can be achieved in days while for equipment only 34.5 per cent agreed to requesting and obtaining equipment. Rather, many (37.4 per cent) believed that it takes a month or thereabout for request and access to equipment in the Calabar port. A comparative graph is shown in figure 8. The figure shows how lead time for requesting port worker (in blue) tilts more days while for equipment (in red) tilts to weeks and months. This demonstrates the low level of commercial and logistic activities in the Calabar port even though 94.5 per cent of research respondents agreed that port workers, and/or equipment for cargo handling is always available upon request.

TABLE 4: *Lead time for requesting port worker and/or equipment*

Position/ Skills Type	Request for Port worker Frequency	%	Request for Equipment Frequency	%
Days	117	67.2	60	34.5
Weeks	17	9.8	49	28.2
Month	40	23.0	65	37.4
Total	174	100	174	100

Source: *Author's field survey, 2017*

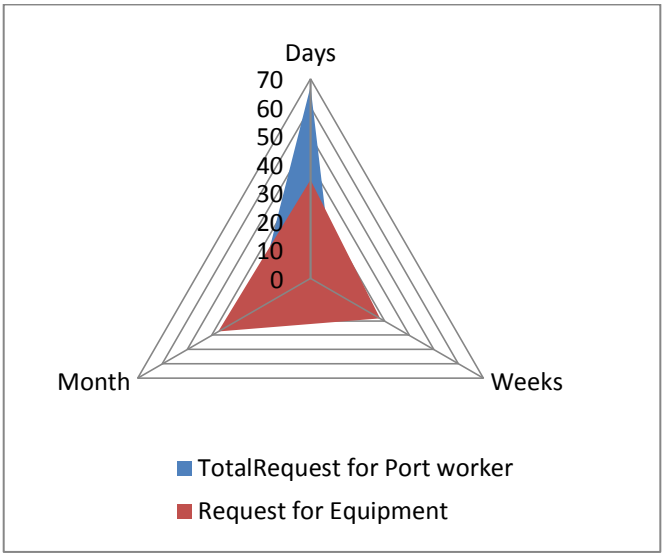

FIG 8: *Comparison between lead time for requesting port worker and equipment*

6.3 Cargo Handling Operations

6.3.1 Assignment of port workers to cargo handling operations

Research participants indicated different approaches in which port workers are assigned to particular cargo handling operations, including 'per work schedule' (40.8 per cent) as the most common way of assigning cargo handling operations to port workers; 'rotation' (13.8 per cent); 'first come first served' (33.3 per cent); and other unspecified methods (12.1 per cent). Multiple methods of cargo assignment to port workers have the potential for crises as it is open to conflicting assignments. However, these conflicts may have been controlled by the indication of 97.7 per cent of participants that there exists a cargo location system in Calabar port. Several security measures implemented in the operational area ranges from: only authorized labor have access to operational areas (53.4 per cent); authorized laborers are in uniform and wear IDs and protective gears/hat (15.5 per cent); slogans and safety signs are posted in conspicuous places (12.6 per cent); pedestrian access lanes are clearly delineated (6.3 per cent); and security personnel are posted in strategic locations (12.1 per cent). These measures are taken in combination of more than one but the strength of any of these measures is indicated by the percentage value as average response rate provided by research participants (Table 5).

6.4 Challenges of Sea Port Operations in Calabar

6.4.1 Dredging

Article IX, section 9.6 of the concession agreement stipulates that the dredging of the Calabar port channel has to be done by NPA to the advertised draft of 9.4m. Over ten years after ECM took over operations, this has not been achieved as the dredging of the channel was abandoned same year just months after they commenced operations. The non-completion of the dredging of the channel to the advertised draft of 9.4m meters is today the biggest threat to the development of the port. This has adversely affected her financial projection and cargo throughput which was predicated on the completion of the dredging as assured during the concession exercise. This drop in performance in

TABLE 5: *Security measures in the Calabar port*

S/N	Freq	%
1. Only authorised labour have access to operational areas	93	53.4
2. Authorized labourers are in uniform and wear IDs and Slogans	27	15.5
3. Safety signs are posted in conspicuous places.	22	12.6
4. Pedestrian access lanes are clearly delineated	11	6.3
4. Security personnel are posted in strategic locations	21	12.1
Total	174	100

Source: *Author's field survey, 2017*

General cargo and container volumes are purely affected by non-completion of dredging and pull-out of container services from Calabar by Maersk line. Also, with the withdrawal of Baco Liner services in Nigeria, Calabar port is completely without a container service. At the moment, all the cocoa exporters are trucking to Lagos for consolidation and export at the expense of the Government of Cross River State in terms of revenue and to the port. In view of the on-going projects for Unicem Phase 2 and General Electric projects, there is no guarantee that the project items will be shipped via Calabar port whereas this should be given the deserving attention it deserves.

6.4.2 Marine wrecks

There are 3 ship wrecks occupying valuable space alongside the jetty and preventing maximum utility for berthing and other related operations. Presently, these wrecks serve as a hide out to hoodlums who hide under to steal wheat from and other cargo from vessels berthed at our quays thereby posing threat to investors and unsuspecting port users. The most recent incident occurred during discharge operation of MV Desert Rhapsody in the month of July 2013. These wrecks have further posed accessibility problems to and from quays and thus leading to the inefficiency of port operations.

6.4.3 Bad road network in and out of Calabar

There is an urgent need to fix the bad roads leading to Calabar. Upon successful dredging exercise at the port, the envisaged increase in container business may not be realized. This is because the bad road will still prevent the importers from the South-East and North-Central states from bringing in their cargo through Calabar which was built to service the importers/exporters from these areas. Among this road transport infrastructure challenges is the canopy bridge that inhibit the flow of container traffic across Ikom to the north-central and north-east. Some examples of these wrecks are shown in figure 9.

7. Test of Hypothesis

The probability of the chi-square test statistic (chi-square=13.370) was p=0.004, less than the alpha level of significance of 0.05.The research hypothesis that cargo handling operation is significantly dependent on the availability of cargo designated area in the Calabar port is supported by this analysis.

FIG 9: *Ship wrecks at shore lines in Calabar port*

It can be seen here that Chi-square (3) = 13.370, p< 0.05. This further revealed that there is statistically significant association between cargo handling operation and availability of cargo designated area in Calabar port. Phi and Cramer's Vare both tests of the strength of association and thus showed that the strength of association between the variables is moderate (0.277).

8. Conclusion and Recommendations

Maritime activities provide for any nation one of the vital links with the outside world. The export and import goods for the most part of the world, take place through nations of ports. Sea port services therefore facilitate foreign exchange earnings from exports and access to capital, intermediate inputs as well as raw materials which cannot be obtained locally. This remain the motivation for this study whose main objective was to examine the challenges and prospects of sea port operations with a view to increasing port efficiency and productivity in Calabar port. Previous studies have revealed that container terminal efficiency is influenced by many factors which include but not limited to: quay crane, dwell time, infrastructure, custom practices and security measures, truck turnaround time, etc. The study thoroughly assessed these factors and discussed the extent to which they influence container terminal efficiency within the maritime industry. Based on the findings of this research, it is the opinion of this research that the government of Nigeria needs huge investments in expanding the physical infrastructure in ports such as adequate berthing facilities, wharves, yard capacity, quayside depth, railway, as well as expanding the hinterland road network. The study further recommends the immediate removal of shipwrecks from ECM terminal quays due to the environmental and security risk it poses to the terminal. Finally, management of Nigeria Port Authority should invest more on training and development of staff and employees, as this will minimize some of the human errors and duplications of business processes that normally occur on the job site.

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