

Cargo Throughput Performance in Eastern Nigerian Ports

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Abstract— The study examined cargo throughput in Eastern Nigerian ports. The study adopted a survey research design. Three hundred and eleven questionnaire were administered to operational staff of Eastern Nigerian ports, and oral interviews were conducted using simple random sampling technique across the four ports. A direct emailing system was utilised to sample the respondents directly and available data obtained were analysed descriptively. The analysis carried out revealed that the average cargo throughput recorded over the last ten years were 5,831,771.4 for Rivers Port, Onne Port 26,820,429.2, 6,294,735.3 for Delta Port and Calabar Port was at 2,087,800.6. Findings revealed 98% of the respondents agreed that the variation experienced over the last ten years was as a result of unfavourable government policies; such as high cost of shipment to Eastern Ports, inadequate berthing space, security threats, and choice of Port for clearance by cargo owners. These invariably affect the cargo throughput of these Ports. Further findings indicated an improved cargo throughput in these ports; Onne, Rivers, Delta and Calabar seaports, cargo dwell time and berthing spaces in that order of operational advantages. The statistical analysis revealed that the null hypothesis indicated the rho value of 0.851 @ $p0.000 < 0.05$, which infer that there is significant relationship between port infrastructure and cargo throughputs in Eastern Nigerian ports. The study concluded that there is an improved cargo throughput in the Eastern Ports over the years amidst the inadequacy of port infrastructure. The study also recommended that the port management should make haste to ensure that all impediments to the provision of port infrastructures that would ensure the optimization of cargo throughputs in ports are removed. Government of Nigeria needs huge investments in expanding the port infrastructure such as adequate berthing facilities, wharves, yard capacity, quayside, railway, as well as expanding the hinterland road network.

Index Terms— Cargo Throughput, Port Performance, Eastern Ports.

I. INTRODUCTION

The seaport is one of the terminal points of maritime mode of transport. It consists of a shoreline holding virtually the entire operation where goods and services are transferred by ship to or from land. This type of terminal is well located or sited to optimize the access to land and navigable water (Emenike, Amamilo and Ajayi, 2018).

The maritime sector has contributed immensely to the development of the Nigerian economy in several ways. In

developing nations, port improvement efforts have been hampered by lack of public finance and managerial resources (Russ, et al, 2018). These challenges have been exacerbated in the environment of globalization of production and distribution, technological changes in ship design, and cargo handling methods, which have induced considerable demand on port resources. Thus, to provide funding and management philosophy needed to reposition ports in line with the new challenges, the port administration of most countries opted for reforms in the port sector. The focus of these reforms was on identification of optimal financing and managerial models for public ports based on national peculiarities and reform objectives. Ports are critical nodes in international maritime transport and logistics chains. Cargo handling delays occurring at the ports, for instance, equipment to a great extent alter total transport and logistics costs. Consequently, many maritime nations involved in international seaborne trade constantly evolve strategies and invest significant resources to improve performance in port terminals (Nwokedi et al, 2019).

Port operations similarly, enhance container terminal performance, especially loading and unloading of cargoes (Eniola, 2014). The efficiency of terminal operations is important for cargo transshipment that will ensure Nigeria ports comply with the 48 hours' cargo clearance rule of the International Maritime Organisation (IMO). However, Igboke (2013) suggests that there has been little improvement over time on the efficiency and productivity of Nigeria Ports Management in meeting the IMO stipulation on cargo clearance. The assessment of Somuyiwa and Akindele (2015) handling plants and equipment in Nigerian Ports are either old, obsolete, malfunctioning, broken down or insufficient, with adverse effects on cargo handling operations. The previous studies were done before the private operators took over the operation of Lagos Port Complex (LPC).

The situation of operations at the four ports in Eastern Nigeria since the pre-concession era demonstrates a very low level of cargo throughput, inefficiency in labour performance/output, and low berth occupancy, low labour (stevedores) performance, and customer's service level. Some ports are still performing below expectation in spite of port concession policy.

The study on performance measurements of container terminal operations in Turkey by Esmer (2008) emphasized on the role played by the gates operations. Gates operations involve the two operations which are export delivery by the freight forwarders and import receiving from the yard. Gates operations depend solely on the gates utilization which aims at facilitating the smooth outgoing and incoming to and from

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the port. Proper gates utilization leads to efficient terminal operations.

Port operations such as scheduling of arriving vessels, allocation of wharf space and cranes to serve the vessels, loading and unloading of cargoes, equipment handling, yard operation and gate operations are enhanced through the provision and availability of efficient port infrastructure. Hence, efficient port infrastructure and operations is reflected in the volume of cargo and revenue generated by the port, which acts as a boost to the economy.

The number of vessels that called at the port in 2018 had a decline of 2.72% when compared to the previous year. Also comparing the operations data to that of the neighbouring ports shows that the performances of the neighbouring ports are more robust. Hence, Nigerian port operations need to be reviewed to enable the ports to improve their competitive position in the regional and global market. The major objective of this study is to examine the cargo throughput in Eastern Nigerian ports.

II. METHODOLOGY

The study is on port operations and container terminal performance in Eastern Nigerian port. The Nigerian Ports Authority (NPA) is a Federal Government Agency that governs and operates the Ports in Nigeria. The major Eastern Nigerian Ports include: Calabar Port Complex in Cross River State. The Delta Ports in Warri, Delta State and the Rivers Port Complex and Onne Port Complex both in Rivers State.

Table 1: Sampling Frame

Name of Port	Port Location	Population	Sample Size
Warri Port	Warri, Delta State	376 (26.93%)	84
Calabar Port	Calabar, Cross Rivers State	316 (22.64)	70
Port Harcourt Port	Port Harcourt, Rivers State	427 (30.59%)	95
Onne Port	Onne, Rivers State	277 (19.84%)	62
Total		1396 (100%)	311

Source: Author's work, 2019

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = Sample Size

N = Population of the Study

e = Level of Significance selected at 5%

Accordingly; the sample size (n) for the study is calculated

Port operations are carried out under the supervision of the Federal Ministry of Transportation. The study adopted a survey research design. The population of the study consisted of all the staff in the four Eastern Nigerian ports. Therefore, the population of the study was 1,396 staff. The study adopted the simple random sampling technique. The choice of this method is predicated on the fact that every element in the study shall have equal chance of being studied. The primary data was sourced through the use of questionnaire, personal/oral interviews and observations. The study instrument was used to elicit data from respondents, the study adopted e-mailing of the study instrument to the management and staffers of Eastern Nigeria Ports selected for the study, administering letters and questionnaire on them online, and similar mode was utilised for the returned of filled copies of the questionnaire while the secondary data sources were sourced from published reports of Nigeria Port Authority regarding port performance and container cargo operation. Other relevant literature and internet sources were utilised. The sample elements of the study were drawn from the Managers, Accountants, Operations Managers, Supervisors and Billing Officers. The procedure for sample selection involved the objective selection of the port workers active dealing with port operations and terminal activities in the four selected port. The study used Taro Yamane's formula to determine a manageable sample size as follows:

thus:

$$n = 1396 / 1 + 1396 (0.05)^2 = 1396 / 4.49 = 310.91 \text{ i.e. } 311$$

Sample Size = 311 staff

III. RESULTS AND DISCUSSION

Table 2 Cargo Throughputs in Eastern Nigerian Ports

Ports/Cargo Throughputs	Rivers	Onne	Delta	Calabar	Total
Years					
2010	5,763,979	23,825,586	1,923,258	1,594,277	33,107,100
2011	7,608,751	26,529,731	8,538,831	1,878,753	44,556,066
2012	5,546,182	27,580,145	6,826,011	1,723,195	41,675,533
2013	4,935,944	28,489,102	7,222,786	1,890,779	42,538,611
2014	5,987,181	27,845,844	5,089,300	2,780,400	41,702,725
2015	4,454,987	26,526,815	6,981,436	1,341,790	39,305,028
2016	5,253,102	23,458,883	7,120,691	1,877,100	37,709,776
2017	4,900,111	26,049,226	8,487,103	2,148,922	41,585,362

2018	6,986,177	29,498,840	8,834,876	2,658,230	47,978,123
2019	6,881,300	28,400,124	8,972,546	2,985,560	47,239,530
Total	58,317,714	268,204,292	62,947,353	20,878,006	
Average	5,831,771.4	26,820,429.2	6,294,735.3	2,087,800.6	

Sources: NPA Annual Bulletin.

During the period under review as indicated in table 2 across the eastern ports, Eastern Nigeria Ports in 2010 received a total cargo throughput of 33,107,100 tonnes indicating an increase of 7,213,668 tonnes or 27.85% in comparison with the throughput of 25,893,432 tonnes received in the preceding year. Among these Ports, Onne Port contributed 71.97% of the cargo throughput followed by Port Harcourt Port 17.41%, Delta Port 5.80% and Calabar Port 4.82%. While in 2011, Eastern Ports achieved a cargo throughput of 44,556,066 tonnes indicating an increase of 41,462,228 tonnes or 34.64% in comparison with the throughput of 33,093,632 tonnes made in the preceding year. The throughput of 44,556,066 consists of 14,517,632 tonnes inward traffic and 30,038,434 tonnes outward traffic. Onne Port contributed 59.54% of the cargo throughput followed by Delta Port 19.16%, Rivers Port 17.08% and Calabar Port 4.22%.

Also, the Eastern Ports in year 2012, recorded a cargo throughput of 41,675,533 tonnes indicating a decrease of 2,889,533 tonnes or 6.46% in comparison with the throughput of 44,556,066 tonnes recorded in the preceding year. The throughput of 41,675,533 consists of 12,307,998 tonnes inward traffic and 29,367,535 tonnes outward traffic. This implies that, Onne Port contributed 66% of the cargo throughput followed by Delta Port 17%, Rivers Port 13% and Calabar Port 4%.

Reassessing individual Ports; in 2011, Rivers Port recorded a cargo throughput of 7,608,751, in 2012 (5,546,182), 2013 (4,935,944), while in 2014, and 2015 recorded 5,987,181 and 4,454,987 respectively. There was a negative variation of -1,319,029 or -4.74%, at Onne seaport

the year 2016 recorded 23,458,883 tonnes, and in 2017 (26,049,226 tonnes) of cargo throughput which gave rise to 11.04% variation of cargo throughput at 2,590,343 tonnes. The year 2018, recorded cargo throughput of (Rivers, 6,986,177), (Onne, 29,498,840), (Delta 8,834,876) and (Calabar, 2,658,230). While in 2019, 6,881,300 tonnes were recorded for Rivers Port, Onne received 28,400,124, Delta Port recorded 8,972,546 and Calabar recorded the list at 2,985,560 tonnes.

The average cargo throughput recorded over the last ten years was 5,831,771.4 for Rivers Port, Onne Port 26,820,429.2, 6,294,735.3 for Delta Port and Calabar Port was at 2,087,800.6. From the study survey carried out, 98% of the operational staff of Nigerian Port Authority agreed that the dwindling variation experienced over the last ten (10) years were as a result of unfavourable government policies; ranging from high of shipment to Eastern Ports, operational challenges such as berthing space, security threats; piracy attacks, choice of Port for clearance by cargo owners and delay in vessel turnaround time at various Port. These invariably affect the container terminal performance of these Ports. They also agreed that Eastern Ports such as Onne, Rivers, Delta and Calabar seaports has noticeable improved vessel turnaround time, dwell time and berthing spaces in that order of operational advantages. It is in view of these similar findings above that Emenike, Amamilo and Ajayi (2018) assert that the maritime industry has been performing quite well except in recent time where government policies are having an adverse effect on vessel traffic, which is the essence of any maritime sector. Their findings is in line to the current study survey, which revealed that seaport terminal operators acknowledged to the fact of Eastern seaports across the nation is operating at 30 percent to 40 percent of its usual capacity.

Table 3: Pearson Product Moment Correlational Analysis on Port infrastructure and cargo throughputs in Eastern Nigerian Ports

Statistics	Port infrastructure (PI)	Cargo throughputs (CT)
Pearson correlation		0.851**
Port infrastructure(PI)		
Sig(2-tailed)		
N		0.000
		283
Pearson correlation- Cargo	0.851**	
throughputs(CT)		
Sig(2-tailed)		
N	0.000	
	283	

**Correlation is positive and significant at the 0.05 level (2-tailed)

Sources: SPSS Output; Author's Analysis.

The relationship between the port infrastructure and cargo throughputs indicate that the null hypothesis (H_{01}) shows the rho value is 0.851 @ $p.000 < 0.05$, decision; that there is a strong significant relationship existing between the examined variables. This implies that the null hypothesis (H_{01}) was

rejected and the alternate hypothesis (H_1) was accepted, hence; "there is significant relationship between port infrastructure and cargo throughputs in Eastern Nigerian ports. It can infer that: Port infrastructure as a dimension of port operation has a positive and significant relationship with

cargo throughputs as a measure of container terminal performance in Eastern Nigerian ports. This simply means that port infrastructure has strong relationship with cargo throughputs which is one of the key performance indicators for measuring container terminal performance in Eastern Nigerian ports.

IV. CONCLUSION AND RECOMMENDATIONS

There is improved cargo container traffic in the Eastern Ports over the years under review amidst the inadequacy of port infrastructure. Therefore, there is a need for modern and sustainable infrastructure capable of improving cargo loading and unloading. The port management should make haste to ensure that all impediments to the provision of port infrastructures that would ensure the optimization of cargo throughputs in ports are removed. Government of Nigeria needs huge investments in expanding the port infrastructure such as adequate berthing facilities, wharves, yard capacity, quayside, railway, as well as expanding the hinterland road network. These port infrastructures are the key stimuli for cargo turnaround time, effectiveness and efficiency in the port, so therefore the need for public private partnership funding. And finally, Port authorities should concentrate more attention on infrastructure development policies that have potentials of securing more cargo to the ports to maximize cargo throughput volume, since cargo throughput has proved to contribute more to or impact more on port revenue. The Federal Government of Nigeria, the Nigerian Port Authority (NPA) should institute sustainable policies made to attract more cargo volumes to the port which will invariably lead to improvement in port revenue.

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