



# Evaluation of Logistics Performance of Nigerian Ports in the Post Privatization Regime

Mbachu Justice .C.<sup>1</sup>; Ndikom .O.B.<sup>2</sup>; Nze .I.C.<sup>3</sup>;  
Nwokedi .T.C.<sup>4</sup>

1 Department of Maritime management Technology, Federal University of Technology, Owerri, Nigeria.

2 Department of Maritime management Technology, Federal University of Technology, Owerri, Nigeria.

3 Department of Maritime management Technology, Federal University of Technology, Owerri, Nigeria.

4 Department of Maritime management Technology, Federal University of Technology, Owerri, Nigeria.

## ARTICLE INFO

**Article No.:** 022324028

**Type:** Research

**Full Text:** [PDF](#), [PHP](#), [HTML](#), [EPUB](#), [MP3](#)

**Accepted:** 29/02/2024

**Published:** 13/03/2024

### \*Corresponding Author

Mbachu, Justice C.

#### E-mail:

[justice.mbachu@futo.edu.ng](mailto:justice.mbachu@futo.edu.ng),

[theophilus.nwokedi@futo.edu.ng](mailto:theophilus.nwokedi@futo.edu.ng)

**Keywords:** Maritime logistics, ship turnaround time, cargo dwell time, logistics performance.

## ABSTRACT

The study evaluated the logistics performance of Nigerian ports in the post privatization regime. The objectives of the study was among other things, to investigate the existence of delay in ship husbandry operations and processing of shipping trade in Nigeria seaports; The study used export facto research design, employing secondary data sourced from the Nigeria ports Authority, The Nigeria Shippers Council, The World Bank, the United Nations Conference on Trade and Commerce and the Central Bank of Nigeria. The Net Output Model approach for estimating value of time lost, the paired sample-test and the log-linear multiple regression analysis methods were used to analyze the data obtained. It was found that, there exist disproportionate levels of delay in ship husbandry operations in the individual seaports of Nigeria such that, in each for Onne, Lagos Apapa, Warri, Rivers and Calabar ports, the delays encountered by ship operators in ship husbandry operations is 1.878 days, 5.34 days, 3.47 days, 2.81 days and 2.44 days respectively. The Nigeria port sector average delay in ship husbandry operations is 9.2days. The result of the study also indicate the existence of 9.0days, 16.73days, 14.1days, 15.6days, and 13.4days delays in the processing of shipping trade in each of Onne, Lagos Apapa, Warri, Rivers and Calabar ports respectively. It was recommended that port authorities and terminal operators in collaboration with the Nigeria Shippers Council should develop delay reduction policies and strategies in ports in order to ensure that trade processing and ship operations time in Nigeria ports comply with global benchmark.

## 1. INTRODUCTION:

The concept of Port Logistics is viewed as that which connotes the process of planning, implementing and managing the movement of goods and information involved in the ocean carriage of goods and trade through the seaports (Aylin, 2016; Nwokedi, Ndikom & Okoroji, 2021). Logistics according to Aylin and Yucel (2016) encompasses all the processes involved in planning, organizing and executing the efficient transportation and storage of goods and services from the point of origin to the point of consumption in order to meet customer requirements in a timely and cost-effective manner. According to Panayides (2006), "the integrated demand for maritime transport brings on a maritime logistics concept". The main function of shipping is to move cargoes of shippers from one port to another. By adding logistics activities to the main function like collecting the cargoes in one point, informing the delivery position, helping customers who want special services, preparing bill of lading, container tracking, performing intermodal services and information flow (Heaver, Meersman, & Van de Voorde 2000), the shipping service gets more close to the value added shipping logistics concept. Hult et al. (2007) defined the value of maritime logistics as facilitating the higher efficiency and effectiveness of a maritime logistics service. Maritime transport operators are accordingly encouraged to keep pace with other logistics functions as a central member of a global logistics integration system (Panayides & Song 2008). Available empirical literature are in agreement that the central goal of the development and implementation of the logistical functions in the planning of maritime and port operations is to improve operational efficiency and productivity of concerned firms, while optimizing time, cost, risk and other input variables (Dongping Song, 2021; Olapoju Olabisi, 2019). This implies that, the implementation of port logistical functions should reduce or optimize associated operational costs, port service time, business risk, and ensure port users (consumer) satisfaction, especially with service time and cost of port usage, while improving output (revenue, throughput, etc.) to Port authorities and Terminal operators. These suggest that, one key measure of Port Logistics performance especially when viewed from the perspectives of port user (shippers) satisfaction is Port service time (Ndikom, Nwokedi, Buhari & Okeke (2017). Port service time indicates whether or not the port users face challenges of delay in processing trade through the seaports. This in turn can be viewed in two major components name:

(i) Ship-turnaround time, which indicates the service time for ship operations and vessel husbandry experiences of ship operators in a given port. The ship-turnaround time provides the basis for understanding the amount of delay or otherwise, that ship operators experience in particular ports.

(ii) Cargo dwell time, which indicates the overall time of processing shipping trade from the port by shippers. The cargo dwell time as well provides the basis for understanding the quantum of delays experiences of shippers in seaports.

The current study therefore foresees the need to investigate the logistics performance of the Nigeria ports from the perspectives of delays in ship husbandry and trade processing. To do this, the study identified the central problems, aim and objectives to be pursued by the study in subsequent sections. It is very important to note here that the port concessioning and privatization policy of the Nigerian Government in 2001, saw the transition of the Nigerian ports from Landlord port models to service port models in which private corporations were enlisted to carryout port operations and provide port services; while the Government through the Nigeria Ports Authority (NPA) regulate the operations of the private service providers. According to Ndikom (2011), the clear policy intent for this was to improve the management performance of the day-to-day running of ports, in order to enthrone efficiency, improve productivity and ensure port user satisfaction. These were all lacking in the era of the landlord model, when Government through the NPA, functioned as both the service provider, and the regulator. Part of the aim of the privatization policy was also that the Nigeria Ports Authority (through the hiring of private companies to operate and manage the port facilities), will enthrone competitiveness in port service provision, which will in turn reduce or optimize the respective cost and price of service production and consumption, optimize time of ship operations and husbandry as well as time of processing of shipping trade in the ports. Available empirical studies suggest that the productivity of the Nigerian ports over the years has improved, following the implementation of the 2001 port reform regime. These improvements are evident in the areas of port revenue, cargo throughput, ship traffic and container throughput trade handled in the ports. However, African Development Bank (2010); UNCTAD (2022) and World Bank report (2023), all indicate rising port costs of shipping trade to Nigeria and other Sub-Saharan African ports as a result of elongated time of ship operations and trade processing. This represents problem situation such that, Nigeria has not significantly addressed the challenges of increasing port costs of shipping through Nigerian ports, associated with delays and elongated time of processing shipping trade. These anomalies therefore point towards the existence of a problem situation where the port privatization exercise has failed to improve the logistics performance of the ports, in terms of time of ship husbandry and operations and trade processing. Moreover, there is a seeming lack of empirical studies that provides adequate knowledge and information on the level of time delays faced by ships

trading in Nigeria as well as the quantum of time delay to which shipping trade is exposed in Nigerian ports.

### 1.1 Aim and Objectives of the Study

The aim of the study is to evaluate the logistics performance of the Nigeria seaports in the post privatization regime. The specific objectives of the study are:

1. To ascertain the existence of delay in ship operations and husbandry in Nigerian seaports
2. To assess the existence of delay in the processing of container shipping trade in Nigerian ports

### 1.2 Research Question

1. What is the quantum of delay in ship operations and husbandry in Nigerian seaports?
2. What amount of delay exists in the processing of container shipping trade in Nigerian ports?

### 1.3 Hypotheses

1. There is no delay in ship operations and husbandry in Nigerian seaports.
2. There is no existence of delay in the processing of container shipping trade in Nigerian ports.

## 2. LITERATURE REVIEW

Several works have been carried out in this area to evaluate the logistics performance of Nigerian ports with regards to delays encountered by ship owners in ship husbandry and delays encountered by shippers in processing shipping trade through the ports. Many authors have tried to define the concept of "Logistics" vis-a-vis "Maritime Logistics". The Council of Supply Chain Management Professionals (CSCMP, 2010) define logistics as: "the process of planning, implementing, and controlling procedures for the efficient and effective transportation and storage of goods including services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements. According to Nwokedi *et al* (2021), Maritime logistics, similar to port logistics, is an integrated concept aimed at addressing all aspects of logistics and supply chain challenges associated with maritime transportation and the delivery of goods via the seaports, with focus on improving and/or maximizing efficiency of ports and maritime transport, bring about cost-effectiveness in port operations and use, limiting time of port service delivery, improving maritime safety and security services, improving quality of service quality, utility/customer satisfaction, etc., associated with the use of maritime transport and seaports in the delivery of consignments by shippers and freight forwarders. Portal cranes play vital role in bulk ports that would handle loads with heavy weight and high height, lifting

and laying down often during the operating process; Haiwei, Weijian, Ning and Yufei (2015). In modern logistics system, ports also contain value added services like warehousing, packaging, inland connections, repairing and assembly which make ports (a cluster of organizations) to fully become a link in supply chain (Bichou & Gray, 2004; Carbone & De Martino, 2003). According to Tuna and Arabelen, (2013), "Maritime logistics is referred to as the process of planning, implementing and managing the movement of goods and information involved in the ocean carriage." Tuna and Arabelen, (2013), suggests that the main issue in maritime logistics lies in the concept of integration which has to be evident in physical level (intermodal or multimodal), economic/strategic level (vertical integration, management structure) or organizational level (relationship based, people and process integration between organizations. Lee et al (2012) notes that, while maritime transportation focuses on the individual functions relating to sea transportation, maritime logistics focuses on the effective and efficient cargo and information flow in the scope of logistics system. Maritime logistics is not only interested in sea transportation activities like shipping, loading and unloading but also in value added logistics activities like warehousing, packaging, repairing, stuffing, storage, etc. It is evident that with the above definitions, the Nigerian ports have failed to live up to expected heights. This is witnessed in the delays encountered by ship owners who call at the Nigerian ports and the delays also encountered by shippers in shipping trade processing of goods. Ships spend more time at Nigerian Ports than the global benchmark (of 1.25 days for container ships) for Ship Turnaround time while cargoes spend more time at the ports before been cleared to leave which does not conform to the global benchmark (of 4 days) for cargo Dwell time in efficient ports. Ship Turnaround Time (STRT) is a port-related factor that influences the flow of shipping trade via the ports and is defined as the total time that a vessel spends at a port from its arrival to departure. According to Nwokedi et al (2021), STRT is a major factor that influences port choice by ship owners and operators as it indicates the level of efficiency of use of port superstructures and cargo handling equipment. Thus, high ship turnaround time may imply longer period of stay in ports by vessels awaiting services with the attendant implications on the economy and finances of the affected ship-owners and operators. Higher STRT also increases the risk of delay in delivery of shipments and cargo to the shippers' warehouses in the hinterland markets, which could result to situation of stock-out and scarcity in the domestic markets, price inflation, shutdown, etc, among other negative economic implications. Cargo dwell time (CDWT) as a port-related factor influencing the flow of shipping trade via the ports. It is the measure of the time that elapses from the time the cargo arrives in the port to the time the cargo leave the port premises after all permits and clearances have been secured for the cargo to leave the port to the shippers' terminal and/or warehouse. There

are up to 32 government agencies including the Nigerian Customs Service, all of which cause avoidable delays in the clearing of imported goods and consignments (Nwokedi et al 2021). These numerous agencies mostly constitutes a major delay in shipping trade processing through the Nigerian causing the Cargoes to spend more time at the port than is required, (Ndikom, 2011). In this study, our interest is to determine the existence and quantum of delay of ship husbandry operations that exists in the Nigerian Ports as well as the existence and amount of delays that exists in shipping trade processing in the Nigerian Ports and the best way to tackle these anomalies.

### 3. METHODOLOGY

The study used secondary data obtained from the Nigerian ports authority and the Nigerian Shippers Council and the use of descriptive statistics, inferential statistics and multiple linear regression models in establishing the objectives. It also used secondary data obtained from World Bank publications on cargo global dwell time and ship turnaround time benchmarks in ports to determine the ship husbandry and trade processing time delay in Nigerian ports.

**3.1 Research Design:** The study used ex-post facto research design. It used time series historical data on the logistics performance of each of Onne port, Warri port, Calabar port, Lagos Apapa port, and Port-Harcourt port in terms of ship turnaround time performances and cargo dwell time performances of each of the ports between 2007 and 2021. Secondary data on ship turnaround time performance, cargo dwell time performance of each port were collected.

**3.2 Method of Data Analysis:** The ship turnaround time and cargo dwell time experiences of shippers and ship-owners in each of the ports of Apapa Lagos, Calabar, Onne, Warri and Port-Harcourt Ports provide evidences of the average times spent in ship husbandry and cargo processing through each port. The average ship turnaround time and cargo dwell time benchmarks

operational in global ports represent the expected time standard required for ship husbandry and trade processing that all efficient seaports should comply with. The time delay experiences of ship-owners in ship husbandry ( $T_{dsh}$ ) in each Nigerian seaport is obtained by comparing the global average ship turnaround time benchmark with the actual ship turnaround time experiences of ship-owners in each of the ports used in the study. Similarly, time delay experiences of ship-owners in trade/cargo processing ( $T_{dtp}$ ) in each Nigerian seaport is obtained by comparing the global average cargo dwell time benchmark of 4days with the actual cargo dwell time experiences of shippers in each of the seaports.

In this way, the delays in ship husbandry and cargo processing in the seaports will be obtained using equations (1) and (2) below;

$$T_{dsh} = STR_a - STR_e \quad (1)$$

$$T_{dtp} = CDT_a - CDT_e \quad (2)$$

Where:

$T_{dsh}$  = Time delay in ship husbandry in each of the ports experienced by ship-owners

$STR_a$  = Actual ship turnaround time experiences of ship-owners in each of the ports

$STR_e$  = Expected Ship turnaround time or global ship turnaround time benchmark

$T_{dtp}$  = Time delay in trade processing experienced by shippers in ports

$CDT_a$  = Actual cargo dwell time experiences of shippers in the ports

$CDT_e$  = expected cargo dwell time or cargo dwell time standard benchmark

### 4.0 RESULTS AND DISCUSSION OF FINDINGS

In this section, the data collected from the Nigerian ports authority (NPA) and UNCTAD were used for the study and presented as shown in the various tables below:

**Table 1: Cargo Throughput (tons), Ship Traffic Performance, Effort (Man-hours) and Number of days Ship is worked at Berth in Nigerian Ports in Post Reform Era (2007-2021).**

Year	Cargo throughput (tons)	Ship traffic	At Berth (Days)	Effort (Man-hours)
2007	57,473,350	4,849	3.39	8760
2008	64,372,749	4,623	3.58	8760
2009	65,775,509	4,721	4.60	8760
2010	6,744,727	4,881	4.27	8760
2011	83,461,697	5,232	4.27	8760
2012	77,092,625	4,837	4.04	8760
2013	78,281,634	5,369	4.2	8760
2014	84,951,927	5,333	4.3	8760
2015	77,387,638	5,014	4.6	8760
2016	70,365,036	4,373	4.1	8760
2017	71,535,636	3,897	4.3	8760
2018	74,677,604	3878	4.3	8760
2019	81,264,169	3259	4.23	8760
2020	80,826,672	4054	4.1	8760
2021	79,915,877	4100	4.3	8760

Source: NPA Statistical Report, 2019

Table 1 shows data collected for each of the identified variables which covered a period of 15 years, between 2007 and 2021, considered as the post port privatization regime in the study. The table showed a tremendous increase in the volume of cargo throughput as well as ship traffic that called at the Nigerian ports during the Post port privatization regime as against what was obtainable during the pre port privatization regime. It gave evidence to the fact that cargo throughput and ship traffic improved tremendously as a result of the

privatization of the Nigerian Seaports which was one of the main aims of introducing the Privatization policy. It also showed an increase in the number of days that ships were been worked upon at berth in the post port privatization regime which was against the aim of introducing the privatization policy. As the number of days spent at berth increased, the number of man hours spent on working on these ships also increased. These are all evident in Table 1.

**Table 2: Ship Turnaround Time (STRT) Benchmark in Global Ports for Various Vessel Types**

s/n	year	(i) Container Vessel (days)	(ii) Liquid BULK (days)	(iii) Dry bulk Cargo (days)	(iv) Global average (days)
1	2007	0.80	0.96	2.08	1.28
2	2008	0.8	1.0	2.04	1.28
3	2009	1.0	1.1	2.0	1.366666
4	2010	1.0	0.95	2.01	1.32
5	2011	0.8	0.90	2.23	1.31
6	2012	0.7	1.2	2.0	1.3
7	2013	0.7	0.85	2.04	1.196666667
8	2014	0.8	0.93	2.05	1.26
9	2015	1.0	0.94	2.08	1.34
10	2016	0.9	1.0	2.06	1.32
11	2017	0.8	0.95	2.08	1.276666667
12	2018	0.70	0.94	2.05	1.23
13	2019	0.7	1.10	2.05	1.283333333
14	2020	0.8	0.96	2.06	1.273333333
15	2021	1.0	1.0	2.05	1.35

Source: UNCTAD Review of maritime Transport, 2011, 2017 and 2022 Editions.

The Ship Turnaround Time (STRT) is a measure that indicates the average time, that it takes a vessel to be loaded and/or discharged, on arrival in a given seaport, until it departs the port terminal, after loading or discharging with a global benchmark of 4 days. Based on

the STRT data for the trio of Container Vessel, Liquid Bulk carriers, Dry bulk Carriers, a global average STRT benchmark for all ships trading in global ports, was determined as shown in item (iv) for the post privatization regime. This data set shall be used in further analysis to

determine the existence of delay in ship operations and husbandry in Nigerian Sea ports. This table is of great importance as it shall be used to compare the global average STRT for all ships trading in the Nigerian

Seaports to ascertain the quantum of delay that actually exists in ship operations and husbandry of Nigerian seaports.

**Table 3: Post Reform Ship turnaround (STRT) Time Performance Indicating the Lead-Time in Vessel Husbandry in Nigerian Ports between 2007 and 2021**

s/n	year	(i) Onne port STRT (days)	(ii) Lagos Apapa STRT	(iii) Rivers STRT (days)	(iv) Warri STRT	(v) Calabar STRT (days)	(vi) STRT average in Nigerian ports
1	2007	2.55	6.75	4.2	5.00	3.0	4.3
2	2008	2.76	5.59	3.2	6.50	4.01	4.412
3	2009	3.50	6.55	3.6	5.8	3.95	4.68
4	2010	3.84	5.38	2.55	5.36	3.43	4.112
5	2011	2.05	5.48	3.09	4.71	3.25	3.716
6	2012	3.5	7.1	4.19	3.75	4.84	4.676
7	2013	4.6	6.2	3.83	5.35	4.45	4.886
8	2014	3.70	7.9	5.77	5.90	5.00	5.654
9	2015	2.59	7.2	6.55	4.00	3.72	4.812
10	2016	3.39	7.5	4.05	3.09	3.45	4.296
11	2017	2.47	7.53	5.00	4.19	4.55	4.748
12	2018	3.70	5.3	3.00	3.15	3.00	3.63
13	2019	2.30	7.8	2.26	4.51	3.05	3.984
14	2020	3.10	5.4	4.8	5.6	3.20	4.42
15	2021	3.50	7.8	5.5	4.5	2.95	4.85

Sources: Nigeria Shippers Council (NSC) 2019 performance report; Nigerian Ports Authority (NPA), Statistical Report, various editions. UNCTAD Review of Maritime Transport.

Table 3 above shows data/record of the STRT performance of each of the ports of Onne, Lagos Apapa, Rivers, Warri and Calabar between 2007 and 2021, considered as the post reform era in the study. The average STRT prevailing in the Nigerian port sector, for all ships trading in Nigerian ports, each year covered in the post reform era (2007-2021), was determined as shown in item (vi). For each of the ports, it was noticed

that an average of 4 days was spent by ships in ship operations and husbandry in Nigerian Seaports. This is as against the global STRT followed by average benchmark of global ports posited in Table 2. It is evident from the table that Lagos port has the highest STRT followed by Warri Port with Onne port having the lowest time spent by ships in its port.

**Table 4: Cargo Dwell Time Performance of Nigerian Seaports Indicating the Time Spent in Processing Seaborne trade in the Seaports Post Port Reform Era (2007-2021)**

s/n	year	(i) Onne port Cargo dwell time (days)	(ii) Lagos Apapa dwell time	(iii) Rivers Port Dwell time (days)	(iv) Warri port dwell time (days)	(v) Calabar Dwell time (days)	(vi) Nigerian average	(vii) Dwell time global average benchmark
1	2007	11	19	18	17	13	15.6	4
2	2008	10	20	16	20	13	15.8	4
3	2009	12	19	19	18	15	16.6	4
4	2010	13	20	20	21	18	18.4	4
5	2011	12	19	20	17	17	17	4
6	2012	11	21	15	20	18	17	4
7	2013	15	19	16	20	20	18	4
8	2014	14	22	18	21	19	18.8	4
9	2015	11	21	20	19	20	18.2	4
10	2016	15	19	17	18	15	16.8	4
11	2017	13	23	18	21	17	18.4	4
12	2018	15	21	20	20	18	18.8	4
13	2019	14	23	20	22	21	20	4
14	2020	16	22	16	20	18	18.4	4
15	2021	13	23	18	20	19	18.6	4

Source: Nigeria Shippers Council (NSC) 2019 performance report; Nigerian Ports Authority (NPA), Statistical Report, various editions. UNCTAD Review of Maritime Transport.

The CDWT is a measure that indicates the average time, that it takes a shipper to process his/her shipping export or shipping import trade through the seaport, from the terminal operators, customs authorities, ports authority and other government agencies operating in the ports, until the trade (containerized or otherwise) is delivered away from the seaport to the consignees or shippers warehouse. The average CDWT prevailing in the Nigerian port sector, for all trades in Nigerian ports for

each year covered in the post reform era (2007-2021), was determined as shown in item (vi), on table 4. The record/data for the cargo dwell time CDWT benchmark for the global port sector/shipping industry is also shown in item (vii). The table shows a tremendous difference between the Nigerian average CDWT and that of global ports which points to the existence of delay in the processing of container shipping trade in Nigerian ports.

**Table 5: The Existence of Delay in Ship Husbandry in Nigerian Port Sector (2007-2021)**

	N	Range	Minimum	Maximum	Sum	Mean
SHDELAYNIGERIAVERAGE	15	1.99	2.40	4.39	47.79	3.1860
SHDELAYONNE	15	2.66	.74	3.40	28.16	1.8776
SHDELAYAPAPA	15	2.58	4.06	6.64	80.09	5.3396
SHDELAYWARRI	15	3.45	1.77	5.22	52.02	3.4682
SHDELAYRIVERS	15	4.23	.98	5.21	42.20	2.8136
SHDELAYCALABAR	15	2.14	1.60	3.74	36.46	2.4309
Valid N (listwise)	15					

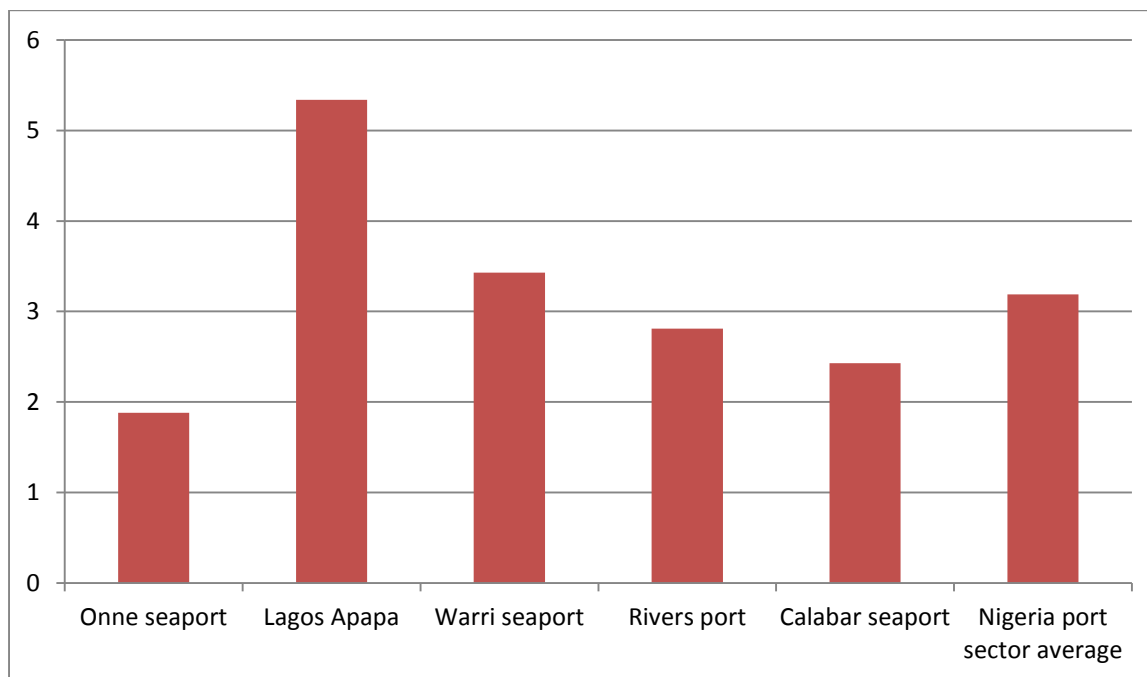
#### Descriptive Statistics

	Std. Deviation
SHDELAYNIGERIAVERAGE	.51546
SHDELAYONNE	.71292
SHDELAYAPAPA	.98693
SHDELAYWARRI	1.01464
SHDELAYRIVERS	1.22399
SHDELAYCALABAR	.71752
Valid N (listwise)	

Source: Authors Calculation

Table 5 above shows the result of the extent of delay in ship husbandry in the five major seaports in Nigeria in the extended years of post-reform from 2007-2021. The result of the study indicate that average delay suffered by ship operators in getting their vessels loaded or discharged in the Nigerian port sector is 3.19 days (76.56 hours) with a standard deviation of 0.5154. This implies that following the implementation of the port reform policies in Nigeria, the Nigerian port sector still witness delays in ship husbandry as a result of increased ship turnaround time to the extent of 3.19 days (76.56 hours) on average. It also indicates that the port sector in Nigeria is still yet unable to achieve compliance with the global port sector standard ship turnaround benchmark of 1.2 days for all ship types. Thus, ship owners transiting through the Nigerian seaports suffer delays up to an average of 3.19 days (76.56 hours), which consequently increases port cost borne by the ship operators and charterers. Table 5 also reveals the extent of delay that ship operators suffer in the individual seaports. For

example, in Onne and Lagos Apapa seaports, the average delays suffered by ship operators between 2007-2021 post reform period is 1.88 days (45.12 hours) and 5.34 days (128.16 hours) respectively with respective standard deviations of 0.71292 and 0.98693. In Warri, Rivers and Calabar seaports, ship operators suffer averages of 3.47 days (83.28 hours) 2.81 days (67.44 hours) and 2.43 days (58.32 hours) delays respectively as a result of higher ship turnaround time in Nigerian ports in comparison to the standard global port sector benchmark. The result indicates that the ship operators suffer the most (highest delays in ship husbandry) delays in the Lagos Apapa ports, followed by the Warri seaport, while in the Onne seaport, ship operators and charterers suffer the least amount of delay in ship husbandry operations. Figure 1 below is a comparison of the amounts of delays in ship husbandry operations in individual Nigeria seaports, affecting ship operators and charterers in the post reform era.



**Figure 1. Average delay (days) in ship husbandry operations in Nigeria ports affecting ship operators and charterers**

Source: Prepared by Author.

The figure 1 above presents a graphical view of the extent of delay in days that ship operators and charterers face in the loading and discharge of their vessels in the individual Nigerian ports, and the local port sector

average. It is important to further show by what percentages these delays differ or increased, from the global port sector ship turnaround time benchmark, as shown in table 6 below.



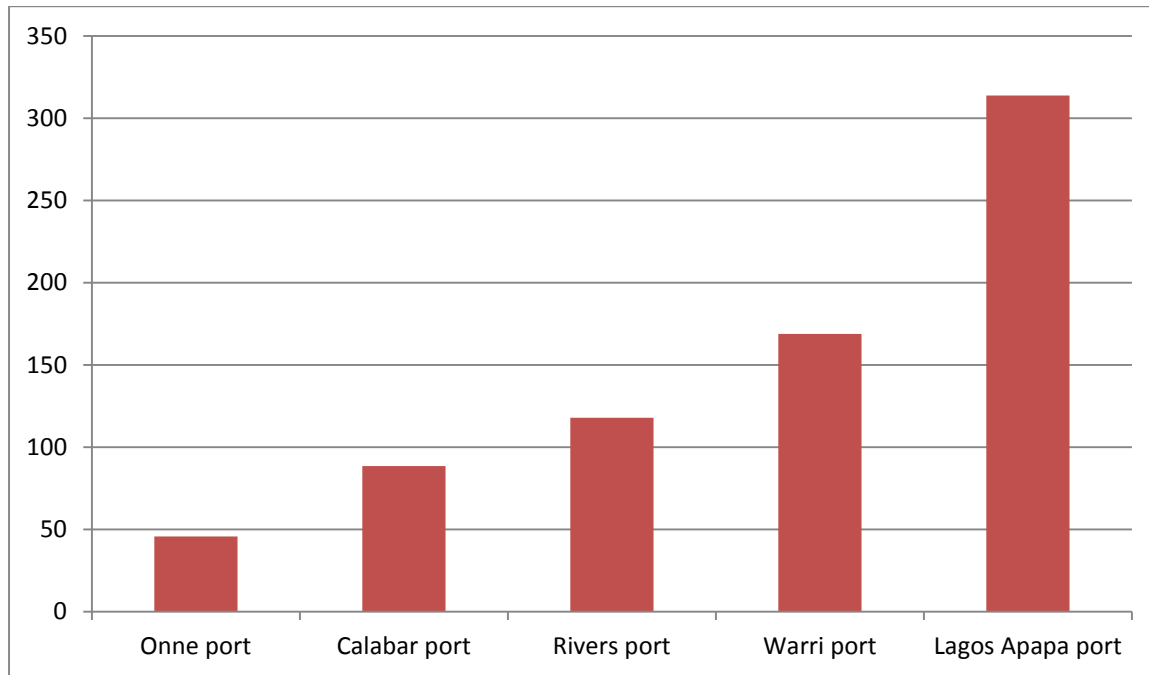
**Table 6: Percentage (differences) between Delays in Ship Husbandry Operations in Nigerian seaports and Global Port Sector standard Benchmark indicating extent of increase in delay in Nigeria**

Ports	Difference-increase in delay		Difference- increased delay	
	Days	%difference	Hours	%difference
Onne port	0.59	45.74%	14.16hrs	45.74%
Lagos Apapa	4.05	313.82%	97.18hrs	313.82%
Warri port	2.18	168.9%	52.32hrs	168.9%
Rivers Port	1.52	117.8%	36.48hrs	117.8%
Calabar port	1.14	88.37%	27.36hrs	88.37%
Nigerian port sector	1.90	147.2%	45.6hrs	147.3%
Global port sector benchmark	1.29	-	30.96hrs	-

Source: Authors calculation

The result of the study presented in table 6 above indicates that between 2007 and 2021 represented as the post concession era in the Nigerian maritime/port industry, the delays in ship husbandry operations (loading and discharging operations, etc.) affecting ship operators and charterers in the sector is about 147.3% higher than the global port sector standard benchmark of 1.29 days (30.96 hours). The Nigerian port sector is about 1.90 days (45.6 hours), higher than the global standard benchmark. The individual ports of Nigeria each have higher time delays of ship husbandry and

operations than the global port sector benchmark. For example, the delay experienced by ship operators in Onne and Lagos Apapa seaport is 45.74% and 313.82% respectively higher than the global port sector standard ship turnaround time benchmark. Warri seaport, Rivers port and Calabar port have respective significant delays of 168.9%, 117.8%, and 88.37%; higher than the global port sector benchmark. Figure 2 below shows the ranking of the Nigerian seaports in increasing order of delays in ship husbandry operations, affecting ship operators and charterers in Nigerian shipping industry.



**Figure 2. Ranking Nigerian seaports in order of increased delays in ship husbandry operations affecting ship-owners in post reform era.**

Source: Prepared by Author.

**Table 7: Determining the Existence of Significant Difference between the Global Port Sector Ship Turnaround Time Benchmark and Average Delay in Ship Husbandry in Nigerian Seaport**

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 GLOBALSTRT	1.2924	15	.04480	.01157
SHDELAYNIGERIAVERA GE	3.1860	15	.51546	.13309

**Paired Samples Test**

	Paired Differences			
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference
	Lower			
Pair 1 GLOBALSTRT - SHDELAYNIGERIAVERA GE	-1.89351	.52053	.13440	-2.18177

**Paired Samples Test**

	Paired Differences	t	df	Sig. (2-tailed)	
					95% Confidence Interval of the Difference
					Upper
Pair 1 GLOBALSTRT - SHDELAYNIGERIAVERAGE	-1.60525	-14.089	14	.000	

Authors Calculation

Table 7 above investigated the existence of significant difference between the global port sector ship turnaround time benchmark for all ships, and the Nigerian port sector average delays in ship husbandry operations affecting operators in Nigerian ports. The result reveal a mean global port sector STRT benchmark of 1.29 days (30.96 hours) with standard deviation of 0.0448 and a mean Nigerian port sector delays in ship husbandry operations of 3.19 days (76.56 hours) with standard deviation of

0.5155. The t-score is -14.089 and the p-value is 0.000 with 14 degrees of freedom. There, the study infers that there is significant difference between the extent of delays in ship husbandry operations in Nigerian port sector and global port sector benchmark. The result implies that ship operators and charterers suffer much extended higher delays in Nigerian ports, suggesting the need for corrective measures to be implemented.

**Table 8: The Existence of Delay in the Processing of Container Shipping/Seaborne Trade in Nigerian Ports**

	N	Range	Minimum	Maximum	Sum	Mean
TRADEDELAYNIGERIAPORTS	15	4.40	11.60	16.00	206.40	13.7600
TRADEDELAYONNE	15	6.00	6.00	12.00	135.00	9.0000
TRADEDELAYAPAPA	15	4.00	15.00	19.00	251.00	16.7333
TRADEDELAYRIVERS	15	5.00	11.00	16.00	211.00	14.0667
TRADEDELAYWARRI	15	5.00	13.00	18.00	234.00	15.6000
TRADEDELAYCALABAR	15	8.00	9.00	17.00	201.00	13.4000
Valid N (listwise)	15					

**Descriptive Statistics**

	Std. Deviation
TRADEDELAYNIGERIAPORTS	1.23335
TRADEDELAYONNE	1.81265
TRADEDELAYAPAPA	1.57963
TRADEDELAYRIVERS	1.75119
TRADEDELAYWARRI	1.50238
TRADEDELAYCALABAR	2.44365
Valid N (listwise)	

Source: Authors Calculation

Table 8 above shows the result of the extent of delay in the Processing of Container Shipping/Seaborne Trade in Nigerian Ports in the five major seaports in Nigeria, in the extended years of post-reform from 2007-2021. The result of the study indicate that average delay suffered by shippers in getting their seaborne (containerized and non-containerized trade) processing in the Nigerian port sector is 13.76 days (330.24 hours) with a standard deviation of 1.2335. This implies that, following the implementation of the port reform policies in Nigeria, the Nigerian port sector still witness delays in processing seaborne import and export trade as a result of increased cargo dwell time, to the extent of 13.76 days (330.24 hours) on average. It also indicates that the port sector in Nigeria is still yet unable to achieve compliance with the global port sector standard cargo dwell time benchmark of 4.0 days (96) for all trade types. Thus, shippers transiting trade through the Nigerian seaports suffer delays up to an average of 13.76 days (330.24 hours), which consequently increase port cost borne by the shippers. The table 8 also reveals the extent of delay that shippers encounter in the individual seaports. For

example, in Onne and Lagos Apapa seaports, the average delays encountered by shippers in getting their consignments delivered through the Nigerian ports between 2007-2021 post reform period is 9.00 days (216 hours) and 16.73 days (401.42 hours) respectively with respective standard deviations of 1.81265 and 1.57963. In Rivers, Warri and Calabar seaports, shippers encounter averages of 14.067 days (337.61 hours), 15.60 days (374.4 hours) and 13.40 days (321.6 hours) delays in processing shipping trade, respectively in the ports, as a result of higher cargo dwell time in Nigerian ports, in comparison to the standard global port sector CDWT benchmark. The result indicates that the shippers encounter the most (highest delays in trade processing) delays in the Lagos Apapa ports, followed by the Warri seaport, while in the Onne seaport, shippers encounter the least amount of delay in processing shipping trade. Figure3 below is a comparison of the amounts of delays in the processing of seaborne in individual Nigeria seaports, affecting shippers in Nigeria, in the post reform era.

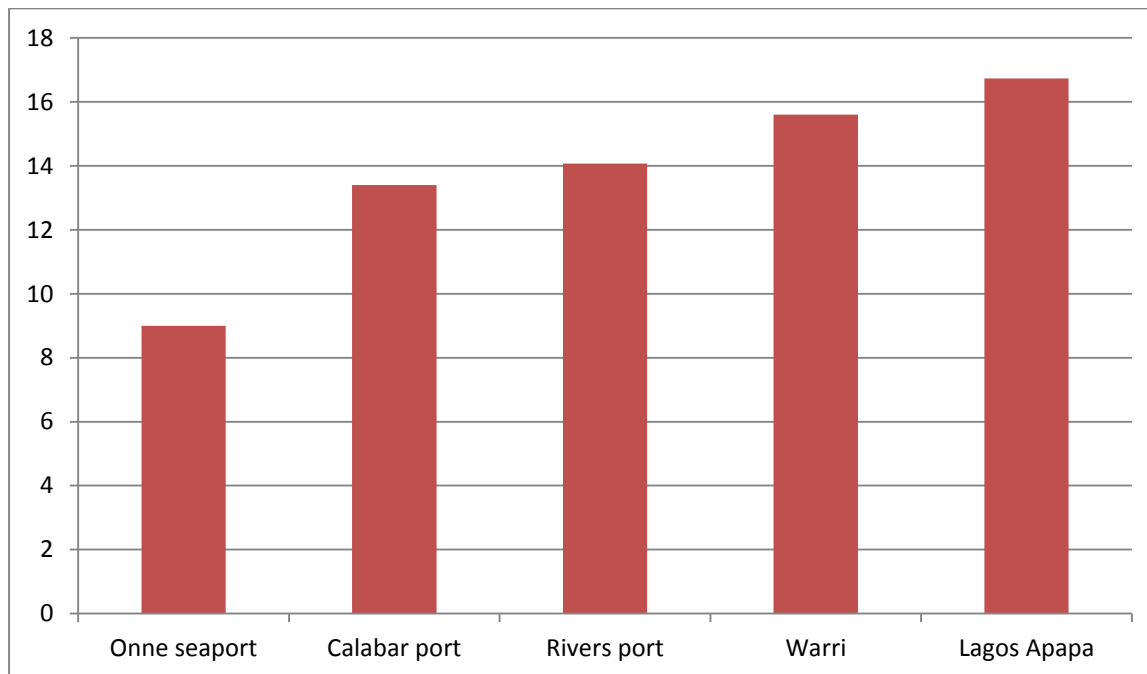


Figure 3: comparison of the amounts of delays in the processing of seaborne in individual Nigerian seaports, affecting shippers in Nigeria, in the post reform era.

The figure 3 above presents a graphical view of the extent of delay in days that shippers encountered in processing and delivering their seaborne trade and consignments through the individual Nigerian ports. It is

important to further show by what percentages these delays differ or increased from the global port sector cargo dwell time benchmark, as shown in table 9 below.

**Table 9: Percentage (differences) between Delays in Processing Shipping Trade in Nigerian seaports and Global Port Sector CDWT Benchmark**

Ports	Difference-increase in delay		Difference- increased delay	
	Days	%difference	Hours	%difference
Onne port	5.00	125%	120hurs	125%
Lagos Apapa	12.733	318.33%	305.59hours	318.33%
Warri port	11.60	290%	278.4hours	290%
Rivers Port	10.067	251.68%	241.61hours	251.68%
Calabar port	9.40	235%	225.6hours	235%
Nigeria port sector	9.76	244%	234.24hours	244%
Global port sector benchmark	4.00	-	96.0hrs	-

Source: Authors calculation

The result of the study presented in table 9 above indicates that between 2007 and 2021 represented as the post concession era in the Nigerian maritime/port industry, the delays in processing and delivering seaborne trade, affecting shippers in the sector is about 244% higher than the global port sector CDWT benchmark of 4 days (96 hours). The Nigerian port sector induces about 9.76 days (234.24 hours) higher delays in processing shipping trade through it than the global port sector CDWT benchmark. The individual ports of Nigeria have each higher time delays of processing shipping trade through it than the global port sector benchmark.

For example, the delay experienced by shippers in Onne and Lagos Apapa seaport is 125% and 318.33% respectively higher than the global port sector cargo dwell time benchmark. Rivers seaport, Warri port and Calabar port have respective delays in processing seaborne trade through it of 251.68%, 290%, and 235%; higher than the global port sector benchmark. Figure 4 below shows the comparison of the global port sector CDWT benchmark and the Nigerian port sector average delays encountered by shippers in processing shipping trade in the ports.

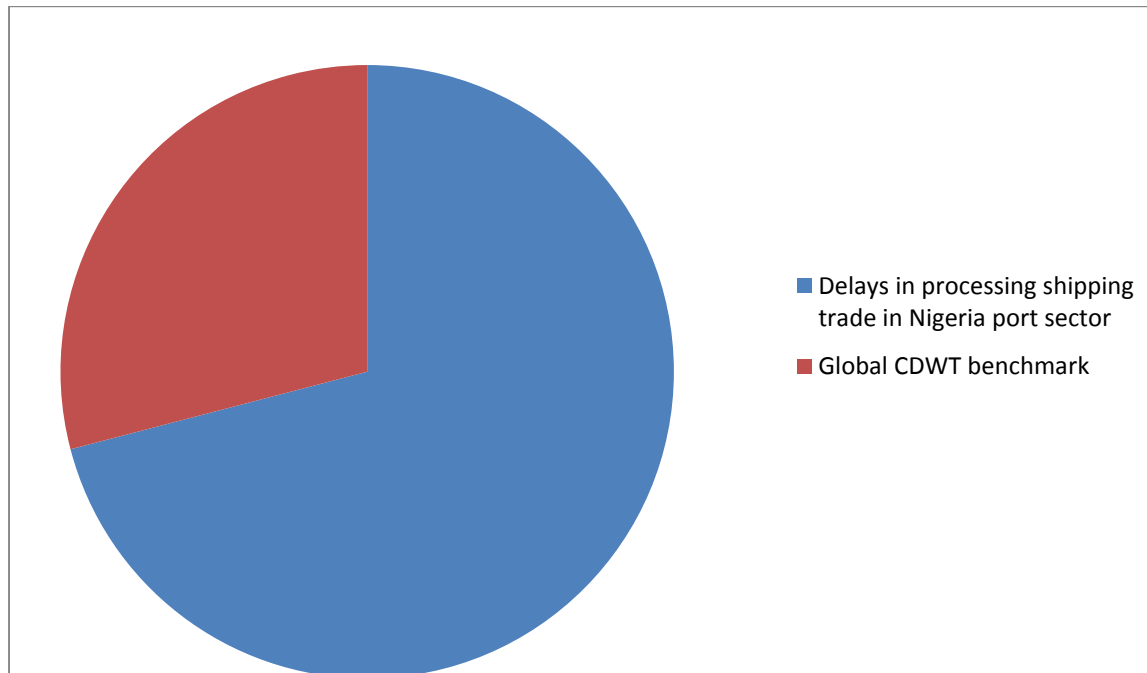


Figure 4: Comparison of the global port sector CDWT benchmark and the Nigerian port sector average delays encountered by shippers in processing shipping trade in the ports.

**Table 10: Determining the Existence of Significant Difference between Global Port Sector Cargo Dwell Time Benchmark and Average Delay in Processing Shipping Trade in Nigerian Seaports**

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 GBLOBACDWT	4.0000	15	.00000	.00000
TRADEDELAYNIGERIA ORTS	13.7600	15	1.23335	.31845

**Paired Samples Test**

	Mean	Std. Deviation	Std. Error Mean	Paired Differences
				95% Confidence Interval of the Difference
				Lower
Pair 1 GBLOBACDWT - TRADEDELAYNIGERIA ORTS	-9.76000	1.23335	.31845	-10.44300

**Paired Samples Test**

	Paired Differences	t	df	Sig. (2-tailed)	
					95% Confidence Interval of the Difference
					Upper
Pair 1 GBLOBACDWT - TRADEDELAYNIGERIA ORTS	-9.07700	-30.649	14	.000	

Source: Authors Calculation

Table 10 above investigated the existence of significant difference between the global port sector cargo dwell time (CDWT) benchmark for all trades, and the Nigerian port sector average delays in processing seaborne container and non-container trade transiting through the ports, affecting shippers in Nigeria. The result reveal a mean global port sector CDWT benchmark of 4.00 days (96 hours) with standard deviation of 0.000 and a mean Nigerian port sector delays in processing of seaborne trade of 13.76d days (330.24 hours) with standard deviation of 1.23335. The average difference between

the delays in trade processing in Nigerian ports and the global port sector CDWT benchmark is 9.76 days (234.24 hours), against the Nigerian port sector. The t-score is -30.649 and the p-value is 0.000 with 14 degrees of freedom. We infer that there is significant difference between the extent of delays in the processing of shipping trade in Nigerian port sector and global port sector CDWT benchmark. The result implies that shippers suffer much extended higher delays in Nigerian ports in the post reform era, suggesting the need for corrective measures to be implemented.

**4.1. Test of Hypotheses**

Here, the various hypotheses of the study were tested. The hypotheses tested include:

**H<sub>01</sub>: There is no delay in ship operations and husbandry in Nigerian seaports.**

**H<sub>02</sub>: There is no existence of delay in the processing of container shipping trade in Nigerian seaports.**

**Table 11- Test of Hypothesis H<sub>01</sub>: There is no delay in ship operations and husbandry in Nigerian seaports.**

	Average Delay in ship operation = $d_{ts}$	Decision: Accept $H_{04}$ if industry average = 0
Port sector/Industry Average	3.1860	Reject $H_{01}$
ONNE PORT	1.8776	$d_{ts} > 0$ ; Reject $H_{01}$
LAGOSAPAPA	5.3396	$d_{ts} > 0$ ; Reject $H_{01}$
WARRI PORT	3.4682	$d_{ts} > 0$ ; Reject $H_{01}$
RIVERS PORT	2.8136	$d_{ts} > 0$ ; Reject $H_{01}$
CALABAR PORT	2.4309	$d_{ts} > 0$ ; Reject $H_{01}$

Source: Prepared by the Author. **Note:** since industry average  $d_{ts}$  is  $> 0$ ; we Reject  $H_{01}$

The test of hypothesis  $H_{01}$  shown in table 4.11 above reveal that the average delay in ship husbandry operations in the Nigerian port sector is 3.19; which is greater than zero, (ie.: **3.19 > 0**). Therefore we reject the null hypothesis  $H_{01}$  and accept the alternate that, there is

the existence of delay in ship husbandry operations in Nigerian ports. Similarly, there is delay in ship husbandry operations in all the Nigerian ports of Onne, Lagos Apapa, Rivers, Warri and Calabar.

Table 12. Test of hypothesis  $H_{02}$ : There is no existence of delay in the processing of container shipping trade in Nigerian seaports.

	Average Delay in ship operation = $d_{trade}$	Decision: Accept $H_{02}$ if industry average = 0
<b>Port Industry Average</b>	13.7600	Reject $H_{02}$
<b>ONNE PORT</b>	9.0000	$d_{ts} > 0$ ; Reject $H_{02}$
<b>LAGOSAPAPA</b>	16.7333	$d_{ts} > 0$ ; Reject $H_{02}$
<b>WARRI PORT</b>	15.6000	$d_{ts} > 0$ ; Reject $H_{02}$
<b>RIVERS PORT</b>	14.0667	$d_{ts} > 0$ ; Reject $H_{02}$
<b>CALABAR PORT</b>	13.4000	$d_{ts} > 0$ ; Reject $H_{02}$

Source: Prepared by the Author. **Note:** since industry average is  $> 0$ ; we Reject  $H_{04}$

The test of hypothesis  $H_{02}$  shown in the table 12 above reveal that the average delay in the processing of shipping trade in the Nigerian port sector is 13.760; which is greater than zero, (ie: **13.760 > 0**). Therefore we reject the null hypothesis  $H_{02}$  and accept the alternate that, there is the existence of delay in the processing of shipping trade in Nigerian ports. Similarly, there is delay in processing of shipping trade in all the Nigerian ports of Onne, Lagos Apapa, Rivers, Warri and Calabar.

## 5. CONCLUSION AND RECOMMENDATIONS

In conclusion, the major findings of the study indicate that there is an existence of delay in ship husbandry operations as well as an existence of delay in the processing of shipping trade in Nigerian Ports. The quantum of delays was also ascertained as the port sector average delay in ship husbandry operations in Nigeria is 3.2days. The most delay in ship husbandry operations is encountered by ship operators and charterers in Lagos Apapa port. This is subsequently followed by the Ports of Warri, Rivers Port, Calabar and Onne. The port sector average delay in the processing of shipping and container trade in Nigeria as discovered by the study is 13.7days and the Lagos Apapa port subject shippers' consignment to the most delay of about 16.days. This is subsequently followed by the Ports of Warri, Rivers Port, Calabar and Onne. It is worthy to note that with such statistics, the Nigerian ports are not service friendly ports and thus, will witness Ship-owners try their best to avoid its Ports. This is in a view to avoid these delays evident in the Ports as both ship-owners and shippers experience high logistical costs in Nigerian ports owing to these avoidable delays. Owing to these anomalies also, Nigerian Ports will lose its ranking globally as port service friendly ports, thus killing the image of Maritime trade in the country. There is urgent

need to address these evident problems portrayed in this study as Nigeria loses billions of naira when ship owners and shippers avoid its ports owing to delays in Ship Turnaround Time (STRT) and cargo dwell time (CDWT) which is not an index for globally efficient ports

### 5.1. Recommendations

In proffering lasting solutions to the evident problems identified in this study, the Port authorities, terminal operators and the Nigerian shippers' council should develop strategies to ensure that the ship turnaround time prevailing in Nigerian ports should be compliant with the ship turnaround benchmark operational in the global port sector. This will guarantee reduced delay in ship husbandry in Nigerian ports, affecting ship operators. The number of equipment in the ports should be greatly considered and reviewed upwards. In suing for a higher turnaround time, there should be in place a good number of equipment such as Cranes and Forklifts to efficiently and effectively handle ship traffic and container tonnage expected at the ports. All yard operations need to be digitalized. Gross crane productivity, crane intensity and berth productivity should be relatively considered also as they pose a threat to ship turnaround time in the Nigerian ports. Nigeria ports Authority (NPA) should in developing a policy for eliminating delay in ship husbandry in Nigerian ports should prioritize Lagos Apapa port and Warri port first in the implementation of the strategies/policy, since ship operators encounter the most delays in those ports. This is followed by Rivers port, Calabar port and lastly, Onne port. The Nigeria Shippers Council (NSC) should enforce that terminal operators and government agencies comply with the cargo dwell time benchmark of 4 days operational in the global port sector. Since the Lagos Apapa port, Warri port and Rivers port subject shippers to the greatest delays in the processing of shipping trade in the port, the implementation of strategies and policies to address

delay in trade processing in ports should first consider these ports before extending to Onne and Calabar with least delay experiences. Gate-in and Gate-out should be automated as well as proper management of all

shipment related documents. If these recommendations are properly effected, Nigerian ports shall experience proper effectiveness and efficiency to be ranked among globally efficient ports.

## REFERENCES

- Aylin C. & Yucel o. (2016) Maritime Logistics. Retrieved: 06/07/2021, from <http://www.IGglobal.com>. DOI: 10.4018/978-1-4666-9779-9.ch019.
- Bichou, K. & Gray, R. (2004). A logistics and supply chain management approach to port performance measurement. *Maritime Policy and Management*, 31(1), 47-67.
- Carbone, V. & De Martino, M. (2003). The Changing Role of Ports in the Supply Chain Management: An Empirical Analysis. *Maritime Policy and Management*, 30(4), 305-320
- Bichou, K. & Gray, R. (2004). A logistics and supply chain management approach to port performance measurement. *Maritime Policy and Management*, 31(1), 47-67.
- Dongping Song: Container Logistics and Maritime Transport. *WMU J Marit Affairs* 20, 405–406 (2021).
- Haiwei, L., Weijian, M., Ning Z., & Yufei, F. (2015). Modeling and simulating the operation of the harbor portal crane. *Journal of Coastal Research*, 73(1), 89-94.
- Heaver, T., Meersman, H., & Van de Voorde, E. (2000). Do mergers and alliances influence European shipping and port competition? *Maritime Policy and Management*, 27(4), 363-373.
- Hult, G.T., Ketchen, D.J., & Arrfelt, M. (2007). Strategic supply chain management: improving performance through a culture of competitiveness and knowledge development. *Strategic Management Journal*, 28 (10), 1035–1052.
- Lee, E-S., Nam, H-S. & Song, D-W. (2012). Defining maritime logistics and its value in Maritime Logistics. In Song, D-W. & Panayides, P.M. (Eds.) *Maritime logistics: a complete guide to effective shipping and port management*, Kogan Page.
- Ndikom .O.B. (2011) Fundamentals of Freight Forwarding Management and Practice in Nigeria.
- Ndikom, Nwokedi, Buhari & Okeke (2017). An Appraisal of Demurrage Policies and Charges of Maritime Operators in Nigerian Seaport Terminals: the Shipping Industry and Economic Implications. *Naše more* 64(3) pp. 90-99. DOI 10.17818/NM/2017/3.3.
- Nwokedi T. C., Ndikom O.B., Okoroji L.I. and Nwaorgu J., (2021) Determinant Port-related Factors Affecting the Flow of Shipping Trade and Logistics in Nigerian Seaports. *LOGI – Scientific Journal on Transport and Logistics Vol. 12 (1) Pg:261-270*. DOI: 10.2478/logi-2021-0024
- Olapoju, Olabisi. (2019). an appraisal of containerization in ports of western and eastern Nigeria. *International Journal for Traffic and Transport Engineering (IJTTE)*. 9. 188-197. 10.7708/ijtte.2019.9(2).05.
- Panayides, P.M. (2006). Maritime logistics and global supply chains: towards a research agenda. *Maritime Economics and Logistics*, 8 (1), 3–18.
- Panayides, P.M. & Song, D.-W. (2008). Evaluating the integration of seaport container terminals in supply chains. *International Journal of Physical Distribution and Logistics Management*, 38 (7), 562–584.
- Tuna, O. & Arabelen, G. (2013). Deniz Ulaştırma Lojistiği (Maritime Logistics). In Cerit, A., Deveci A. & Esmer, S. (Eds.), *Denizcilik İşletmeleri Yönetimi (Maritime Business Management)* (pp.533-561). İstanbul, Beta Basım A.Ş.

**Cite this Article:** Mbachu, JC; Ndikom, OB; Nze, IC; Nwokedi, TC (2024). Evaluation of Logistics Performance of Nigerian Ports in the Post Privatisation Regime. *Greener Journal of Business and Management Studies*, 12(1): 38-52.