Assessment of Vessel Turnaround Time in Eastern Nigerian Ports

Monday, E. I.*, Emenike, G. C. and Ibe C. C.

Centre for Logistics and Transport Studies, University of Port Harcourt, Choba, Rivers State, Nigeria
**Corresponding Author*

***Abstract*:- The study examined vessel turnaround time 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 Ports. A direct emailing system was utilised to administer respondents questionnaire directly and available data obtained were analysed descriptively. The study findings revealed that container terminal performance in Eastern Nigerian ports with regards to vessel turnaround time at its best of 2 days per vessel especially for Onne Port in recent time, followed by Rivers Port, Delta (Warri) Port, and the Calabar Port in that order of efficiency. The PPMC analysis revealed that the rho outcome of 0.798 @ p0.000 <0.05 reveals that there is a strong significant relationship between port infrastructure and vessel turnaround time in Eastern Nigerian ports, which infer that the null hypothesis was rejected and alternate hypothesis was accepted indicating that; there is a significant relationship between port infrastructure and vessel turnaround time in Eastern Nigerian ports. The study concluded that vessel turnaround time has a global standard duration of 24 hours per vessel, hence the need for total improvement across the Eastern Ports. Port managers should improve on port automation orientation of their ports by encouraging the use of efficient work information and communication technology systems in order to improve on vessel turnaround time among others port performance indicators. Port managers should institutionalise port automation that will improve cargo turnaround time in the various sea-port so as to increase the income generation activities of port, thereby improving the nation's economy.**

I. INTRODUCTION

The operational situation at the four ports in Eastern Nigeria since the pre-concession era demonstrates a very low by 8% with respect to level of cargo through put, inefficiency in labour performance/output, and high turnaround time for ships, low berth occupancy, low labour (stevedores) performance, and customer's service level (Nwanosike et al., 2016). Some ports are still performing below expectation in spite of port concession policy. Eastern ports which are all landlord ports operate below expectations, instead of the forty-eight hours' international standard for a ship to berth, discharge her cargoes and sail; it takes two (2) to three (3) days, sometimes weeks even a month for a vessel to complete her cargo operation, to discharge direct/indirect delivery of cargo general and containerized, and sail in Eastern ports. This means there are some problems responsible for delays at the Eastern ports. The operational problem is believed to include lack of adequate handling cargo equipment, inefficient port automation and non-functional/inadequate vehicles to effect cargo delivery, lack of infrastructure, poor funding, inaccessibility to the ports and terminals, uncooperative stevedores' attitude, stiff management bureaucratic bottle necks of government agencies like Nigeria custom service, and non-automation of operation in the ports or attitude of clearing agents in the ports.

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.

Port operations similarly, enhance container terminal performance, especially loading and unloading of cargoes (Eniola, 2014). The efficiency of terminal operations is important for cargo transhipment that will ensure Nigeria ports comply with the 48 hours' cargo clearance rule of the International Maritime Organisation (IMO). However, Igbokwe(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 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.

Port congestions, high container dwell time, high turnaround time of vessels and trucks, inadequate of port facilities such as berths, etc have tremendously negated the operational performance of Eastern Ports. These drawbacks in port activities have made Eastern Ports operationally inefficient leading to increases in demurrage charges and operating cost of vessels. The implied economic implication of the aforementioned inefficiencies is that most shippers will prefer to call at other ports with less congestion, better port facilities and sophisticated cargo handling equipment. The economy is

also experiencing increases in the prices of consumable goods, cut-off-flow during operations by the production companies, decrease in per capital income of port employees and general decreases in the revenue accruable to the port.

The vessel or ship turn-around time is an accumulation of the two critical times, ship service time at berth and waiting time or the time the ship spends in port from its arrival within the limits of the port up to its departure (Francou, 2001). Based on statistics provided by KTO for the last two and a half years, 1999-2001, ships' turn-around time was equivalent to the ships' service time at berth as there was no waiting time. This indicator is one of the most common measurements of port performance in the world because the survival of ports totally depends upon the satisfaction of the ship-owner its primary customer. The shortest ship turn-around time is the most advantageous for the ship-owners because their profits are highly influenced by the time spent in port. Thus, the shorter the staying time of ships in ports the higher the profit. Based on Francou (2000) time in port is 35 approximately 18% of distribution of port expenses. Ship turnaround time however includes waiting time, manoeuvring time between the entrances to the berth or mooring point, ship service time at berth, shifting time between berths and manoeuvring time to leave the port. This study seeks to investigate what is the actual problem responsible for the low turnaround time of vessels and delay in container terminal performance in Eastern Nigerian seaports. It is in view of these that this study was carried to assessed vessel turnaround time 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. 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:

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 thus:

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

Sample Size = 311 staff

III. RESULT AND DISCUSSION

Table 2: Vessel Turnaround Time in Eastern Nigerian Ports

Ports/Turnaround Time in days / **Years**	**Rivers**	**Onne**	**Delta**	**Calabar**	**Total**
2010	10.55	4.84	5.36	3.43	**24.18**
2011	9.09	4.05	4.71	3.25	**21.1**
2012	8.19	2.5	6.75	4.84	**22.28**
2013	6.83	2.6	5.35	4.45	**19.23**
2014	5.77	2.70	5.90	5.00	**19.37**
2015	6.55	2.59	4.00	3.72	**16.86**
2016	8.05	2.39	6.09	3.45	**19.98**
2017	8.00	2.47	6.19	4.55	**21.21**
2018	3.00	3.70	3.15	3.00	**12.85**
2019	2.26	2.00	2.51	3.05	**9.82**

Source: NPA Annual Bulletins, 2020

Table 2 shows one of the major performance indicators for port operation. The data obtained show that the average turnaround time of vessels for the year 2010 in the operation of Eastern Ports reduced to 6 days per vessel to 5.28 days per vessel in the next year 2011. In 2012 Eastern Ports recorded 5.84 days in its turnaround time, experiencing a decrease of 10.61% from the preceding year.

The period under review shows that year 2010 recorded vessel turnaround time in days as Rivers Port operated on 10.55 days, Onne Port at 4.84 days, Delta Port 5.36 and Calabar Port 3.43 days for operational turnaround time. At 2011, the Onne seaport recorded a 2.6 days which is at -3.4 days to the next year 2012. 0.1 variation in turnaround time at 4.0% between 2012 and 2013, between 2014 and 2015 the Onne port recorded a negative variation of -0.11 at -4.18%. At Onne seaport variation between 2016 and 2017 was 0.08days at 3.47%. the turnaround time for the year 2018 was at 3.00 days for Rivers Port, 3.70 days for Onne Port, 2.51 days for Delta Port and 3.00 for Calabar Port, while 2019 recorded as follows; Rivers Port had a turnaround time per vessel of 2.26 days, 2.00 days for Onne Port, 3.00 days for Delta Port and 3.05 days for Calabar Port. Port efficiency in recent past has been assessed through vessel turnaround time in days, and it has been shown that the Eastern Ports are over the last ten (10) years has been experiencing an improved turnaround time per Port as Onne Port showed a positive growth in that regard. Followed by the Rivers Port, Delta Port and Calabar in that order of efficiency. Amadi (2014) also opine that, the standard measurement of average turnaround time, which is a primary indices for port performance per ship is at 24 hours. However, for shipping lines port efficiency and cost are major factors in deciding whether or not to call at a port (Sheck, 2007).

Container terminal performance in Eastern Nigerian ports with regards to vessel turnaround time at its best of 2 days per vessel especially for Onne Port in recent time, followed by Rivers Port as seen in Table 2 . Port infrastructure and Port Automation has a significant role in improving the vessel turnaround time of Eastern ports. According to Gertjan and Bart (2018), port infrastructure plays a key role in fastening vessel turnaround time as they aid in quick and efficient discharging of vessels for subsequent journeys. When port infrastructure is properly provided it encourages speedy vessel turnaround time in port. The standard measurement of average turnaround time, which is a primary indices for port performance per ship is at 24 hours as acknowledged by Emenike et al (2018). Ndikom (2013) further noted that ship turnaround time exerts a strong influence on cargo throughput level of a port, while turnaround time record of a port itself influences port choice by ship operators.

It is also important to note that an increase in vessel turnaround time in Eastern ports has a huge negative effect in its vessel and cargo throughput as it was ascertain by Filani and Shomoyiwa (2009), they were of the view that since the cargo stays longer in port or at berth it means that more delay charges is paid for time wastages due to poor infrastructural condition and failure to fully automate the Eastern Ports. Port authorities in this case loose customers/patronage and subsequently revenue.

Table 3 shows the results of the test of hypothesis, the results of the hypothesis tested show strong positive relationship. The r outcome of 0.798 at p =0.000 ($p<0.05$) reveals that there is a strong positive relationship between port infrastructure and vessel turnaround time in Eastern Nigerian ports, and it is also significant; which means that the null hypothesis was rejected and alternate hypothesis was accepted indicating that; there is a significant relationship between port infrastructure and vessel turnaround time in Eastern Nigerian ports.

Table 3: Pearson Product Moment Correlational Analysis of port infrastructure and Vessel Turnaround Time in Eastern Nigerian ports

Statistics	Port infrastructure (PI)	Vessel turnaround time (VTT)
Pearson correlation		0.798**
Port infrastructure	(PI)	
Sig(2-tailed)		0.000
N		283
Pearson correlation- vessel turnaround time (VTT)	0.798**	
Sig(2-tailed)	0.000	
N	283	

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

Source: SPSS Window Output, Version 22.0

From the inferential analysis so far, it can be stated that the outcome of the relationship between port infrastructure as a dimension of port operation and the measure of container terminal performance in Eastern Nigerian ports which is vessel turnaround time, is positive and significant. This simply means that port infrastructure is an asset and it helps to which to facilitate vessel turnaround time in Eastern Nigerian ports.

V. CONCLUSION AND RECOMMENDATIONS

Vessel turnaround time has a global standard duration of 24 hours per vessel, hence the need for total improvement across the Eastern Ports. Port managers should improve on port automation orientation of their ports by encouraging the use of efficient work information and communication technology systems in order to improve on cargo throughputs, vessel turnaround time among others port performance operational indices. Port managers should institutionalise port automation that will improve cargo turnaround time in the various sea-port so as to increase the income generation activities of port thereby improving the nation's economy.

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