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AN EMPIRICAL STUDY OF NIGERIAN SEAPORTS OPERATIONAL PERFORMANCE

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Abstract:
This study examines the operational performance of Nigerian seaports and the critical factors that can affect cargo handling in the domestic and international supply chains. The evaluation of operational performance of seaports reflects on their status and reveals the position of the seaport competitiveness in the maritime industry. Moreover, it is important to note the impacts of operational efficiency of seaports on the inbound and outbound supply chain and logistics, which is the vital role of maritime business survival. This study utilized regression model to analyse seaport operational performance of the Nigerian seaports. While, Anova test was used to examine the level of significance of the independent variables, against the dependent variable. The results from the study show that there is a positive significant relationship between cargo throughput as the dependent variable and independent variables (number of vessel traffic, turnaround time, and number of employees) of the seaport. Since the p-value < 0.05%. This implies that the higher cargo throughput operations, the higher number of vessel traffic, thereby increasing seaport cargo traffic. Finally, the number of vessel traffic was positive, with a high significance level at values of (2.366). While, turnaround time and number of employee coefficient values with values of (– 0.086 and - 0.519), it indicates high level of significance, although both were negative coefficients, which infer decrease in operational performance. Therefore, there is a need to improve seaport operational performance and some characteristics that may be needed to rebrand the seaport to achieve a higher operational efficiency level to avoid congestion in the nation seaports.

Key words:
Seaport, operational performance, cargo, turnaround time and throughput.

INTRODUCTION

The socio-economic development of as a nation depends on both domestic and international trade to a great length. However, foreign trade is one of the principal generators of economic growth or development. Economic growth occurs when trade balance increases in favour of a country in question, and in phenomena where all trade-offs and economies of scale plays to their advantage. It could be said that a nation economic growth increased foreign trade, because foreign trade itself has a great influence on economic growth. The above argument could be sustained when viewed from the angle of a developing country like Nigeria, who cannot manufacture most of the goods needed by her citizens must import them. Furthermore, she must have to export her raw materials, mainly crude oil in order to obtain foreign exchange/currency needed to pay for the import of capital equipment, raw materials, and technological skills for her economic development [1]. A port is the terminal facility provided to serve the purpose of accommodating all shipping requirements for a ship or sea going vessel to be provided with a berthing place as well as also providing all the necessary facilities and equipment for effective and efficient cargo handling operation, general maintenance and coordination of all shipping activities and operations. The cargo carried by ship means nothing until, they are discharged and transferred to an inland vehicle for onward journey to the shipper's warehouse, hence the necessity for the availability for effective cargo handling facilities and port operations. Here, it is often said that there is a master servant relationship existing between the ship and the port. In other words, the survival of a port economically depends upon her ability to service its customers, the calling ships efficiently and cost effectively [1]. Today effective port facilities and operation serves as an unchallengeable criteria for improved shipping activities and hence, improved economic development of any nation, and it has been statistically proven that no land locked nation has the capacity to adequately promote its international trade without making use of the port provided facilities and operations, so they look to the nearest port facility available to them and provided by another neighbouring country, as such can be seen in the case of Niger Republic which depends of the services provided by the Nigerian ports to facilitate its international trade, and consequently subjected to high port charges and tariffs. The port has been described severally as a gateway to a nation's economy. The economic growth of a nation depends on how efficient and cost effective. The port is operated and managed. Just as the economic growth of a nation demands for port facilities, also the port facilities must be run or operated efficiently to enable further economic growth or expansion. In a situation whereby, a port is underutilized or lacking adequate facilities as such cases as that of under capacity, there is a high tendency of the port losing customers as a result of dissatisfaction with services, which might result in the diversion of cargo and ship traffic to neighbouring ports with adequate facilities and capabilities of handling ship traffic and cargo.

1 NIGERIAN SEAPORTS REFORM AND CONCESSION

From the initiation of operation of the NPA in 1956, Nigeria had worked a service port model. This was confronted with a great deal of difficulties, which brought about the thought of changing over to a landlord port model or port concession. The port concession project was finished in 2006 after a universal focused offering procedure. This prompted the rise of 26 terminals, which were given to private terminal administrators on the Build, Operate and Transfer (BOT) model. The Nigerian ports saw a quick change because of this change in which Nigerian ports were handed over to the port administrators called concessionaires.

Concessions emanated from the requirements for some change. Concession may be viewed as undifferentiated from public-private associations (PPPs) and Private Finance Initiatives (PFIs) as well as an arm of privatization. Privatization of state-owned enterprises (SOEs) became a key part of the auxiliary change procedure and globalization system in numerous economies [2]. It picked up popularity lately. However, has been an old concept used by the French government and can be found in the water project of 1776 [3]. Section 168 of the Draft Ports and Harbour Authorities Bill characterizes a "concession" as an accord between an Authority and a third party in accordance with which such third party is approved to provide port services or operate port facilities as stated by the bill [3]. It is contended that privatization of terminals through concession contracts would be a profitable choice if port rivalry is compelling, however, not inexorably in situations where competition should be made by regulation [4]. The FGN set out on the concession of Nigerian Ports basically to take care of the extended issues of inefficiency, corruption, mismanagement, and huge debts that describe the Nigerian ports. Vehemently concession of Nigerian ports alludes to renting of port terminals and re-association of stevedoring companies. Around 110 applications were gotten in December 2003 and out of 94 pre-qualified concessionaires, just 20 were conceded to work Nigerian seaport terminals for 10-25 years [5- 8].

The idea of productivity is extremely unclear and demonstrates hard to apply in an ordinary port organization reaching out crosswise over production, trading and service businesses. Ports are intricate and multi-parts organization in which institutions and functions regularly cross at different levels [9]. There are numerous methods for measuring port effectiveness albeit decreased to three general classification's physical indicators, factor productivity indicators and economic and financial indicators [10]. Physical indicators refer to time measures about the ship, e.g. Ship turnaround time, ship waiting time, berth occupancy rate). It can here and there measure coordination with land modes, e.g. cargo dwell time or to what extent it takes for offloaded freight to leave the ports. The targets of the Port concession or reform was to build proficiency in port operation, lessening expense of port administrations to stakeholders, reduction of cost to the government for the backing of port sector and pull in private sector in order to free public assets for public services [11]. Given the proposal of the task (CPCS, World Bank and Royal Haskoning), the Landlord port model was picked. The landlord port model generally involved people in private sector being in charge of port planning and administrative assignments (pertaining to safety, security and environment), and keeps up responsibility for related area and essential infrastructure and separating the Nigerian Ports Authority into a few independent port authorities, each in charge of an alternate geographical zone. However, Nigerian ports seem to lack the ability to adapt efficiently in order to meet the ever-changing and developing needs of industries [12].

1.1 Statement of problem

The state of maritime industry in Nigeria deserves attention. The Nigerian maritime system has suffered from such inefficiency, which has incapacitated the level of shipping activities in the ports today. And these have all been occurring due to gross incompetence and mismanagement of port operations and activities, and such problems as lack of adequate infrastructural facilities to properly handle shipping operations in good time. The issue of congestion around port areas to and from the port vicinity cannot be overlooked, as such is the case surrounding the ports in Nigeria more especially Apapa port, which emanates as a result of the non-stop shipping activities that are being carried out in the port surroundings. The port congestion also affects shipping activities. As a result of such traffic gridlocks, shipping activities are not carried out efficiently and effectively, resulting in long turnaround time for ships and increased containers dwell time. The average waiting time of vessels in Nigerian

ports is at the lowest level since most berths seem to remain empty, yet the average turnaround time of vessels remains higher such that when it is compared to the turnaround time of ships in the developed countries, one concludes that the Nigerian port's operations are inefficient. There are excess berths relative to the volume of calling ships, which translates to very low waiting time, yet a high turnaround time. The scenario shifts the problem to services time of the ship in the ports [1, 13]. Many researches have conducted into sea-port operational efficiency. These studies focused on the tactical methods of improving sea-port operational efficiency [14-20]. Some researchers regard seaport as Third-Party Logistics (3PL) provider who intervenes in a series of different companies and supply chains [21]. Three different channels: trade channel, logistics channel and sup-ply chain channels were identified by [21] as a new frame- work of measuring performance of seaports. However, there still exists a gap in assessing the seaport operational efficiency. The question: "What characteristics are key to improving sea-port operational and to what extent, they can bolster efficiency?" it has not been adequately addressed in literature. Some research dwells on one or two aspects at a time leaving out other aspects. This research seeks to address this concern by examining sea-port operational efficiency, establishing determinants of such efficiency for its evaluation and building its model. Since various aspects of efficiency do not lend themselves to precise analytical techniques but can benefit from subjective judgments on the collective basis [22], regression model was used as a feasible method for identifying key factors that are significant to sea-port operational performance.

1.2 Aim and objectives

This study assesses Nigerian seaport operations using cargo throughput, number of employees, and turnaround time and ship traffic calling at the ports as the performance indicators. The objectives are:

- To examine the relationship between cargo throughput and port operations in Nigerian ports.
- To study the relationship between turnaround time and port operations.
- To determine the relationship between the number of employees and port operations.
- To make recommendations based upon the research findings.

1.3 Research hypotheses

The hypothesis below are developed and will be tested in view of ascertaining the significant relationship between variables and port operational performance.

H1: There is no statistically significant relationship between cargo throughput and number of vessel traffic, turnaround time, and number of employees.

2 LITERATURE REVIEW

Seaport operation is defined as cargo handling (or moving) activity, performed by a designed company (gang or team), consisting of labour and machines. It is also defined as the operation of a wharf and other port facilities, operation of port passenger transport service, operation of cargo loading/unloading, haulage and warehousing services within a port area and so on [23]. Presently, there is a difficulty in defining port efficiency due to non-universal definition of what indicates an efficient port or what port efficiency entails [24]. An efficient seaport should be one that is competent in operations. Based on this definition, efficiency of

sea-port operations is determined by duration (time) of ship's stay in a port, quality of cargo handling and quality of service to inland transport vehicle during passage through the port [25]. Quality of cargo handling is in the form of berth throughput and quality of service to the inland vehicle is dependent on port infrastructure. Productivity has been identified as a measure of sea-port operational efficiency [19, 26]. Many researchers have used various approaches to evaluate sea-port efficiency. Annual firm level surveys have been employed as indicators of seaport operational efficiency, but "there was almost no information on how port efficiencies evolve over time from these studies" [25]. Many studies have used data on inputs, outputs and production function theory, by means of data envelopment analysis (DEA), to estimate the most efficient production frontier across a set of seaports [15, 19, 26]. The approaches using this method have the advantage of economies of scale derived from econometric evidence, but the drawback is that they typically assume constant return to scale [25]. To address the issue of error estimation and statistical confidence, another approach, econometric estimation of cost functions, was developed by [25]. The method, however, has "difficulties with data requirements, particularly measurement of labour, capital and other requirements" [25] which limit its application to many seaports at a time. Some research has been done on the contribution of port ownership to efficiency. Transformation from public to private ownership is believed to improve sea-port operational efficiency even without change in level of competition [27]. Some researchers [27], contended that principal-agent problem may cause by private sector as a result of capital market imperfections [19].

Clark et al. described a port as an enterprise that must provide quality service to her customers to survive economically [28]. This is because shippers as well as, ship owners demand efficiency services from port operators for continual patronage. The ability of a ship to function economically depends among other factors, the availability of a good functional port. In the same manner, [29] sees a port as a service facility that needs to be equipped properly to service her master efficiently if its usefulness and performance level are to be recognized. According to [29, 30], just as the shipping industry's usefulness, efficiency and overall performance are evaluated in the light of services rendered by the sector to the nation [31, 32] observed that, more recently, the literature on port efficiency has focused on total factor productivity, using techniques such as Data Envelopment Analysis (DEA) or Stochastic Frontier Analysis (SFA). The aim is to identify the maximum output that can be achieved from a given set of inputs, or – alternatively – the minimum resource cost of producing a given output. The overall efficiency of individual ports can then be measured by comparing their output (normally annual cargo throughput) and resource inputs with those of the nearest point on the "production frontier", which itself is based upon the input/output ratios of the best-performing ports in the sample. It is difficult (although not impossible) for DEA and SFA models to handle more than one type of output. So, they are usually applied to single-cargo terminals rather than multi-cargo ports. The ports used for efficiency comparisons are usually at different stages in their life's cycles. Ports approaching full capacity are generally recorded as "efficient", even when they are congested and offer poor standards of service, because they are maximizing the output obtained from the available facilities. New ports, in contrast, often show up as inefficient because capacity can only be built in relatively large increments and several years of traffic growth may be needed before it is filled up and the port is achieving its maximum output. Table 1 however, indicated that Nigeria imports more than the exports and this portends that the Gross Domestic Product (GDP) of the country may not be economically sound [12].

Okeudo has studied on the measurement of efficiency level in Nigerian seaport after reform policy implementation, case study of Onne and Rivers seaport [33]. In the study, the researcher focused upon the impact of reforms on port performance using Onne and Rivers ports as a reference point. It analyses the pre- and post-reform eras of the ports in terms of

their performance [34, 35]. The reforms took effect from 1996 after the Government of Nigeria concession the ports to private investors. In carrying out the analyses, the parameters used are; Ship traffic, Cargo throughput, Ship turnaround time, Berth Occupancy and personnel were used as variables for the assessment. DEA models were used to assess the seaport reforms and the result shows that the seaport performance is improving unlike before the port reforms. [36] studied on Sea-Port operational efficiency, evaluating five Asian Ports using Stochastic Frontier Production Function Model. In the study they used stochastic frontier and inefficiency models to analyse sea-port operational efficiency and Delphi technique to seek expert respondents' opinion on its characteristics. The research also uses structural equation modelling to build a model of sea-port operational efficiency as a further step to examine the significance of the characteristics. The results from this study, emphasize the need to improve sea-port operational efficiency, and indicate which characteristics should be given more attention.

3 MATERIAL AND METHODS

The research methodology is based on the production theory from the statistics modelling of linear regression. The characteristics of operational technologies represent the relationship that exists between input and output indicators at the seaport. A quantitative research approach is used to investigate the possible relationship between seaports, cargo throughput, turnaround time and number of employees, in other to establish if the ship traffic calling is determined by the independent variables in Nigerian ports and if it has any effect and to what extent. Linear regression analysis was used with the aid of statistics package for social science (SPSS) software version 23.0 software package to determine the relationship between dependent and independent variables and the production function of the seaport operations. Secondary data is sourced from the National Bureau of Statistics (NBS) annual abstract statistics reports and bulleting, Nigeria Port Authority (NPA) annual report and the Nigeria Customs Service (NCS). Taking a review of relevant literature related to the contents in executing this research project. The information required for the research work was mainly gathered from the published material from the relevant authorities and past and relatively relevant records. Some of the data information presented in those materials was also documented for different goals, which had different aims.

4 MODEL FORMULATION

There are many statistical investigations in which the objectives are to determine if a relationship exists between two or more variables. If such relationship can be expressed by a mathematical formula, it can be used for making predictions. Linear regression analysis is used to determine the relationship between two or more independent variables, with the other dependent variables. It determines relationship strength between tested variables, using the coefficient of determination (R^2). The significance level of the variables that will be tested here is determined by using the F – test and the P – test as the tools. The calculated F value is compared with the tabulated/critical F value to determine the level of significance to the relationship between variables, while the P (Probability) value is compared with the significance level for the research in order to determine the level of significance to the relationship between the variables. To achieve set objectives for this study, a regression statistic is used to formulate descriptive equations/models, based on the general equation.
The formula for multiple regression model is stated as follows:

$$\hat{Y} = b_0 + b_1(x1) + b_2(x2) + b_3(x3) + \cdots \ldots\ldots + b_n(xn) + \text{en} \quad (1)$$

Where, y - dependent variable
x_n *- independent variable*
b_0 *- constant and*
b_n *- coefficient of x.*
en - error term

Where the dependent variable is: Y = Cargo throughput, while the independent variables $x1, x2, \ldots\ldots\ldots xn$ are given as follows: number of vessel traffic, turnaround time and number of employees, to capture the level of Nigerian seaports operational performance.

4.1 The coefficient of determination (R^2)

The coefficient of determination (R^2) measures the rate of variation in the dependent variable, which is explained by the independent variable. The coefficient has a result between zero and one (i.e. 0 and 1), with a value of 1demonstrating a great fit. This value is normally changed to a percentage to know the strength of relationship.
The decision rule here states that:

- *If R2 ≥ 50% then relationship is strong.*
- *If R2< 50% then relationship is weak.*

4.2 Decision rule

The decision rule adopted for this study stipulates under what condition the null hypothesis will be accepted or rejected. The region of rejection determines the proportion of the area in which the hypothesis null is rejected. The null hypothesis (H0) is rejected if the T-calculated (T-cal) or F-calculated (F-cal) is greater than the T-tabulated (T-tab) or F-tabulated respectively at P-value equal to 0.05. While it is accepted if the T-calculated or F-calculated is less than T- tabulated or F- tabulated respectively at P- value equal to 0.05.

F test:
The decision rule here states that:

- If $F_{calulated} > F_{tabulated}$ then relationship is significant i.e. reject H_o,
- If $F_{calulated} < F_{tabulated}$ then relationship is not significant i.e. accept H_o.

P test:
The decision rule here states that:

- If P value < significance level (0.05) then relationship is significant i.e. reject H_o,
- If P value > significance level (0.05) then relationship is not significant i.e. accept H_o.

5 DATA ANALYSIS AND FINDINGS

The data gathered are collated for a better understanding and consistency in presentation. In this study, each of the analyses is done with two sets of variables, where one is the dependent variable (Y) and the other is the independent variable/ predictor (X). There are variables involved in this model, these variables were used in the process of analysing the raw data as follows;

- Dependent variables: Cargo throughput.
- Independent variables: turnaround time, number of vessels, number of employees.

Tab. 1 *Nigerian shipping activities data at the ports between 2007-2014*

Year	No. of Vessels	Cargo Throughput (mt)	Turnaround-time (days)	No. of Employees
2007	4,510	57,473,350	3.75	6,913
2008	4,290	63,982,749	4.59	4,967
2009	4,721	65,775,509	6.55	4,303
2010	4,881	76,744,727	5.38	4,233
2011	5,232	83,450,032	5.48	4,157
2012	4,837	77,104,758	5.75	4,057
2013	5,369	78,281,684	4.63	3,990
2014	5,333	85,016,708	5.98	3,870

Source: NPA website.

Tab. 2 *Descriptive statistics of the Nigeria shipping activities data at the ports between 2007-2014*

	Mean	Std. Deviation	N
CAR_THRU	73,478,689.63	9,893,146.548	8
NO_VESS	4,896.63	392.456	8
TURN_TIME	5.26	0.895	8
NO_EMP	4,561.25	1,006.525	8

Source: Authors

The statistics shown on the above table are large numbers and the implication is that the original data is sourced from the Nigeria Port Authority (NPA) direct and it shows that the data is real, not estimated data. The original data used to compute the standard deviation is clearly displayed in the table 2. The result shows the mean of the variables used in this analysis.

Tab. 3 *Correlations result of the of the shipping activities of the Nigeria ports*

		CAR_THRU	NO_vESS	TURN_TIME	NO_EMP
Pearson Correlation	CAR_THRU	1.000	0.871	0.488	-0.820
	NO_vESS	0.871	1.000	0.335	-0.644
	TURN_TIME	0.488	0.335	1.000	-0.740
	NO_EMP	-0.820	-0.644	-0.740	1.000
Sig. (1-tailed)	CAR_THRU	0.0	.002	0.110	0.006
	NO_vESS	0.002	0.0	0.209	0.042
	TURN_TIME	0.110	0.209	0.0	0.018
	NO_EMP	0.006	0.042	0.018	0.0
N	CAR_THRU	8	8	8	8
	NO_vESS	8	8	8	8
	TURN_TIME	8	8	8	8
	NO_EMP	8	8	8	8

Source: Authors

Table 3 shows the Pearson correlation and 1-tailed test result. The correlation analyses indicate significant positive relationships between the dependent and independent variables, which are, isotonic and justified to be included in the model [37]. The correlation analysis for the Nigerian seaport variables shows various significant relationships between the dependent and independent variables, using the regression model of Pearson correlation analysis. Table 4.3, confirms that there is a correlation between cargo throughput and Number of vessel traffic at 0.871 (87%), meaning that there is a normal relationship between dependent and independent variables. This means that the number of vessel traffic that brought the cargo to the seaport is on the average. For cargo throughput and turnaround time result, stand at 0.488 (48%), which means that there is very weak relationship between the dependent and independent variable. Between the cargo throughput and number of employees, the analysis result is -0.820 (-82%), meaning that there is a very weak significant relationship between the tested variables; while on the turnaround time and number of vessels, the result shows 0.335 (34%). It implies that there is a weak significant relationship between the turnaround time and number of vessel traffic, it reveals that the turnaround time of vessels in the Nigeria seaports is lower, the relationship proves that there are many vessel delays in the seaports. The correlation of employees' number and number of vessel traffic shows a result -0.644 (-64%), meaning that there is an average weak relationship between the number of employee and number of vessel, this means that the number of employee that work at the Nigeria seaports does not have adequate capacity to handle the number of vessels calling at these ports. As a result, delay of vessels at these ports are eminent and also causing further delay in custom clearance and relevant documentation for shipping companies.; while the number of employees and turnaround time result is -0.740 (-74%), meaning that there is a very weak relationship between the number of employee and turnaround time, this result shows that due to low number of employee, there is a low turnaround time of vessels at these ports and this is the major factor facing Nigerian seaports, which make them unattractive and uncompetitive for shipping . Because of this issue, shippers have diverted so their cargoes to the neighbouring seaports such as Benin Republic, Togo, Cameroon etc. Whereby the country is losing out from an important source of revenue [38].

Tab. 4 *Model Summary* [b] *of the Nigeria shipping activities at the ports*

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig.F Change	Durbin-Watson
1	0.936[a]	0.877	0.784	4,598,180.019	0.877	9.468	3	4	0.027	2.526

[a] *Predictors: (Constant), NO_EMP, NO_ vESS , TURN_TIME*
[b] *Dependent Variable: CAR_THRU*

The above table revealed the cumulative estimated regression model result of the Nigerian seaports, given the levels of both dependent and independent variables. The regression analysis shows the relationship of cargo throughput as dependent variable and the independent variables as the number of vessel traffic, turnaround time of the vessel, and number of employees. The (t values) presented in the above table, are the ratio of coefficients to standard error shows how significant each variable is. The variable number of vessel's traffic was noted as positive, with high significance levels of, (values at 2.366). While, turnaround time and number of employee coefficients with (values – 0.086 and - 0.519), this indicates a high level of significance, although both were negative coefficients, which infer decreased in the operational performance.

From the above analyses, the output summary spread sheet of the regression model; R-square value is (877), this means that 88% is the percentage of variance in the explanatory variables, demonstrated by the regression model of cargo throughput as the explained variable by the independent variables denoted as X1, X2, & X3, it represents number of vessel, turnaround time and number of employees. The adjusted R square with a value of (784), reveals that about 78% of the cargo throughput are explained by the explanatory variables. This value is reasonable and close to the (R squared value). Therefore, it is acceptable. Finally, multiple R with a value of (936) shows that there is an overall relationship of (94%), between the dependent variable (Y1) and the independent variables (X1, X2, and the independent variables (X1, X2, and X3).

Tab. 5 *Coefficients [a] of the Nigeria shipping activities at the ports*

Model	Unstandardized Coefficients		Std Coefficients	T	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	31,898,892.258	50,091,8220.1		0.637	0.559	-107178302.04	170976086.6					
NO_VESS	14,259.276	6,027.052	0.566	2.366	0.077	-2474.504	30993.057	0.871	0.764	0.416	0.540	1.852
TURN_TIME	-946369.044	3004572.725	-0.086	-0.315	0.769	-9288400.28	7395662.193	0.488	-0.156	-0.055	0.417	2.396
NO_EMP	-5,099.717	3,293.667	-0.519	-1.548	0.196	-14244.402	4044.969	-0.820	-0.612	-0.272	0.275	3.639

[a] Dependent Variable: CAR_THRU

Table 5 is used to explain the elasticity of the independent variables (number of vessel traffic, turnaround time and number of employees). The elasticity of the β^1 (number of vessel traffic) result is approximately (0.566), implying that the elasticity of variable to the intercept is elastic. If the β^1 (number of vessel traffic) increases by (10%), dependent variable will increase by (0.57%). The elasticity of the β^2 (turnaround time) result is approximately (-0.086), the elasticity of variable to the intercept is inelastic. If the β^2 (turnaround time) increases by (10%), dependent variable will increase by (-0.09%). The elasticity of the β^3 (number of employees) result is approximately (-0.519), the elasticity of variable to the intercept is inelastic. If the β^3 (number of employees) increases by (10%) dependent variable will increase by (-0.52%). As [39] noted the relationship and the increase in elasticity and the inelastic limit of the independent variables towards its dependent variable.

A parametric model was used to test hypothesis to determine if the parameters used are significant on the dependent variable or not. If the p-value is <0.05, the null hypothesis is rejected, and the alternative hypothesis is accepted.

There is no significant relationship between cargo throughput and number of vessel traffic, turnaround time, and number of employees. Table 6 below shows that the P- value calculated is equal to 0.027. Since the P- value is less than 0.05, the alternative hypothesis is accepted, which means that there is significant relationship between cargo throughput and

number of vessel traffic, turnaround time and number of employees of the seaport operational performance. Also, there is a positive significant relationship between dependent variable (cargo throughput) and the independent variables (number of vessel traffic, turnaround time, and number of employees) of the seaport since the P-value < 0.05%. This implies that the higher cargo throughput operations, the higher number of vessel traffic, thereby increasing seaport operational performance [40-42], states that operational performance of container ports is the measurement of how productivity and efficiency of the seaports are rated based on the input and output variable estimation.

Tab. 6 *ANOVA[a] of the Nigeria shipping activities at the ports*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	600547402385694.400	3	200182467461898.160	9.468	.027[b]
	Residual	84573037963463.200	4	21143259490865.800		
	Total	685120440349157.600	7			

a. Dependent Variable: CAR_THRU
b. Predictors: (Constant), NO_EMP, NO_vESS, TURN_TIME

Tab. 7 *Coefficient Correlations of the Nigeria shipping activities at the ports*

Model			NO_EMP	NO_vESS	TURN_TIME
1	Correlations	NO_EMP	1.000	.626	.728
		NO_vESS	.626	1.000	.277
		TURN_TIME	.728	.277	1.000
	Covariances	NO_EMP	10848243.083	12430055.655	7204312235.187
		NO_vESS	12430055.655	36325360.299	5015987511.686
		TURN_TIME	7204312235.187	5015987511.686	9027457262139.064

a. Dependent Variable: CAR_THRU

The coefficient correlation in the table 7, shows that the independent variable number of employees has a value of 0.626 (63%) relationship to the number of vessels, this means that there is an average relationship between these variables. Number of employees has a value of 0.728 (73%) relationship to the turnaround time of the vessel, and this relationship is of the average. While turnaround time has a value of 0.277 (28%) relationship to the number of vessels is a very weak relationship, meaning that within Nigerian ports, there will be due to a lot of delays due turnaround time of the vessels at the seaport is very weak. There will be congestions in the port, and this will drive so many shipping companies and shipper to the neighbouring country's seaports for their shipping business. This causes the country so much loss of revenue from the shippers and as well as the shipping companies [43, 44].

6 CONCLUSION AND RECOMMENDATIONS

This study sought to evaluate Nigerian sea-ports operational performance; examine the characteristics significant to sea-ports' operational efficiency. The obtained results provide valuable implications to port authorities, operators and business practitioners depending on port. The results show that port size and infrastructure, private sector participation and quality of both cargo-handling and logistics services are important determinants of efficiency. The study found that reforms have been beneficial to the ports and the economy as there is an observed improved cargo throughput at the seaports in Nigeria, although turnaround time of the vessel dropped on the average. Number of employees has a value of 0.728 (73%), relationship to the turnaround time of the vessel, and this relationship is of the average. While turnaround time has a value of 0.277 (28%), relationship to the number of vessels is a very weak relationship, meaning that within Nigerian ports, there will be a lot of delays due to the turnaround time of the vessels at the seaport is very weak. Therefore, there is a need for the regulators, as it is in the concession agreement made provision for an appraisal of the reform operation, but there is non-implementation of such practice as entrenched in the agreement. There is also the problem of arbitrary increase in charges by the shipping companies hence there is an urgent need for a regulator to check the excesses of the shipping companies. The terminal operators ought to always publish its rates, charges and the conditions. There are many government agencies in our ports, this has resulted to high cost of doing business at Nigerian ports hence loss of revenue to both Government and Concessionaires. Furthermore, e-payment should be used for documentation, as it will go a long way in reducing cash gratification and delays thereby realizing the 48hours cargo clearance. The government and the concessionaires should invest more in port infrastructure (cargo handling equipment's) to enhance the ports operation. This will bring about the increase in turnaround time of the ports thereby reducing ship congestion and cargo congestion at the nation's ports.

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