THE INTERNATIONAL JOURNAL OF HUMANITIES & SOCIAL STUDIES

Port Productivity and Container Adoption by Industries in Nigeria

Dr. Adeyanju John Aderemi
Assistant Chief Lecturer, Maritime Academy of Nigeria, Oron, Akwa, Ibom, Nigeria
Dr. Esin John
Lecturer, Maritime Academy of Nigeria, Oron, Akwa, Ibom, Nigeria

Abstract:
In this era of globalisation in transport technology, container packaging technique has become an innovation that cannot be over looked. Aside from enhancing effective delivery of cargo at the final destination, it has also improved port performances and productivity in most countries of the world.
This study examines the extent of port productivity and container traffic in Nigerian ports. The study specifically aimed at establishing the relationship between import and export container traffic and port productivity. Through the use of quantitative data, sic ports (Apapa Bulkship Terminal, AP Mollers and RORO/Tincan Island, Rivers, Delta and Calabar ports) known for increased shipping activities were purposively selected for the study. To complement the data, a total of 360 questionnaires were administered to 30 sampled towns in each of the six geo-political zone of Nigeria based on their population and growth. Two hypothesis were formulated in order to achieve the objectives of the study. These hypothesis were tested using Stepwise Regression Model. The result indicates that significant relationship exists between traffic of export containerised cargoes and total export cargo throughput in five(5) of the six(6) ports selected for the study on one hand, while a significant relationship between the traffic of the import containerised cargoes and total import cargo throughput was established in three(3) of the six(6) ports on the other hand. The obvious implication of the results of the analysis is that containerised cargoes contribute more to the total export cargoes throughput and less to the total import cargo throughput of Nigerian trade.
Based on these findings, the study recommends the formulation of policies that would improve the adoption of containerised trade, particularly, in the total import of cargo throughput in Nigeria.

Keywords: *Port productivity, container packaging, adoption, cargo throughput, industries*

1. Introduction

Productivity indicators at ports according to UNCTAD (1975) include Berth Occupancy Factor, Superficial Throughput, and Linear Throughput etc. Berth Occupancy Factor are tonnage of cargo handled per hour of ship's time at berth. The Cargo Performance Index (CPI) which is the tonnes of cargo handled per hour of ship cargo-handling time is one of the indices to measure the Berth Occupancy Factor at the port. Equally, the Port Performance Index is the idle time of a ship within the port. However, both the Berth Occupancy Factor and Cargo Performance Indices considered the operational time of the ship and these reflect the work schedule at the port as well as the throughput of cargoes handled per hour.

Superficial throughput is the expression of the ratio of the tonnage of cargoes handled at a berth to the degree of utilization of other facilities such as transit shed, warehouses, etc. To determine the superficial throughput at a berth each unit of the storage areas is usually compared to the volume of cargoes received at the berth during a particular time. The transit shed and stacking areas at each port can be used to determine the superficial throughput, although, the data is difficult to collect due to average time each category of cargoes spends at the transit shed and stacking areas. According to Bohdan(1972), occupancy of cargo at the transit sheds and open storage areas are not easy to express in accurate figures because of overcrowding of cargoes with some having overlapping days in the shed. However, Berth Occupancy Rate, expressed in percentage of the dwell time of ship at port, can still be used as a productive factor for vessel at port.

Container transportation requires efficient and careful port planning in order to increase ship and port productivities. Also, measuring port productivity involves both physical and institutional planning which can have limiting factors. These factors influence the productivity measurements which make it impossible to compare ports in different locations. According to Thomas and Thomas (1989), there has not been universally valid way to compare productivity on a cross-sectional analysis because of lack of uniformity in the data used in productivity assessment. This was supported by Hanh, et al(2006) who observed that the productivity of port is influenced by a range of factors and only few of which can be controlled by terminal operators.

Data related to port productivity as identified by Thomas and Thomas (1989) are outlined in the table 1 below:

Terminal Operating Element.	Important factors influencing productivity	Nature of influence on operation.	Productivity Measure	Productivity Factor Measured.
Port Yard/Terminal	Area, shape layout, yard handling methodology box size mix Dwell time.	Extent to which containers must be grounded, stacked	TEUS/Gross acre. TEUS Capacity/net storage areas.	Yard Throughput/ Yard Storage.
Crane	Crane characteristics, Level of Operator Skill, training, Availability of cargo, Breakdowns, Breaks in yard support, vessel Characteristics.	Operational Delays.	Moves/gross gang or crane hours- down time. Moves/gross gang or crane hours.	Net Productivity Gross Productivity.
Gate	Hours of Operation, Numbers of Lanes, Degrees of Automation, and Availability of data.	Extent to which weighing, inspection, documentation checks are expedited.	Containers/hour/lane Equipment moves/hour/lane Truck turnaround time.	Net Throughput. Gross Throughput.
Berth	Vessel scheduling. Berth length, Number of Crane.	Extent of berth utilization	Container vessel shifts worked/year/container berth.	Net Utilization
Labour	Gang size, work and safety rule, workforce skill, training, motivation, vessel characteristic	General tempo, speed of operations.	Number of moves/man hour	Gross labour Productivity.

Table 1: Productivity Measures of Ports and Container Terminals
Source: Thomas and Thomas (1989)

Using the above measurement indices, the productivity of port can be said to depend on cargo throughput handled at a period of time at a port and more so other variables as identified in table 1. Thus, the port productivity data as identified by Thomas and Thomas (1987) serves as a check list upon which the productivity at Nigerian Ports could be assessed. Against this background, this study examines the relationship between container traffic and port productivity in Nigeria as well as the rate at which industries use containers as a means of packaging in freight transportation.

2. Materials and Methods of Study

Six ports (Apapa Bulkship Terminal, AP Molers Terminal, RORO port, Tin Can Island port, Delta port and Calabar port) known for increased shipping activities were purposively selected for the study.

In order to determine the contribution of container traffic in each sampled port to the productivity at that port. Quantitative data related to port productivity and container traffic were collected at the selected ports for the study. These data were subjected to a step wise multiple regression analysis to establish the strength of their relationship. Step wise multiple regression analysis according to King (1969) is among the commonly used tool in research for understanding of functional relationship among multi-dimensional variables. The resultant regression model can be used to perform both predictive and explanatory functions (Oyesiku, 1995). In this study, the model is used to perform only explanatory function. The regression equation is of the form.

$Y = a_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + e$

Where;

Y = Container Traffic (CTRF)
a_0 = Regression Constant.
x_1 = Berth Occupancy Rate in Percentage.(BOR)
x_2 = Cargo Throughput.(CGTP)
x_3 = Average Ship turnaround time.(STAT)
X_4 = Gang Utility Rate.(GUR)
X^5 = Crane idle time in hour or Plant Availability Rate(CIT/PAR)
b_1- b_6 = Regression Co-efficients

The regression equation above was used to determine the relationships that exist between container traffic at each port and other variables such as Berth Occupancy Rate in percentage, Cargo Throughput in tonnage of both export and import traffic, Average Ship Turn Around Time in hour, Gang Utility Rate in hour and Crane Idle Time in hours or Plant Availability Rate in hour.

The justification for the application of the stepwise regression model in this study rest on the fact that it is possible to select the independent variable that is most correlated with the dependent variable. The second most important variable is entered next into the analysis. This procedure continues in this stepwise manner, entering at each stage the “best” independent variable in term of the ability to reduce the remaining unexpected variance. Only the independent variable that significantly accounts for or contributes its reduction of the total unexplained variance were chosen while others were dropped. In this study, six productivity indices were identified and employed in the analysis. These indices are considered relevant in explaining the relationship between port productivity and container adoption in Nigeria.

In the same vein, the responses of industries to the adoption of containers as a packaging method are presented based on the questionnaires administered in each sampled town from each Geo-Political zones in Nigeria. Thirty questionnaires were administered in each of the sampled town of the zone and two towns were selected in each zone based on population size and industrial growth of the towns in the Geo-Political zone. The towns selected in each Geo-political zone were among the highly populated towns and cities based on 2006 population census in Nigeria. These towns and cities were:

i. South-West (a) Lagos (b) Ibadan.
ii. South-East (c) Aba (d) Enugu.
iii. South-South (e) Port-Harcourt. (f) Calabar
iv. North-Central (g) Ilorin (h) Jos.
v. North- East (i) Bauchi (j) Maiduguri.
vi. North-West (k) Kaduna (l) Kano.

A total of 360 questionnaires were administered to 30 sampled industries in each town/city in each zone. Unfortunately, only 235 questionnaires were completed and returned which constituted about 65.3%. The frequencies and percentage of responses were tabulated and presented in tables 8-11, In some instances the total frequencies are more than the total number of industries sampled because some responses are in multiples, for example some industries are involved in more than one operations i.e combined manufacturing and transport.

3. Result and Discussion

Dependent Variables (Co-efficient of Regression)	**Independent Variables**
Constant = 31830.603	CGTP = 6.52E-005
	GUR = -0.411
	BOR= 122.613
	STAT =526.997
R = 0.662	
R^2 = 0.438	
F = 0.976	
"t" = 0.962	
N = 10	

Table 2: Regression Summary for Apapa Bulkship Terminal
Source: Author's field survey, 2014

At Apapa Bulk ship terminal, Ship Turn Around Time(STAT) have the highest regression co-efficient of 526.997 followed by Berth Occupancy Rate with 122.613 (Table 2). To determine the reliability of the model the F- value yielded 0.976 which is significant for the model at 0.05 significant level. However, the t- value of 0.962 is less F –value of 0.976 indicating that the variables fit the regression model. However, the R^2 value is not strong enough at 0.438 which indicates that other exogenous variables contributed to the model.

The R^2 for Apapa Bulkship Terminal indicates that the volume of container traffic in the port is determined by STAT, BOR, GUR, and CGTP as these variables jointly contribute 43.8 percent of the variation in port productivity. However, STAT and BOR seems to be the most important determinant of container traffic in Apapa Bulkship Terminal. The model obtained is as follows;

$Y= 31830.6 +122.6X_1 + 6.52X_2 + 526.997X_3$

This means that given a unit increase in X_1 (Berth Occupancy Rate), port productivity will increase by 1226 units holding STAT, GUR and CGTP constant.

Dependent Variables (Co-efficient of Regression)	**Independent Variables**
Constant = 437034.9	CGTP =0.189
	CIT = -61.773
	BOR= 4663.302
	STAT = -17402.3
R = 0.990	
R^2 = 0.980	
F = 12.008	
"t" = 1.550	
N = 10	

Table 3: Regression Summary for Ap Molers Terminal
Source: Author's field survey, 2014.

At AP Molers Terminal, only Berth Occupancy Rate have the highest regression co-efficient of 4663.302 indicating that Container traffic improves the Berth Occuppancy Rate of the port. However, Ship Turn Around Time and Crane Idle Time have a negative values of -17402.3 and -61.773 which implies that a unit increase in Berth Occupancy rate arising from increase in container traffic at AP Molers Terminal, Ship Turn Around Time and Crane Idle Time will decrease by 17.40 and 61.77 percentages respectively. Thus, there is inverse relationship between Berth Occupancy rate and Ship Turn Around Time as well as Crane Idle Time in AP Molers Terminal. This confirm the incessant delay always reported at the ports which is also attributed to the high Crane Idle Time. The F-Value yielded 12.008 which is significant at 0.05 significant level. The R^2 is high with a value of 0.980 which indicated that about 90.8% of the container traffic in AP Molers Terminal is significantly determined by STAT, BOR, CIT, and CGTP (Table 3). This is not surprising because AP Moler is a Container Port specializing in handling majority of container traffic in Nigeria. The model obtained in the form;

$Y= 437034.9 + 4663.3X_1$

Dependent Variables (Co-efficient of Regression)	Independent Variables
Constant = -40334.3	CGTP = 0.028
	BOR= 630.918
	STAT = -6750.438
R = 0.633	
R^2 = 0.518	
F = 1.853	
"t" = -0.488	
N = 10	

Table 4: Regression Summary for Roro Port
Source: Author's Field Survey 2014.

The regression summary of both independent variables and dependent variable at RORO ports is shown in Table 4. The regression co-efficient shows that Berth Occupancy Rate contributed significantly to container traffic in RORO port (630.918), Cargo Throughput (0.028) and Ship Turn around Time contributing negatively
(-6750.438). The model yielded F- value of 1.853, with a t- value of -0.488. Therefore the variable did not fit the model perfectly at the port. In the same vein, the R^2 of 0.518 shows all the three selected preditor variables jointly contributed about 51.8 percent variation in container traffic and RORO port productivity. In the same vein, the model obtained is in the form:

$Y= -40334.3 + 630.918X_1 + 0.028 + -6750.438$

Dependent Variables (Co-efficient of Regression)	Independent Variables
Constant = 9227.866	CGTP = 0.000
	BOR= 104.425
	STAT = -1123.405
R = 0.633	
R^2 = 0.4	
F = 1.558	
"t" = 2.976	
N = 10	

Table 5: Regression Summary for Tin Can Island Port
Source: Author's Field Survey 2014.

The regression summary in Table 5 indicates that only Berth Occupancy Rate has positive co-efficient of 104.425, while Ship Turn Around Time has negative co-efficient of -1123.405. Cargo Throughput has no co-efficient value. Also, the variable did not fit the regression model well because the F- Value of 1.558 is weak while the t- value of 2.976 is also higher than the significant value at 0.05 significant level. In the same vein, the R^2 of 0.4 indicated that about 40% of the container traffic in Tin Can Island port is accounted for by BOR and STAT. The model obtained is in the form:

$Y= 9227.86+ 104.425X_1$

One significant thing about both RORO and Tin Can Island ports is that the Berth Occupancy Rate is an important factor in the productivity of these ports. This may be attributed to the fact that these ports compliment AP Molers in handling container traffic and more so they are ports within Lagos Complex. It is easier for these ports to handle container traffic due to fact that facilities are readily available just like AP Molers that handle bulk of container traffic in Nigeria. However, it is surprising that Ship Turn Around Time had negative contribution, this may be attributed to administrative and port procedures.

Dependent Variables (Co-efficient of Regression)	**Independent Variables**
Constant = 111859.5	CGTP =0.126
	BOR= -547
	STAT = -16075.4
R = 0.508	
R^2 = 0.258	
F = 0.813	
"t" = 1.414	
N = 10	

Table 6: Regression Summary for Delta
Source: Author's Field Survey 2014

Regression summary presented in Table 6. indicates that the variables do not fit the linear regression model perfectly well because the F- Value of 0.813 is weak and more so, the significant value of 0.526 is higher than 0.05 significant level. Also, the R^2 of 0.258 indicates that about 25.8% of the variables contributed to the regression model. It could however be adduced from the analysis that no serious contributions were recorded between the dependent variables and the independent variable, which confirmed that Delta Port is contributing lower container traffic. One of the plausible and obvious reason for this low performance was the increased wave of insurgency, piracy and militancy in the Niger Delta coupled with low drafted nature of the water front.

Dependent Variables (Co-efficient of Regression)	**Independent Variables**
Constant = -6792.723	CGTP =0.013
	PAR = 133.468
	BOR= -146.905
	STAT = -842.300
	GUR = -28.766
R = 0.990	
R^2 = 0.980	
F = 48.315	
"t" = -2.093	
N = 10	

Table 7: Regression Summary at Calabar Port.
Source: Author's Field Survey, 2014.

The regression result for Calabar port indicated two directions of contribution as recorded; positive co-efficients of 133.468 and 0.013 were recorded for Crane Idle Time and Cargo Throughput respectively, while negative co-efficient of -842.300, -146.905 and -28.766 were recorded for Ship Turn Around Time, Berth Occupancy Rate and Gang Utility Rate respectively. However, the regression co-efficient of the dependent variables which indicated negative direction does not impact positively on the independent variable (Container Traffic). Only Cargo Throughput (CGTP) and Plant Availability Rate(PAR) have positive Regression Co-efficient (b). The R^2 yielded a higher value of 0.990 with F Value of 48.315 significant at 0.05 level which implies that the summary is reliable and fit the linear regression model. The model obtained is in the form;

$Y= -6792+ 0.013X_2 +133.468X_5$

4. Relationship between Containerised Cargo and Cargo Throughput

One of the major indices to measure the productivity of port is the Cargo throughput which is the volume of cargo both exports and imports that pass through the port. Although, there are other factors which are often considered in Port Productivity such as berth occupancy rate, ship turn around time, superficial throughput, gang hour, crane idle time etc which were explained earlier. However, Cargo throughput is a vital indicator to explain the productivity of the port in terms of the quantity of trade being transacted at the ports. Therefore, productivity at the port is anchored on increased cargo throughput which can be expressed as the cargo handled per unit of other factors utilised in achieving output.

In an attempt to find out the relationship that exists between containerised cargo and cargo throughput at the sampled ports, regression analysis was used to establish the relationship between the two variables. The total cargo throughput was used as dependent variable, while the volume of containerised cargo at each port is used as independent variables. The assumption is that the disaggregate volume of containerised cargo at each port contributes to the aggregate cargo throughput at all Nigerian ports.

Table 8 and 9 are the summary of the result of the regression analysis.

EXPORT						
	(APICG)	(CTICG)	(TICG)	(DTICG)	(RPICG)	(CLICG)
b.	-50.561	5.912	12.144	0.916	0.013	-22.931
t- Value	-5.580	17.769	5.036	0.0032	0.013	-1.181

Table 8: Regression Result of Total Cargo Throughput and Tonnageof Import Containerisedcargo at Each Port
Source: Author's Field Survey, 2014

Note that:
APICG= Apapa Import of containerised Cargoes.
CTICG= Import of Containerised Cargoes at AP MOLERS Terminal
TICG= Tin can Island Import Containerised Cargoes.
DTICG= Delta Ports Import Containerised Cargoes.
RPICG= Rivers Port import Containerised Cargoes.
CLICG= Calabar Port Import Containerised Cargoes.

EXPORT						
	(APECG)	(CTECG)	(TECG)	(DTECG)	(RPECG)	(CLECG)
B	18.084	-26.432	-8.165	-5.205	-102.589	-258.762
t- Value	1.245	-1.994	-0.866	-0.062	-2.546	-0.576

Table 9: Regression Result of Total Cargo Throughput and Tonnageof Export Containerisedcargo At Each Port
Source: Author's Field Survey,2014.

Note that:
TECG = Total Export of Cargo Throughput at all Nigerian Port.
APECG= Apapa Export of containerised Cargoes.
CTECG= Export of Containerised Cargoes at AP MOLERS Terminal
TECG= Tin can Island Export Containerised Cargoes.
DTECG= Delta Ports Export Containerised Cargoes.
RPECG= Rivers Port Export Containerised Cargoes.
CLECG= Calabar Port Import Containerised Cargoes.

In order to test whether the variables used fit the linear regression model, the test of significance using the F- value was carried out. The F-Value is higher than the significant values for both import and export traffic which implies that the variable fit the linear regression model. Furthermore, to ascertain the theoretical reliability of the result the r^2 indicated 0.702, which implies that the variables contributed about 70.2% to the regression model for export traffic and r^2 of 0.995 which is about 99.5% for import cargoes. In the light of the above, it is important to summarise the result of the regression analysis using hypotheses testing.

4.1. Hyphothesis Testing for Export Traffic

- H_O = There is no significant relationship between Tonnage of Export Containerised cargoes and Total Export cargo throughput at the sampled Ports.

S/N	SAMPLED PORTS	t- value	Table value	Decision Rule
1	Apapa Bulk Terminal	1.245	2.02	ACCEPTED
2	AP MOLERS Terminal	-1.994	2.06	ACCEPTED
3	TCI	-0.866	2.02	ACCEPTED
4	Delta Port	0.062	2.02	ACCEPTED
5	Rivers Ports	-2.546	2.02	REJECTED
6	Calabar Port	-0.576	2.02	ACCEPTED

Table 10: Summary of Decision Rule for Hypothesis (Export Cargo)
Source: Author's Field Survey,2014

The export cargo has a different relationship in that apart from Rivers ports the null hypothesis is accepted for all the selected ports. This implied that there is significant relationship between Total export Cargo Throughput and export Containerised cargo in five of the port selected for the study, while negative relationship was established in only one port (Rivers port)

4.2. Hyphothesis Testing for Import Traffic

- H_O = There is no significant relationship between Tonnage of Import Containerised cargoes and Total Import cargo throughput at sampled Ports.

S/N	SAMPLED PORTS	t- value	Table value	Decision Rule
1	Apapa Bulk Terminal	-5.550	2.02	REJECTED
2	AP MOLERS Terminal	17.769	2.06	REJECTED
3	TCI	5.036	2.02	REJECTED
4	Delta Port	0.032	2.02	ACCEPTED
5	Port Harcour/Onne	0.013	2.02	ACCEPTED
6	Calabar	-1.181	2.02	ACCEPTED

Table 11: Summary of Decision Rule for Hypothesis 2.(Import Cargo)
Source: Author's Field Survey,2014

From the decision rule for hypothesis above, the null hypothesis was rejected for three ports and accepted for three ports. The ports where the hypothesis was rejected are Apapa Bulkship, AP Molers and Tin Can Island ports while those accepted are Delta, Rivers and Calabar ports.
The implication of the above is that Containerised Cargoes has significant relationship with total import cargo throughput in the former ports while there were no significant relationships at the later ports. This confirmed that container traffic contributes to import cargo throughputs in the ports located within Lagos areas, whereas other ports in the Niger Delta regions have low traffic.

5. Analysis of Responses by Industries to Container Packaging Method in Nigeria

5.1. Operations of the Sampled Industries
The analysis revealed that the operation covers five major categories and a total of 267 respondent frequencies were recorded. As earlier stated in section 3.0, the frequencies observed are more than the total number of questionnaires because some industries engage in more than one operation.

S/N	Operations Frequencies of responses	Percentage of Total	
1	Manufacturing	52	19.5
2	Transportation	50	18.7
3	Agriculture	47	17.6
4	Mining (including Oil and Gas	54	20.2
5	Warehousing	59	22.1
6	Others	5	1.87
	TOTAL	267	100%

Table 12: Sectors of the Sampled Industries
Source: Author's Field Survey,2014

In table 14, industries that operate warehousing has the largest frequencies of responses constituting about 22.1%, followed by mining (including oil and gas). Manufacturing and transport have 19.5% and 18.7% respectively. This implies that these industries are adopters of container packaging method. Also, the analysis indicated that 92.1% of these industries transport goods in bulk cargoes whether as input for production or output from their production. In the same vein, about 95% of these industries have transport unit that co-ordinate the transportation and logistic activities of the industries. On ownership of company vehicles, table 9 indicates that 63.3% operate on- the- spot hiring of vehicles while 32.5% of the industries own their vehicles. Again, the frequencies observed are more than the number of questionnaires because there was multiple responses. Some industries owns vehicle and still have to hire vehicle to compliment there transport services.

S/N		Frequencies	Percentage
1	Company Vehicle	81	32.5
2	On –The – Spot Hire	160	64.3
3	Others	8	3.2
	Total	249	100%

Table 13: Ownership of Vehicle
Source: Author's Field Survey,2014

S/N	Methods	Frequency	Percentage Of Total
1	Loosed Form	66	15.4
2	Bags/Bale	189	44.1
3	Cartons/Crate	80	18.6
4	Containers	94	21.9
	Total	429	100%

Table 14: Analysis of Packaging Method for Inward Goods
Source: Author's Field Survey,2014

The analysis in table 16 indicates that packaging in bags/ bales still dominate the freight transport in Nigeria with 44.1% and 41% for inward and outward goods respectively followed by the use of containers which accounted for 21.9% and 15% for inward goods and outward goods respectively by the sampled industries. However, packaging in bales/bags and crates/cartons dominate the outward goods with 41% and 33.5% respectively. Container packaging for outward goods constituted about 15% by the sampled industries.

S/N	Methods	Frequency	%
1	Loosed Form	39	10.5
2	Bags/Bale	153	41
3	Cartons/Crate	125	33.5
4	Containers	56	15
	Total	376	100%

Table 15: Analysis of Packaging Method for Outward Goods
Source: Author's Field Survey, 2014

6. Summary and Conclusion

The relationship between container traffic and port productivity indices such as cargo throughput, ship turnaround time, berth occupancy rate etc. revealed that only ship turnaround time has a significant relationship with container traffic at Apapa Bulk Ship terminal, meaning that container traffic improves the operational time of ship at the port. At AP Moler, only Berth Occupancy Rate has relationship with container traffic, which implies that container traffic improves Berth Occupancy Rate at the port. At RORO and Tin Can Island ports, container traffic contributed significantly to Berth Occupancy Rate. This is attributed to the fact that both ports handles appreciable traffic of containers in Lagos area. Calabar port displayed two levels of relationship between container traffic and other indices. Positive relationship exists between container traffic and both cargo throughput and plant availability rate, while negative relationship exists between container traffic and ship turnaround time, gang utility rate, and berth occupancy rate. A Warri port does not display any significant relationship between container traffic and any of the productivity indices.

In the same vein, a distinction can be identified in packaging method between inward and outward goods. The adoption of container is higher for inward goods, whereas, it is lower for outward goods among the sampled industries.

7. References

i. Adeyanju, John A (2010) Pattern and Trend of Container Traffic in Nigeria and Port Productivity. Unpublished Doctoral Thesis of Geography Department, University Of Ilorin.
ii. Bohdan, N. (1972) Port Problems in Developing Countries; Principles of Port Planning and Organisation. Tokyo International Association of Ports and Harboours.
iii. Hanh, D. L. and Melissa, M (2006) Container Terminal Productivity: Experiences at the ports of Los Angeles and Long Beach. NUf Conference paper.
iv. King, L.J (1969) Statistical Analysis in Geography. Prentice- Hall, Englewood Cliff (New Jersey).
v. Oyesiku, O.O. (1995) Understanding Multiple Regression Analysis. Higher Education Books Series;13-36
vi. Thomas, J.D and Thomas ,M.L. (1989) Container Terminal Productivity: A perspective. Report of Research Number NA86 AA – DSG044 University of Washington.
vii. UNCTAD (1975) In Jean, G (1986) Port Administration and Management. International Association of Ports and Harbour. Tokyo, Japan.