

# Influence of time on Seaborne oil trade in Nigeria and the relationship with Port revenue

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## Abstract:

The study analyzed the influence of time on seaborne oil trade in Nigeria. It determined the trend of seaborne oil export and import trade in Nigeria. The key objectives of the study were to measure the influence of time on seaborne oil import and export trade in Nigeria, to compare seaborne oil export and import trade facilitated by Nigeria seaports and to estimate the relationship between seaborne oil trade and port revenue in Nigeria. Secondary data on port revenue, tonnages of seaborne oil export and import trade were obtained from the Central bank of Nigeria and used in carrying out the study. The statistical tools of trend analysis, simple regression analysis and independent sample t-test were used to analyze the data obtained. It was found that the trend of seaborne oil export and import trade in Nigeria over the period covered by the study was increasing. The linear function showing the trend of seaborne oil export trade over the period covered in the study is:  $Y = 3123477666.230 + 1951150.588 + e$ . It was also found that time induces an increasing trend on seaborne oil import trade facilitated via the Nigeria seaport terminals. The linear model showing the relationship between seaborne oil import trade facilitated through the seaports and port revenue over the period is:  $Y = 180425475.184 + 12.177\text{oilimporttrade} - 0.316\text{oilexporttrade} + e$ . Seaborne export oil trade has a mean value of  $799310590.7000 \pm 39845685.83675$  with a seaborne oil import trade of  $14523981.8400 \pm 3396038.07534$  facilitated over the time period covered in the study. Recommendations were given on how to further grow seaborne oil trade in Nigeria. The implication to port management is that to sustain the revenue earnings capacity of the seaports through oil import and export trade, investment in the infrastructure for handling oil cargo flow via the seaport should take increasing trend in line to the direction of trade flow.



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## Introduction

We define seaborne oil trade is the exchange of petroleum resources (crude oil and refined oil resources) from and to supply and demand countries and its carriage and/or transportation by sea using ocean going tankers vessels. It is composed of seaborne oil export and import trade and covers all kinds of petroleum energy resources, whether crude oil or refined petroleum resources. Nigeria's seaborne oil trade comprises seaborne refined petroleum products import trade and crude oil export trade via the Nigeria seaports and the oil export terminals respectively; both categories of marine terminals being administered by the Nigeria Ports Authority (NPA). Oil is a major source of energy in the global economy and a major ocean based energy resource found in large quantities onshore and offshore in Nigeria. Thus its exploration, drilling and subsequent transportation to market centers, refineries and depots are mostly sea based activities involving the use of vessels of various kinds and forms, ranging from Exploration vessels and tanker vessels; to drilling Floating Production Storage and Offloading Systems (FPSO'S) (Guerrero, 2012; Chukwuneyem et al, 2015). Apart from the use of pipelines in the long distance transportation of fossil energy resources, shipping by use of vessels offers the best alternative for long distance carriage of oil trade globally. Gbadebo (2012) notes that oil trade took roots in Nigeria following the discovery of oil in commercial quantities by Shell-BP in Oloibiri, in present day Bayelsa State Nigeria in 1956. The discovery also of other important oil wells discovered during the period such as Afam and Bomu in Ogoni Rivers State; crude oil production commenced in 1957 and by the end of 1960; an aggregate of 847,000 tons of crude oil was exported by sea (Gbadebo, 2012; David, 1965). Other oil exploration and production firms were subsequently given licenses to operate in the emerging oil industry in Nigeria towards the end of 1950. Such firms include: Mobil in 1955; Tenneco in 1960; Gulf Oil and later Chevron in 1961; Agip in 1962; and Elf in 1962 (David, 1995). The crude oil export seaborne in Nigeria are handled at the oil export terminals administered and supervised by the Nigerian ports Authority (NPA) in various locations offshore Nigeria while handling of seaborne import of refined petroleum product are handled at the major seaports and jetties in different regions of Nigeria also supervised by the NPA. The major crude oil export terminals in Nigeria are operated by the major multinational oil companies operating in Nigeria. At a glance, the table below summarizes the number of crude oil export terminals in Nigeria and the operators of each terminal (Guerrero, (2012).

**Table 1:** Crude oil export Terminals in Nigerian and the Operators.

S/No	Operator	Terminal	Location	Facility	Crude Stream
1	SHELL	Bonny	Onshore	Terminal	Bonny Light
2	SHELL	Forcados	Onshore	Terminal	Forcados Blend
3	SHELL	Sea Eagle	Offshore	FPSO	EA Crude
4	SHELL	Bonga	Offshore	FPSO	Bonga Crude
5	Exxon Mobil	Qua Iboe	ONSHORE	Terminal	Qua Iboe Light
6	Exxon Mobil	YOHO	Offshore	FPSO	Yoho Crude
7	Exxon Mobil	Erha	Offshore	FPSO	Erha Crude
8	Exxon Mobil	USAN	Offshore	FPSO	Usan crude
9	Chevron	Escravos	Onshore	Terminal	Escravos Light
10	Chevron	Pennington	Offshore	FPSO	Pennington Light
11	Chevron	Agbami	Offshore	FPSO	Agbami Crude
12	Agip	Brass	Onshore	Terminal	Brass Blend
13	Agip	Abo	Offshore	FPSO	Abo crude
14	Total E&P	Amennam/Odudu	Offshore	FPSO	Amennam Blend
15	Total E&P	Akpo	Offshore	FPSO	Akpo Condensent

Source: Adopted from Ian G (2011). Available at [http://: www.Udohnigeriaheartbeat.com](http://www.Udohnigeriaheartbeat.com).

Developing a plan that will ensure sustainable seaborne oil trade flow in Nigeria which maximizes the economic benefits of the oil export and import trade in the country will require an understanding of the influence of time on the trade. The relationship between the trend of flow of seaborne import and export trade and port revenue is inevitably important in driving higher the revenue earning capacity of the ports and planning the infrastructural needs of the oil and gas import and export terminals in Nigeria. Terminal managers can thus empirically determine investment levels necessary to improve the impacts of sea borne crude and refined oil freightment as well as oil terminal infrastructure in Nigeria. The maritime sector of the global ocean economy has over the years, been adjudged as a key contributor to World economic development. Thus the United Nations in recent times places emphasis on the need for coastal states to proactively plan the rate and manner of exploration and exploitation of resources in their oceans area and the subsequent sustainable use of such resources to achieve sustainable development goals. Nigeria and South African in this regard were ranked 19<sup>th</sup> and 9<sup>th</sup> in the World as coastal states with greater economic expectations and benefits to emerge as top blue economic hubs in Africa. Proactive planning is therefore needed as advised by the World Bank based on empirical models depicting impacts, trends and investment levels, level of returns that will elicit the needed maximum benefits from the ocean economy of Nigeria which is currently dominated by seaborne oil trade. This has necessitated this study to analyze seaborne oil trade in Nigeria as a component of the blue/ocean economy of Nigeria for which empirical models are needed for maximum positive impact and development (Gbadebo, 2008). The seaport terminals as hubs for transfer of cargo to and from marine transport modes facilitate seaborne trade of all kinds based upon which port revenue is earned for the continued development of the sector and the Nigerian state. The capacity of the seaport to however facilitate greater volume of trade and generate higher revenue is most times dependent on the types of cargo traffic that flows via it and the volume of seaborne import and export trade generated. This may equally be related to the natural endowment of the country and port region. Thus for purposes of economic planning, the relationship between the volumes of seaborne trade of various kinds transiting the port and port performance with regards to its relationship with revenue generating capacity of the port terminals.

### **Aim and Objectives of the Study**

The aim of the study is to analyze the influence of time seaborne oil trade in Nigeria. The specific objectives of the research are:

- (i) To determine the trend of seaborne oil export trade in Nigeria
- (ii) To measure the influence of time on seaborne oil import trade in Nigeria
- (iii) To compare seaborne non-oil and seaborne oil trade facilitated in Nigeria seaports.
- (iv) To determine the relationship between seaborne oil trade on and port revenue in Nigeria.

### **Research Questions**

- (1) Is there a significantly increasing trend in seaborne oil export trade in Nigeria?
- (2) What is the influence of time on seaborne oil import trade in Nigeria?
- (3) Is there a significant difference in seaborne oil trade and non-oil trade facilitated by Nigeria seaports?
- (4) What is the nature of relationship between seaborne oil trade and port revenue in Nigeria?

### Brief Review of Literature

David (1995), Ajakiye (2001) and Klan (2017) note that Nigeria is the largest oil and gas producer in Africa with the history of oil exploration in Nigeria dating back to 1907 when Nigerian Bitumen Corporation conducted exploratory work in the country, during the early period of the first World War. Following the country's breakthrough into the oil and gas ocean energy market in the mid 1950's, it has developed a viable oil and gas sector adjudged to be among the best in the world. At present, about 5,284 wells have been drilled mostly in the Niger Delta region of Nigeria. It is believed that the passage of time over the years has influenced positively the boom and growth of the trade in Nigeria, particularly the discovery of more crude reserves and the entrance of indigenous firms into the upstream oil exploration and production operations cum local content development. The downstream sector has equally witnessed growth over time with more indigenous firms involved in the seaborne importation of refined petroleum resources whose domestic demand over time has geometrically increased induced by increasing ownership of cars, public transport demand, and increased industrial use. According to the department of Petroleum Resources (DPR, 2014), the average production costs per barrel in Nigeria are \$3.5 and \$5.0 onshore and offshore respectively. This according to DPR (2014) offers one of the most profitable investment regions to oil and gas exploration and production firm; necessitating a high pull of foreign direct investments into the oil and gas sector in Nigeria. Frynas (2011) views that as of at year 2000, seaborne oil and gas exports accounted for more than 98% of export earnings and about 83% of federal government revenue. It also provides 95% of foreign exchange earnings, and about 65% of government budgetary revenues. This trend of contribution is expected to continue over many decades in the future as the more oil reserves are being currently discovered offshore Nigeria. Majority of Nigeria offshore oil and gas reserve are domiciled in the Gulf of Guinea, which as at end 2003 held some 4.5% of the world oil reserves with Nigeria having the greatest reserve. According to the Energy Institute Report (2017), the Gulf of Guinea (GOG) holds the second largest concentration of oil reserves in a single confined basin after the Middle East and majority of it is Nigeria (Genova and Toyin, 2003). The figure below is a breakdown of the GOG reserves by region/country as percentages of World oil reserve.

**Table2: GOG Reserves as Percentages of World Proven Reserves**

% of World proven Reserves By Countries in GOG				
	4.0 to 4.5%	between 2.0 to 3.0%	between 1.0% to 1.2%	Below 1.0%
Countries		Nigeria	Angola	(1) Cameroon (2) Rep. of Congo (3) Gabon (4) others
	Total GOG reserve			

Source: Adapted from: Nigeria oil services LLC (2014).

The Gulf of Guinea is reported currently produce approximately 5% of world-wide production with the Niger Delta region in particular dominating production given the strength of significant discoveries made the region in past 35 years of serious exploration activities. Notable among the productive oil fields in the GOG include: the Bonga, Agbami, Ekoli and Akpo discoveries in Nigeria and Zafiro and Alba in Equatorial Guinea (DPR, 2014). Other major productive oil fields in the GOG are as summarized in the table below:

**Table3:** Crude oil production fields in the GOG

s/no	Year of Discovery	Field name	Country	Water Depth (m)	Public Domain Reserves (proven + probable)
1	1996	ABO	Nigeria	800	101
2	1996	BOSI	Nigeria	1424	683
3	1996	BONGA	Nigeria	1125	735
4	1998	AGBAMI-EKOU	Nigeria	1435	780
5	1999	NNWA	Nigeria	1200	64
6	1999	AKPO	Nigeria	1360	590
7	1999	IKIJA	Nigeria	1400	Na
8	1999	ERHA	Nigeria	1191	500
9	1999	DORO	Nigeria	1280	Na
10	2001	BONGA SOUTH WEST	Nigeria	1245	500
11	2001	APARO	Nigeria	1185	209
12	2001	BOLLA	Nigeria	1100	185
13	2002	USAN	Nigeria	746	Na
14	2002	NSIKO	Nigeria	1750	Na
15	1996	GRISOL	Angola	1500	725
16	1997	KUITO	Angola	413	600
17	1998	HUNGO	Angola	1202	700
18	1998	CHOCALLO	Angola	1150	300
19	1999	XIKOMBA	Angola	1359	100
20	1995	ZAFIRO	Equatorial Guinea	850	1200
21	1999	CIEBA	Equatorial Guinea	800	135

Sources : Adapted from (1): NAPIMS (2016), www.wikipedia.com. (2) Nigeria oil services LLC. Prepared by Jeff Scot (2014)

As estimated by the United States Energy information Administration (EIA, 2017; NNPC, 2008), Nigeria's proven oil reserves stand between 16 and 22 billion barrels ( $2.5 \times 10^9 \text{m}^3$  and  $3.5 \times 10^9 \text{m}^3$ ). According to Khlan (2017), Nigeria supplies only about 2.7% of the world's total oil supply; This is approximately 5 times less than Saudi Arabia 12.9%, Russia 12.7% supplies to the total World supply 3 times less than the United States 8.6% supply. It is expected that the country will improve its production given the right level of investment over time. Sea borne oil export and import trade remain the backbone of the Nigerian economy as the country ranks 6<sup>th</sup> on the table of major oil exporting countries as shown below:



**Table 3:** Major Oil producing countries ranked in order of net exports in 2011, 2009 and 2006 in thousand bbl/d and thousand m<sup>3</sup>/d

	Exporting nation	10 <sup>3</sup> bbl/d (2011)	10 <sup>3</sup> m <sup>3</sup> /d (2011)	10 <sup>3</sup> bbl/d (2009)	10 <sup>3</sup> m <sup>3</sup> /d (2009)	10 <sup>3</sup> bbl/d (2006)	10 <sup>3</sup> m <sup>3</sup> /d (2006)
1	Saudi Arabia (OPEC)	8,336	1,325	7,322	1,164	8,651	1,376
2	Russia	7,083	1,126	7,194	1,144	6,565	1,044
3	Iran (OPEC)	2,540	403	2,486	395	2,519	401
4	United Arab Emirates (OPEC)	2,524	401	2,303	366	2,515	400
5	Kuwait (OPEC)	2,343	373	2,124	338	2,150	342
6	Nigeria (OPEC)	2,257	359	1,939	308	2,146	341
7	Iraq (OPEC)	1,915	304	1,764	280	1,438	229
8	Angola (OPEC)	1,760	280	1,878	299	1,363	217
9	Norway	1,752	279	2,132	339	2,542	404
10	Venezuela (OPEC)	1,715	273	1,748	278	2,203	350
11	Algeria (OPEC)	1,568	249	1,767	281	1,847	297
12	Qatar (OPEC)	1,468	233	1,066	169	-	-
13	Canada	1,405	223	1,168	187	1,071	170
14	Kazakhstan	1,396	222	1,299	207	1,114	177
15	Azerbaijan	836	133	912	145	532	85
16	Trinidad and Tobago <sup>1</sup>	177	112	167	160	155	199

Source: US Energy Information Administration (2014). [www.wikipedia.com/](http://www.wikipedia.com/)

Nigeria have major trade partners in the sea borne oil trade which include India, USA, China, Japan, Britain, France, Italy, among others (Khlan (2017)). The major importers of crude oil and gas products that determines the demand for oil import in the global oil trade include are as summarized in the table 4. UNDP (2006) report indicates an increasing trend in Nigerian crude oil production and export, while noting that the oil export trade accounts for above 90% of the country's revenue. The report is optimistic that the trend of oil export trade and the impacts will be sustained for many years to come. Saviolakis, (2013) notes that in order to assess the market trends in the transportation of oil and natural gas resources, it is necessary to focus on the countries involved in both oil import or export trades. This is because while exporters' influences the nature of the trade and the location of the exact fields and loading terminals; importers will determine the choice of ships, routes and locations of disports. Adopting the regression analysis and analysis of variance analytical tools in a related study, Onyemечи et al (2017) found that about 90% association exist between the GDP (gross domestic product) of Nigeria and her ocean energy sector. It equally found that offshore oil and gas energy trade more significantly impact on the GDP of Nigeria than other ocean economy business clusters (Onyemечи *et al.*, 2017; Ozturk, Bezir and Ozek, 2009).

**Table 4:** Major importers of Crude oil and gas resources in order of net imports in 2011, 2009 and 2006 in thousand bbl/d and thousand m<sup>3</sup>/d:

Importing nation	10 <sup>3</sup> bbl/day (2011)	10 <sup>3</sup> m <sup>3</sup> /day (2011)	10 <sup>3</sup> bbl/day (2009)	10 <sup>3</sup> m <sup>3</sup> /day (2009)	10 <sup>3</sup> bbl/day (2006)	10 <sup>3</sup> m <sup>3</sup> /day (2006)
1 United States	8,728	1,388	9,631	1,531	12,220	1,943
2 China	5,487	872	4,328	688	3,438	547
3 Japan	4,329	688	4,235	673	5,097	810
4 India	2,349	373	2,233	355	1,687	268
5 Germany	2,235	355	2,323	369	2,483	395
6 South Korea	2,170	345	2,139	340	2,150	342
7 France	1,697	270	1,749	278	1,893	301
8 Spain	1,346	214	1,439	229	1,555	247
9 Italy	1,292	205	1,381	220	1,558	248
10 Singapore	1,172	186	916	146	787	125
11 Republic of China (Taiwan)	1,009	160	944	150	942	150
12 Netherlands	948	151	973	155	936	149
13 Turkey	650	103	650	103	576	92
14 Belgium	634	101	597	95	546	87
15 Thailand	592	94	538	86	606	96

Source: US Energy Information Administration(2014), [www.wikipedia.com/](http://www.wikipedia.com/)

### Methodology

The study obtained and used secondary data covering a period of 10 years from 2006 to 2015 on seaborne oil export and import trade, and port revenue. It employed the ordinary least square method of regression analysis to estimate the relationship among seaborne oil import and export trade, and port revenue. It equally employed trend analysis statistical method to determine the influence of time on seaborne oil import and export trade over the period covered in the study. The independent sample t-test was used to compare the tonnages of seaborne oil export and import trade over the period. The multiple regression method was employed to model the relationship between seaborne oil trade and port revenue using port revenue as the dependent variable Y, while the tonnages of seaborne oil export and import trade over the period were used as independent variables X<sub>1</sub> and X<sub>2</sub> respectively. This shows the relationship between two variables; dependent variables (Y) and independent variables may be expressed mathematically as:

$$Y = a + b_1X_1 + b_2X_2 + e$$

Where

Y = Dependent variable

$X_1, X_2$ , = Tonnages of seaborne oil import and export trade respectively

a = intercept,

$b_1, b_2$  = coefficients.

e = the unexplained variation

## Result and Discussion

**Table 5:** Determining the Trend of Seaborne Oil Export Trade in Nigeria

Equation	Model Summary					Parameter Estimates		
	R Square	F	df1	df2	Sig.	Constant	b1	b2
Linear	.022	.180	1	8	.683	3123477666.230	1951150.588	
Logarithmic	.022	.180	1	8	.683	29044198254.849	3923608801.176	
Quadratic	.022	.180	1	8	.683	3123477666.230	1951150.588	.000
Exponential	.024	.196	1	8	.669	4524083.445	.003	

The independent variable is Time (Year).

Source: Authors calculation

The result of the analysis shows that the trend of seaborne oil export trade in Nigeria over the period covered by the study is increasing as the coefficient of the explanatory variable has a positive coefficient. We assert that the passage of time induces seaborne oil export trade to increase. The linear function showing the trend of seaborne oil export trade over the period covered in the study is:

$$Y = 3123477666.230 + 1951150.588X_1 + e.$$

The result however shows that the four functions (Linear, Logarithmic, Quadratic, and Exponential) are not significant at  $p=0.683 \geq 0.05$ , however exponential function were found to have the highest R-square value of 0.024 with f-value of 0.196 at df 1,8 which means that there is no significant increase in the trend of export oil trade in Nigeria. The trend of increase in seaborne oil trade over the years is not significant.

**Table 6:** Measuring the Influence of Time on Seaborne Import Oil Trade in Nigeria

Equation	Model Summary					Parameter Estimates		
	R Square	F	df1	df2	Sig.	Constant	b1	b2
Linear	.770	26.824	1	8	.001	1964692910.126	984440.135	
Logarithmic	.770	26.848	1	8	.001	15041188522.340	1979416240.734	
Quadratic	.770	26.824	1	8	.001	1964692910.126	984440.135	.000
Exponential	.776	27.713	1	8	.001	5.336E-056	.071	

The independent variable is Year.

Source: Authors calculation

The result of the analysis of seaborne oil import trade also shows that the passage of time is exerting an increasing influence on the trend seaborne oil import trade facilitated via the Nigeria seaport terminals. Thus the trend of seaborne oil import trade increases over time. Since the coefficient of the explanatory variable is positive, it indicates an increasing trend in seaborne oil trade facilitated by the seaports over the period covered in the study, which implies a positive influence of time on the trade. There thus exist a direct positive relationship between time and seaborne oil import trade such that as time increases, oil import trade also



increases. The linear model showing the influence of time on seaborne oil seaborne oil import trade facilitated through the seaports over the period is:

$$Y = 1964692910.126 + 984440.135X_2 + e.$$

The result shows significant for the four functions (Linear, Logarithmic, Quadratic, and Exponential) which are all significant at  $p=0.001 \leq 0.05$ , however exponential function were found to have the highest R-square value of 0.776 with f-value of 27.713 at df 1,8 which means that there is a significant increase in the trend of import oil trade in Nigeria as influenced by time.

**Table 7 : Comparing Seaborne Oil Export and Import Trades Facilitated By Nigeria Seaports.**

**Group Statistics**

	Group	N	Mean	Std. Deviation	Std. Error Mean
Trade	Export	10	799310590.7000	39845685.83675	12600312.21756
	Import	10	14523981.8400	3396038.07534	1073921.53387

**Independent Samples Test**

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Trade	13.724	.002	62.058	18	.000	784786608.86000	12645994.44255	758218360.41488	811354857.30512
			62.058	9.131	.000	784786608.86000	12645994.44255	756241703.92050	813331513.79950

Source: Authors calculation.

The group statistics table shows that the seaborne export oil trade has a mean value of  $799310590.7000 \pm 39845685.83675$ , with seaborne oil import trade of  $14523981.8400 \pm 3396038.07534$ . However the independent samples test table shows an f-value of 13.724 which is significant  $p\text{-value} = 0.002 \leq 0.05$  at  $df = 18$ , with t-statistics value of 62.058 which is significant  $p\text{-value} = 0.000 \leq 0.05$ . This implies that there is a significant difference between the Export oil trade and import oil trade. The difference favours sea borne oil export trade indicating that more oil export trade has been handled/facilitated by the seaports over the time period covered in the study than oil import trade.

**Table 8: Estimating The relationship Between seaborne Oil Trade and Port Revenue****Model Summary**

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	.826 <sup>a</sup>	.682	.591		31285719.92584

a. Predictors: (Constant), oillexporttrade, oilimporttrade

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14682727101053256.000	2	7341363550526628.000	7.500	.018 <sup>b</sup>
	Residual	6851573898946748.000	7	978796271278106.900		
	Total	21534301000000004.000	9			

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	180425475.184	209456261.515		.861	.418
	oilimporttrade	12.177	3.154	.845	3.861	.006
	oillexporttrade	-.316	.269	-.257	-1.176	.278

a. Dependent Variable: portrevenue

Source: Author's calculation

The table above measures the relationship between seaborne oil trade and port revenue over the period covered in the study. The function of the relationship between seaborne import and export oil trade and port revenue over the period is  $Y = 180425475.184 + 12.177oilimporttrade - 0.316oillexporttrade + e$ . This indicates a positive direct relationship indicating that port revenue increases as seaborne oil import trade increases and vices versa. The result shows that there is no significant relationship between of seaborne oil export trade and port revenue in Nigeria while a significant relationship exists between seaborne oil import trade and port revenue. The F-stat of 7.50 and f-table of 2.13 shows that on the aggregate, a significant relationship exists between seaborne oil trade and port revenue in Nigeria. The implication is that improving seaborne oil trade facilitated via Nigeria port terminals will improve port revenue and performance.

**Conclusion**

There is a significant effect of seaborne trade on port revenue in Nigeria. The result shows significant for the four functions (Linear, Logarithmic, Quadratic, and Exponential) which are all significant at  $p=0.001 \leq 0.05$ , however exponential function were found to have the highest R-square value of 0.776 with f-value of 27.713 at df 1,8 which means that there is a significant increase in the trend of import oil trade in Nigeria. The result however shows that the four functions (Linear, Logarithmic, Quadratic, and Exponential) are not significant at  $p=0.683 \geq 0.05$ , the independent samples test table shows an f-value of 13.724 which is significant  $p\text{-value}=0.002 \leq 0.05$  at  $df = 18$ , with t-statistics value of 62.058 which is significant  $p\text{-value}=0.000 \leq 0.05$ . There is a significant difference between the Export oil trade and import

oil trade. This difference is in favour of sea borne oil export trade indicating that more oil export trade has been handled by the ports over the time period covered in the study.

### Recommendation

To sustain the cargo throughput of the seaports and consequently port revenue, Government must ensure that the current trend of increment in seaborne oil trade is maintained by ensuring that bottlenecks and impediments such as security challenges that limit the oil production outputs of the production companies are proactively determined and handled. The relationship between seaborne oil trade and port revenue which is such that port revenue increases as seaborne oil trade increases should be sustained by improving the demand for port services by oil tankers through increase in seaborne oil export trade in Nigeria.

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