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RESEARCH ARTICLE

ECONOMETRIC ANALYSIS OF SEAPORT DEVELOPMENT AND ITS IMPACT ON THE ECONOMIC GROWTH OF NIGERIA

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Abstract

This research dwells on econometric analysis of seaport development and its impacts on the economic growth of Nigeria. Variables such as Trade, Gross domestic product, Logistics performance and Liner Shipping Connectivity were implored for the analysis. Secondary data were collected from the World Bank database and Nigerian Ports Authority (NPA) abstract of ports statistics. The multi factorial ANOVA and Correlation analysis function of the SPSS software were implored for the data analysis. From the correlation output, it was deduced that Liner shipping connectivity(X_4) has a moderate positive and linear correlation of 0.442 with economic growth. This implies that as liner shipping connectivity increases, economic growth increases. The results of the econometric test show that, there was no positive autocorrelation in the regression analysis carried out. It was however, recommended that, Nigeria government needs to churn out viable economic policies that can boost trade in the presence of the current decline in oil prices. Also, the federal government must develop her financial intermediaries in order to provide funds for private sector investment in port infrastructure development. In conclusion, the quality of port infrastructure and maritime transport are germane to facilitating international trade and foreign investments, as foreign investors are interested in countries with good logistics linkages.

Introduction:-

The seaport is a pivotal point for the world export and import trade. The ports are the focus of a broad spectrum of maritime activities, generating revenue, creating employment opportunities, which also propels the economic growth of a maritime nation like Nigeria. Economic growth can be defined as a sustained increase in the output of the economy often termed the Gross Domestic Product (GDP).

It is expedient to note that, over 90 percent of International Trade is done by sea or carried by ships. . It is believed that on daily basis, these ships move millions of tons of cargoes comprising goods and commodities, fuel, crude oil, raw materials, machinery and equipment, foodstuffs, medicaments, etc, around the world. The situation is not different in Nigeria, as a member of international community. It is estimated that well over 90 percent of her visible international trade is sea borne.

The maritime industry, if effectively harnessed, has the capacity to be a big factor in the national economy; with revenue at maximum potentials, capable of competing with oil and gas revenue. Maritime revenue can be a major contributor to the Gross Domestic Product (GDP) of a nation. Gross domestic product (GDP) estimates are commonly used to measure the economic performance of a whole country, but can also measure the relative contribution of an industry or sector. 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 (Emeaghara, 2008). The World Bank's logistics Performance Index (LPI) and UNCTAD's LSCI are geared towards espousing information about countries trade competitiveness in the area of transport and logistics (Hoffmann, 2015).

Wilson and Portugal-Perez (2012);Moïse and Bris (2013) suggest that improvements on physical infrastructure, proxied in a single index by the quality of ports, airports, roads and railroads, bring the greatest benefits in terms of export performance. Furthermore, gravity-based estimates show that, although the marginal effect of physical infrastructure is increasing with per capita income levels, it remains positively large and significant at all levels of developments.

Simulations show that investments in physical infrastructure (to the level of the regional hub) bring the greatest trade gains in magnitude even for developing economies, suggesting that building high-quality hard transport infrastructure (deep seaport development) should be a high priority to nations(Moïse and Bris 2013).

Objectives of Study:-

The main objective of the study is to carry out an Econometric Analysis of Seaport Development and Its Impact on the Economic Growth of Nigeria. However, the research intends to examine specifically the following objectives; To;

1. Establish the relationship between Liner Shipping connectivity and economic growth of Nigeria.
2. Establish the relationship between Logistics Performance and economic growth of Nigeria.
3. Analyse the relationship between Trade and Economic growth of Nigeria.
4. Establish the correlation between Liner shipping connectivity and economic growth of Nigeria.

Literature review:-

Bruce and Gary (2000) opine that, economic growth depends upon goods moving efficiently and safely through the transportation chain. Since the current scenario of world trade goes to cellular vessels, thus the demand for transportation of goods via sea increases tremendously. In view of this, more and more terminals are expanding in order to cater for available demand (Olayinka and Ogundele, 2015). In other words, improved supply chain and logistics (seaport development) will guarantee trade expansion and larger foreign direct investment. This implies that, transportation and logistics improvements are critical to trade flows and the competitiveness of an economy's exports and imports (Hummels et al., 2007; Shepherd et al., 2011). The liner shipping connectivity index measures the seaport connectivity of a nation to other global networks (Shi, 2011).

Arvis et al. (2013) in their paper trade costs in developing world 1995 – 2010, argued that in terms of policy implications, maritime transport connectivity and logistics performance are very important determinants of bilateral trade costs.

The UNCTAD Liner Shipping Connectivity Index (LSCI), aims at capturing a country's level of access to overseas markets through the liner shipping network (UNCTAD 2013). LSCI is the ability to move a cargo from one place to another with due cost, due time and due services.

Wilmsmeier and Hoffmann 2008; Shepherd et al., (2011) opined that shipping connectivity has an important impact on maritime freight rates. The quality of port infrastructure and maritime transport are thus key to facilitating international trade (Bonigen and Wilson, 2008; Moïse and Bris, 2013).

The Need for Seaport Development in Nigeria:-

Skov (2015) in his paper titled, 'Building Economic Capacity through Maritime Infrastructure Development –The APM Terminals Perspective', stated that it is imperative that Nigeria continues to build the necessary maritime infrastructure required to handle the growth of international trade. He further opined that, "There is need for modern container ports, cranes, and expansion of existing facilities to accommodate larger vessels so as to increase container volumes. Investment in more capacity and higher productivity induces shipping lines to respond with more services, more port calls per service and bigger vessels, which in turn increase liner connectivity."

Sanchez et al. (2014) opine that investment in port infrastructure makes a direct proportionate contribution to the GDP growth, and usually leads to improvements in profitability and a reduction in costs for the different economic

agents of the Society. The provision of economic infrastructure like seaports and airports can expand the productive capacity of the economy by increasing the quantity and quality of such infrastructure. The transformation curve or the production possibility frontier curve would shift with the expansion of the economic infrastructure bases, thereby accelerating the rate of economic growth and enhancing the pace of socio-economic development better and proper management of economic infrastructure would have positive output income and employment effects on the economy (Nwangugu, 2012).

Alexandru, (2013) was of the view that, with the rapid growth in container ship size, in the race for reducing transport costs per container, more and more pressure began to be put on the container terminal operators. Thus, not only that the time for operating a vessel has declined dramatically in order to reduce the costs associated with port charges, higher for large vessels, but also massive flows of containers must be managed in such a manner that congestion be eliminated and containers directed most efficiently to end users. The answer of the port terminals came in the form of horizontal expansion and massive technologization of ports activities.

However, the cargo throughput handled in the Nigerian ports in 2010 increased from 66,908,322 metric tonnes in 2009 to 74,910,284 metric tonnes in 2010 indicating a 12% increase (NPA, 2010).

Global trends in port development have it that, out of a total of 100 plus seaport developments being executed the world over; approximately 60 to 75 percent of these are deep sea ports or terminals. Nigeria need new better designed port facilities in line with increased cargo traffic nationally and globally, new and bigger marine vessels that need deeper harbour drafts and global logistics trends and practices have made the need for deep sea port more imperative. With her large maritime space, huge maritime potentials and undisputed leadership position in cargo traffic on the West and Central African region, Nigeria's maritime sector is central to her economic development as a transport, commerce, resource and recreational factor. With such massive maritime capacities and potentials, Nigeria cannot be expected at the rear lines in the scramble for deep seaports in the global maritime industry. Even with poor indigenous vessel operational involvement, Nigeria's huge container, dry and wet bulk cargo traffic is a regional force, a fact well-known to even regional competitors. With the intense competition on the regional maritime space, the imperative to maintain the lead and attain an undisputed hub status in the region as a transhipment centre, is more compelling. It is also common knowledge that the existing ports, especially Apapa and Tincan Ports in the Lagos axis, are overstretched with the attendant inordinate delays in cargo handling and processing. With capacity for 60 million metric tonnes of cargo handling, the ports run at about 100 million metric tonnes. This is expected to increase in the nearest future. The present situation in the ports system in Nigeria falls short of global efficiency. This, manifests in high turnaround time of ships in the ports. The concomitant result is the diversion of ships and cargo meant for Nigerian ports to the neighboring West-African ports of Ghana, Republic of Benin, Togo, etc. (Emeaghara,2008).

Potential Impact of Greenport Development on Nigeria's Economic Growth:-
Greenfield port development in the country will impact positively in the overall cargo handling capacity of the Nigerian ports and thus increase the country's gross domestic product (GDP).

The Federal Government of Nigeria announced plans for development of deep seaports in Nigeria. Some of the proposed deep seaports include; Lekki Deep Seaport in Lagos State, Ibaka Deep Seaport in Akwa Ibom State, Badagry Deep Seaport in Lagos State, Olokola Deep Seaport in Ondo State, Ogidigben Deep Seaport near Escravos in Delta State, and Agge Deep Seaport in Bayelsa State. There are also mentions of Bonny and Calabar seaports in Rivers and Cross River states (Emeka, 2015). He further averred that, since Nigeria is already a dominant market for ships bound for West and Central Africa regions, a deep seaport will increase Nigeria's chance to attain regional shipping hub status and will create jobs and improve per capita earnings, which are important factors in GDP economics.
The other proposed Greenfield port development at Ibaka also portends great economic benefits for Nigeria when completed. Historically, port cities are known to become commercial hubs and population centres, with a collateral development of related infrastructure and businesses due to port activities (NPCC, 2011).

Methodology:-

The data employed in this study were analysed using linear regression and Pearsons correlation analysis. This is to enable us describe the potential economic impact of seaport development on the economic growth of Nigeria.
The regression line which defines this relationship is expressed as:

Model Specification:-

$Y = B_o + B_1X_1 + B_2X_2 + B_3X_3 + ut$……(1)

Where:

Y = GDP growth (annual %)

B_o = Constant

X_1 = Liner Shipping Connectivity Index (LSCI)

X_2 = Logistics performance index (LPI)

X_3 = Trade (% GDP)

B_o is the baseline while B_1, B_2 and B_3 are coefficients of the regression parameters to be estimated.

Discussion of findings:-

Estimating the Research Model:-

$\hat{Y} = B_O + B_1(X_1) + B_2(X_2) + B_3(X_3) + ut$

GDP = -1.991- 0.049 (LSCI) + 3.274 (LPI) + 0.012 (TRADE) + ut

The significance of the above model is tested by way of the F-test using the Analysis of variance (ANOVA) approach. The interpretation of the regression line is that, there is an indirect proportionate effect on the independent variable such that the value of GDP growth generated in the Nigerian economy will increase by; 0.049 percent for every percent decrease in LSCI, 3.274 percent for every percent increase in LPI, 0.012 percent for every percent increase in Trade volume. The regression intercept has a negative value which shows an inverse proportionate relationship with the dependent variable.

Discussion of some of the Critical Factors:-

Logistics Performance Index LPI(X_2): This is the most critical factor from the regression output for the years under study. The 3.274 beta coefficient implies that, GDP will increase by 3.274% for every one percent increase in Logistics performance index. This is in concurrence with the work of Ogunsiji 2010; Olayinka and Ogundele, 2015, who opined that improved logistics performance can accrue benefits in terms of trade expansion/ facilitation, economic diversification and the attraction of foreign direct investment. The Port infrastructure variable of the LPI was used for the purposes of this research. The result from the regression output indicates that within the purview of this research, for the years under study, economic growth (GDP) is most impacted by logistics performance index. Thus, the Lekki Free Zone is set to boost Nigeria's economy by opening up trade routes to bring about an unprecedented surge in logistics and business. The project will cost $1.35bn, and is funded on a public private partnership basis, comprising of the federal government, state government, and private investors. The port will create over 162,000 jobs and help to facilitate decongestion at Nigeria's other ports, built initially to handle 60,000 tonnes, but which are now handling over 100,000 tonnes of cargo.

Trade (X_3) : This is the least critical factor, with a value of 0.012. This indicates that Economic growth (GDP) will increase by 0.012% for every one percent increase in trade. Nigeria's free trade zones are set to start industrial development, improve the local economy and generate employment and technological knowledge, through incentives such as a 100 percent tax holiday, custom duties and levies, foreign ownership of investments, no restrictions on the hire of foreign employees and a complete waiver on import and export licenses. This implies that the free zones will improve trade facilitation and attract more foreign direct investment. In the presence of dwindling oil prices, revenues from export of crude oil has reduced as the demand for crude oil export has depreciated tremendously. This has further weakened the exchange rate, which also has negative multiplier effects on trade and the economy in general.

Figure 1 compares liner shipping connectivity index in the highlighted West African countries. Nigeria has maintained a record of having the highest score for the years under study. With a 22.9 score for 2014, followed by Ghana with a record of 21.7 score for the same year. Guinea has the lowest score of 5.8 for year 2014, compared with other countries. This substantiates that Nigeria attracts the highest cargo traffic in the West African region and therefore, needs to develop her port infrastructure to accommodate the cargo traffic and the economy vessels. With this Nigeria can achieve her quest of being the regional hub in the West African region. It is noteworthy that the 21.7 score achieved by Ghana is a threat to Nigeria, if she fell to develop her ports.

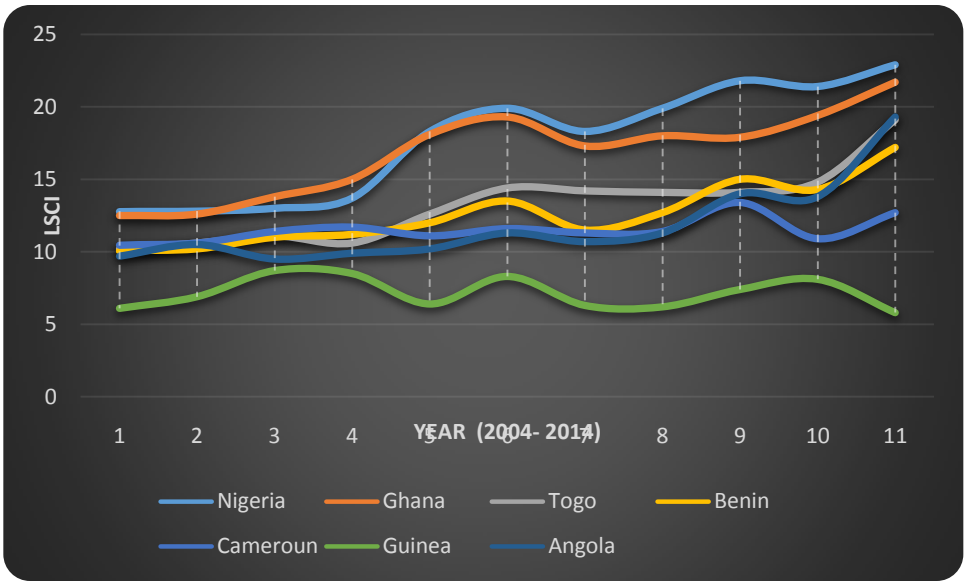

Figure 1: Trends in West African Liner Shipping Connectivity Index
Source: Plotted from Microsoft excel

Discussion of Findings from the Regression Model.:-
From the results obtained in this work, several observation and interpretations can be made. The results obtained from the above model are discussed as follows:

The negative beta coefficient of Liner Shipping connectivity index (LSCI) (X_1) variable indicates an inverse proportionate effect on economic growth (GDP) in the Nigerian economy. This corresponds with the findings of Sanchez et al. (2014), who estimated an economic development model as a function of GDP per capita, Human capital, Economics, financial development, logistics performance index and liner shipping connectivity index, income distribution.

1) The positive beta coefficient of Logistics performance index (LPI) (X_2) variable, indicates a direct proportionate relationship on economic growth (GDP) in the Nigerian economy.
   The positive beta coefficient of Trade (X3) variable for the years under study indicates a direct proportionate relationship on economic growth (GDP) in the Nigerian economy.
   The R^2 value obtained for the model is high and aligns within the acceptable range, hence the model has a high goodness of fit and confirms that 47.5% variations of the dependent variable (economic growth) is explained by the independent variables.

Conclusion:-

In conclusion, investments in port infrastructure development are capital intensive and are done under the public private partnership (PPP). Federal government must make economic policies that will encourage private sector investment in seaport development. From the literature reviewed, ports are critical in the developing economies due to their role in economic growth and social development. Global trends in port development have it that, out of a total of more than 100 seaport development being executed the world over, approximately 60 -75% of these are deep seaports. However, the quality of port infrastructure and maritime transport are germane to facilitating international trade and foreign investments. The Nigerian port reforms were therefore, designed to make the ports competitive, innovative and capable of attracting private sector investments.

The liner shipping connectivity and logistics performance are very important determinants of bilateral trade costs. The liner shipping connectivity measures the seaport connectivity of a nation to other global networks.

Nigeria can become a load center/ transshipment hub if she develops her ports, which will transcend to improving her shipping connectivity and also runs the risk of losing same to other regional ports if she chooses to remain at the status quo. From our findings, Nigeria's economic growth will decrease by 0.049% for a percent decrease in Liner

shipping connectivity and increase by 3.274% for a percent increase in logistics performance and increase by 0.012% for a percent increase in trade.

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