JOURNAL OF MARITIME RESEARCH

Vol XXI. No. I (2024) pp 180–187

ISSN: 1697-4840, www.jmr.unican.es

Shipping Revenue Performance and the Global Economy: Evidence from Nigeria

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ARTICLE INFO

Article history:
Received 5 Sep 2023;
in revised from 28 Sep 2023;
accepted 17 Dec 2023.

Keywords:
Empirical evidence, global economy, Shipping revenue performance, Transport Logistics, Nigeria

ABSTRACT

The purpose of the study is to assess the effect of shipping revenue performance on the global economy using empirical evidence from Nigeria, and to find answers to factors hampering optimal performance in the maritime sector. The study used secondary data which represents the revenue performance for 2008/09-2021/22 fiscal years and data were analyzed with multiple regressions statistics. Findings revealed that shipping revenue performance has a positive and significant effect on the Nigerian economy which invariably is a boost to the global economy. However, pandemics and man-made factors (corruption, political bureaucracy) adversely affect the performance of the maritime industry. It is suggested that nations engaging in maritime transportation should carry out critical and progressive maritime reforms to create wider room for concession of maritime facilities to private companies and utilize public private partnership (PPP) formula to attract investments into the sector.

1. Introduction.

The importance of the maritime industry to economic development came to fuller realization in the 18th century when Adam Smith made reference to water-carriage and its significance in his book "the Wealth of Nations"(Panayotis, n.d). Then imports and exports were 10% lower than world's production in the 19th century, but increased astronomically to more than 50% of world's production in 2015/2016 (Ortiz-Ospina and Rosa, 2016 cited in Panayotis, n.d). The increase or revolution in global maritime trade is linked to the advancement in technologies and innovations.

Hassiba (2018) holds the view that "shipping is the glue binding economies of the world. It connects countries, markets, businesses and people, makes economies rely on one another, moves assets across borders and fixed assets (ports) within borders. Also, shipping provides freight transport services and connects maritime clusters (e.g., ship building, ship repairs, port services, insurance, towage, dredging, offshore support services, financial and legal services, etc)". According to Hassiba (2018) report, 80% of global merchandise trade by volume is in maritime and 10.7 billion tonnes of cargo were moved in 2017 (representing +4% over 2016) with a fleet of 94,169 ships. Hassiba contends that the world seaborne trade growth forecast for 2018 to 2023 volume is expected to grow by +3.8% (i.e, +6% for containerized trade, +4.9% dry bulk, +1.7% crude oil, +2.6% products & gas). Therefore, shipping has become the backbone of international trade (connecting supply chains), engine for growth and positively affects sectors like tourism and fishing. However, it attracts negative externalities which call for mainstreaming sustainability principles (ESCA, 2017; Hassiba, 2018).

Maritime transport is a major component of the blue economy playing a unique role in the EU and accounts for about 40% of total value added at factor cost. Investments in maritime port infrastructure are directly and positively correlated to economic growth and the absence of maritime activities will create vacuum and imbalance in economies (Fratila, 2021). Andrew (2016) defines shipping to mean a vital facilitator of world trade. Shipping has increased the world's GDP in real terms in

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the last two decades by 73% and the value of the EU's trade with the rest of the world amounted to 3.5 trillion pounds in 2015. The shipping industry transports both containerized and non-containerized by sea, carrying out diverse but complementary services (offshore support services, tow, and dredge at sea. In Andrew (2016), the impact of maritime the industry is divided into three; direct impact (e.g, freight services, passengers services, towing, dredging, renting and leasing), indirect impact (e.g, ship building, ship repairs, port services & insurance, financial & legal services), and induced impact (e.g, food & beverages, recreation activities).

Shipping and transport logistics are integral components of the maritime industry across the globe. Both are synchronized into the daily operations in the ports. The world over, ports are serving as takeoff points for loading cargo into ships and discharging the same at another destination, usually between two or more countries. Port operations, shipping operations, and transport logistics operations are a network of operations. It is better described as chains of related functional activities/services that lead to satisfactory revenue and worker's performance and economic growth and development (Edih, et al., 2022a, 2022b; Inah and Elijah,2018; Omoke et al., 2019; Osadume and University, 2020).

Globally, many countries such as China, Singapore, Britain, and America, Ghana, South Africa and Nigeria are trying to harness the vast opportunities in the maritime industry (Imide et al., 2022), and about 90% of transportation needs are transported through carriage by sea(ESCA, 2017). The UN (2021) has predicted that global shipping and transport logistics would grow by 3.5%. Despite the robust picture painted above the sector is being retarded from performing at its full capacity because of natural (pandemics) and man-made disaster/or factors (unnecessary politics and high profiled corruption).

Hence, the study assessed the effect of shipping revenue performance on the global economy using empirical evidence from Nigeria and proffered solutions to the factors limiting full performance of the maritime industry.The hypothesis tested in the study is, shipping revenue performance does not have a positive and significant effect on economic growth.

2. Literature Review.

2.1. Maritime activities and the global economy.

The maritime industry largely engages in the transportation of persons (passengers), and cargo from port A to port B in two or more countries by sea. It entails the carriage by sea (different from carriage of goods by land and air, however the trio are complementary) (Edih, et al., in-press). Simply put, maritime business is shipping and port operations that are regulated by international laws, bilateral or multilateral treaties and conventions (Edih et al.,2022a). Peretomode (2014) and Elem (2008) mentioned some operations that are taking place in the ports as coastal shipping, trawler services, dredging service, tourism, pilotage and towage, dry docking, etc. It also includes terminals and jetties infrastructures, offshore construction and fabrication, warehouse activities, loading and unloading of cargo, and many more.

Ports play the role of facilitators between internal or domestic markets and international or external markets (Edih et al., 2023; Turnbull and Hughes, 2017). Many countries in the world are sustained by imports and exports; New Zealand, Singapore, America, Britain, Ghana and Nigeria. Specifically, Nigeria and New Zealand's economies cannot be sustained without importation and exportation of goods and services (Edih et al., 2023). Ports and terminals, as well as ships and tugboats are facilities that enhance maritime transportation and seaborne transport aids humanitarian services during emergency in the waterways and its environs (Margarita, 2021). In a similar context, maritime transport logistics are a major boost to the delivery of humanitarian assistance in times of disasters (Kovacs and Spens, 2007; Margarita, 2021). Ports have been depicted as measures for diversifying an economy by providing various opportunities; anchor handling of cables, pipes laying vessels, and diving support vessels, etc (Edih et al., 2023; Elem, 2008; Peretomode, 2014).

According to Jung (2011), the ocean is the global route for international trade and global economic integration, and shipping and transport logistics are strong catalyst that energized maritime trade, economic growth and development (Edih et al., 2022a, 2023; Omoke et al., 2019; Osadume and University, 2020). Low cost of transportation has been traced to shipping (Edih et al., 2022a). In this web of trade networks necessitated by carriage of goods by sea, the modified neoclassical theory pushes for investments to create more opportunities in the maritime sector (Grossman and Helpman, 1991; Edih et al., 2022a; Omoke et al.,2019). Research has affirmed that in the Archipelagic Regions of the world, maritime activities and infrastructures propelled economic growth. Also, shipping networks and other transportation modes affect per capita and fiscal revenue (Banerjee, 2009; Edih et al., 2022a; Essoh, 2013; Sjafrijal, 2008). Promoters (activities) of seaborne transport logistics improve socioeconomic growth and international competitiveness in such geometrical or exponential proportion, that every job in the shipping and transport logistics creates 4.4% additional jobs in the U.S economy (Fintell, 2004; Haralambides, 2014).

In Peretomode (2014) and Edih et al.,(2022a), the contributions in percentile of the maritime sector to specified economies were enumerated. Holland, Italy, Belgium and European Union's maritime region has aggregate of 40% to their GDP and in 2012, countries like India got 28.1% from maritime sector, China got 9.7%, Russia had 5.9%, Brazil had 2.8%, while South Africa got 1.3% and 0.15% from the industry respectively. The lackluster performance of the maritime industry in the continent of Africa (especially in Nigeria) calls for urgent maritime reforms. There are arguments that ports or port operations accelerate economic growth, while or at the same time, economic growth pushes the need to establish ports. These are diverse economic postulations or philosophizing from the understanding of various development economists. But, Edih et al, (2022a) argued that a positive link exists between the desire for growth and the development of port's, which in turn produce employment opportunities, generate revenue and other socioeconomic rewards.

Also, in Pearl River Delta, container ports contributed to foreign direct investments (FDIs), and modes of shipping, marketing or promotion strategies, and operations affect human resource and its production capacities and performance (Mobalaji et al.,2012; Zhang and Zhang, 2005). Whether, port operations, shipping operations and/or transport logistics management, represent comprehensive productive activities that are carried out in the maritime industry and connected to the smooth functioning of maritime business in the world of trade. Shipping is that aspect of maritime operations which entails the transportation of cargo (including passengers) from one point to another on a stretch of navigable waters (Ekpo, 2012; Edih et al., 2022a). Shipping and transport logistics, as well as port operations generate employment to the local population where such activities take place.

Bottasso, et al.,(2014) states that a million ton of throughput provides 400-600 jobs and 10% increase in throughput causes 6-20% GDP growth in West European countries, while spillover results in 5-18% increase in employment in neighbouring regions. Port's terminal concession and liberalization increase its efficiency and profitability (Benson and Adekemi, 2018). Concession of port infrastructure and operations empower private operators in cargo handling, shipping and growing an economy. They (ports) have become the economic hub of maritime nations by linking it to the economies of the hinterlands through networks of roads, lowered freight transport cost and access to global markets (Benson and Adekemi, 2018; Ziaul and Hans-Joachim, 2018). However, the studies of Jung (2011) and Deng et al., (2013) showed that the effect of ports on South Korea and China's economies were negative.

Shipping and global trade are complementary since their growth may be retarded without networking. Based on this knowledge, EU's external shipping policy has been expanded to accommodate; global markets, free and equal access to International maritime transport services, strengthen bilateral maritime dialogue and flexibility (ESCA, 2017). Seaborne trade creates demand for shipping services making it to become the nexus between intercontinental trade. It facilitate bulk transportation of manufactured goods and raw materials by providing cost effective method of carriage (Tsaini, n.d). Shipping activities have become the backbone of global merchandise since more than 80% of the world's commerce is done by carriage by sea (ESCA, 2017; Tsaini, n.d).

2.1.1. Maritime industry and the economy of Nigeria.

Maritime or shipping operations in Nigeria date back to 1906 (Crown, 2017 ; Edih et al., 2022a). As posited in Edih et al., 2022b), Nigeria is in a vantage and safe state to appropriate her coastal endowments that are highly favourable to maritime operations as it will necessarily contribute to GDP growth (Banerjee, 2009; Essoh, 2013). The GDP of Nigeria is improved by the increase in gross registered tonnage of vessels (Omoke et al.,2019; Osadume and Edih, 2020) and shipping operations are significant to economic growth (Obed, 2006). According to Ekpo (2012) and Edih et al.,(2022a), maritime activities serve as measures for economic diversification and encourage international relationships. As reported, Nigeria transports 80% of goods coming to West and Central Africa by sea (UNCTAD, 2015), and the World Bank (2008) has asserted that 55% of private investments in waterborne trade takes place in Nigeria.

There is a mutual and compelling relationship between seaport operations and maritime laws across the world (Edih et al., 2022b). While seaports are the doors to trade and growth (Inah and Elijah, 2018; Jung, 2011), maritime laws provide the "dos and don'ts" that guides and regulates the entire activities going on between nations, companies and persons in the maritime sector. Shipping and other operations in the sector in Nigeria are regulated by the Nigerian Port's Authority (NPA) and Nigerian Maritime Administration and Safety Agency (NIMASA). Basically, the two agencies perform the landlord, the regulator and the operator functions. Regulating competition between port structures is the landlord's function, while the creation and setting up benchmark standards for operations constitute the regulator's function and the operator's function simply means providing port services (Osadume and University, 2020). Based on the combination of factors (human & technological) prevalent in the sector, Ziaul and Hans-Joachim (2018) emphasized the role of human resource and effective ports management for effective and efficient transport logistics performance.

2.1.2. Limitations to shipping and transport logistics management.

The outbreak of Covid-19 pandemic has a negative effect on maritime operations across the globe by disruption of travels by sea (Ozturk and Turan, 2020). As a result international borders were closed depriving the hiring of foreign workers (Lowe, 2012), and reduction in international tourism and business travels (Verikios, 2020). In 2020.2, many countries experienced economic contractions, namely; the U.S economy contracted by by (-35%), the U.K (-31%), France (-32%), Germany (-31%), Singapore (-27%), and the rest of EU (-29%)(Verikios, 2020). Also identified as militating factors to maritime trade are damage to cargo due to delays, breakdown of machineries and security risks (Prosertek, 2020). On the basis of the UN's prediction, 24.7 million jobs would be lost as a result of the coronavirus pandemic and its consequences would be worse than the 2008 financial crisis (BBC News, 2020 ; Panayides, 2019).The Asian financial crisis tempered with the growth of seaborne trade in the late 1990s and the 2008 economic downturn limited the volume of maritime business (Tsaini, n.d). The great depression of 1923-33 and great recession of 2008/09 wreaked havoc on global economy leading to collapse of banks, drastic reduction in trade (Edih et al., 2023). Recession could be caused by failure to anticipate risks, and not reflecting on the "continuity bias effect"(Barry 2017) and pandemics/wars (Muhammad et al., 2022).

Currently, there are eight (supposed) ports and terminals in Nigeria; Apapa port, Port Harcourt port, Onne Port, Warri cluster of ports, etc. However, some are operating below optimality while others are in a moribund condition due to a variety of bottlenecks. Among the identified limitations are;

1. Paucity of port infrastructure (Benson and Adekemi, 2018;

Ekpo, 2012).
2. Lack of incentives for investments (Edih et al., 2023).
3. Lack of funding (Benson and Adekemi, 2008).
4. Decline in port calls (Omoke et al., 2019; Edih et al., 2022b).
5. Lack of adequate computerization of port daily operation's data (Edih et al., 2022b).
6. Insecurity in the waterways (sea pyrates) (Edih, et al., 2022b).
7. Political interference and corruption (Edih et al., 2022b).
8. Port congestion and demurrage.
9. Lack of dredging operations leading to shallowness of the waterways, preventing the docking of the required ships in the Nigerian ports.
10. Abandonment of other ports apart from Lagos cluster of ports- Apapa port, Tincan port, etc.

Based on these factors hampering maritime operations, the need for maritime reforms toward addressing them cannot be overemphasized (Jerome, 2008; Osadume and University, 2020).

3. Methods and Materials.

Secondary data representing the revenue performance of the Nigerian maritime industry for 2008/09 - 2021/22 fiscal years were extracted from official bulletins and publications of CBN, Bureau of Statistics, NPA and NIMASA. The data are relevant determinants of the impact or significance of the shipping and transport logistics sector (i.e. the maritime industry) to GDP for a given period. Data were subjected to the multiple regressions statistical test at five percent (5%) level of significance.

3.1. Definition of variables.

The selected variables are; gross domestic product (GDP), gross registered tonnage (GRT), and port throughput (or total tonnage of cargo handled). GDP is the parameter for measuring economic growth of a nation, usually for a given period (fiscal years). GRT is the actual record of internal volume or capacity of ships (water going vessels) registered for maritime transport, and port throughput represents the amount of cargo (or number of vessels) handled by the port authority for the period.

3.2. Model specification.

The study adopted the model used in Osadume and University (2020) and Imide et al., (2022), however with minor modifications in line with the performance indices and other crucial measurement metrics designed by World Bank.

1. Income/expenditure per GRT transformed into Total Revenue/Expenditure divided by Total GRT/or NRT of shipping.
2. Operating surplus per ton of cargo handled (port throughput) is measured Operating surplus divided by Total Tonnage of cargo handled.
3. The rate of return on turnover is measured by Operating surplus divided by Operating income.
4. GDP or TRGDP is a function of total revenue to gross registered tonnage (TRGRT), operating surplus to total tonnage of throughput (OSTP), and operating surplus to operating revenues of the ports (OSOR).
5. Therefore, two models are formulated as follows ;

$$GDP = f(TRGRT, OSTP, OSOR) \quad (1)$$

$$TRGDP = f(TRGRT, OSTP, OSOR) \quad (2)$$

By econometric linearization process, we arrived at;

$$GDP_t = b_0 + b_1(TRGRT)_t + b_2(OSTP)_t + b_3(OSOR)_t + e_t \quad (3)$$

$$TRGDP_t = b_0 + b_1(TRGRT)_t + b_2(OSTP)_t + b_3(OSOR)_t + e_t \quad (4)$$

where;
b_0 is the intercept.
b_1, b_2, b_3 are coefficients.
e_t is stochastic disturbance or error term.
t is the trend for the specified time.
b_0, b_1, b_2, $b_3 > 0$ as a priori expectation.

4. Results and Discussion.

The revenue performance data and analysis as well as discussions are presented in sections 4.1 and 4.2 below.

4.1. Tables of revenue performance data and analysis.

Three Tables were used to analysis (See tables 1 to 3 next pages):

4.2. Discussions on findings.

Table 1 above is the revenue performance data for the maritime industry in Nigeria for 2007/08 to 2021/22 fiscal years. It demonstrates the total revenue, total expenditure, operating surplus (amount remitted), contributions to GD, GRT and port throughput in millions of naira. Contributions to GDP were highest in 2014 with 568, 499 million naira and lowest in 2008 with 295,630 million naira. However, total revenue was highest in 2019 with 277,650 million naira and lowest in 2008 with 90,100 million naira with the GDP of 446,543 million naira and 296,630 million naira respectively. Though total revenue for the period 2007/08-2021/22 was highest in 2019 (277,650 million naira), its contribution to GDP of 446, 543 was lower than the GDP in 2014 of 568,499 million naira. This could be partially attributed to the volume of GRT (156.0714 million) and port throughput (84.951927 million) that represent the highest for the period of assessment. It is evident that the negative consequences of the Covid-19 pandemic were felt in 2020 with a reduction in TR to 201,360 million naira from 277,680 million naira in 2019, while contributions to GDP fell from 446,543 million naira in 2019 to 391,010 million nairas.

Table 2 is a derivative of table 1. In that table 2, the highest contribution to TRGDP is 70.68% (0.70686) in 2017 and lowest

Table 1: Data on Port's Performance, 2008/09-2021/22.

Yr	Amt. realized (TR, Million)	Amt. Exp. (TE, Million)	Amt. Remitted (OS, Million)	GDP (Contrib. Millions)	GRT (million)	Throughput (Million)
2008	90,100	87,050	3,050	295,630	66.2414	42.394336
2009	98,250	94,120	4,130	301,540	75,8481	56,656,142
2010	101,050	95,030	6,020	339,848	106.6896	76.744,727
2011	115,020	105,140	9,880	374,099	122.6147	83.461,697
2012	136,010	125,200	10,810	405,441	129.5069	77.104738
2013	157,310	144,140	13,170	514,966	138.6722	78.281634
2014	172,800	154,770	18,030	568,499	156.0714	84.951927
2015	177,200	158,780	18,430	481,066	144.6152	77.387638
2016	182, 420	158,550	23,870	404,650	139.4065	70.819092
2017	265,600	255,290	10,310	375,745	137.4802	71.903266
2018	270,560	245,910	24,650	398,186	128.6718	73.175127
2019	277,680	248,960	28,720	446,543	131.8975	74.698136
2020	201,360	190,150	11,210	391,010	125.4876	70.245813
2021	223,010	201,090	21,920	401,020	127.5643	69.316715

Source: Nigeria Port Authority, National Bureau of Statistics and Central Bank of Nigeria.

Table 2: Data on Port's Performance, 2008/09-2021/22.

Yr	OSTP	TRGRT	OSOR	TRGDP
2008	71.944	1,360.179	0.03385	0.30477
2009	72.896	1,295.352	0.04203	0.32583
2010	78.442	947.140	0.05957	0.29734
2011	118.378	938.060	0.08590	0.30746
2012	140.199	1050.214	0.08590	0.33546
2013	168.239	1134.402	0.07948	0.30548
2014	212.238	1107.186	0.08372	0.30396
2015	238.152	1225.321	0.10434	0.36835
2016	337.056	1304.547	0.13085	0.45081
2017	143.387	1931.915	0.03882	0.70686
2018	336.863	2120.714	0.09111	0.67948
2019	384.481	2105.271	0.10343	0.62184
2020	159.582	1,604.621	0.0557	0.51497
2021	316.229	1,748.216	0.0983	0.55611

Source: Author's computation, 2023.

Table 3: Multiple Regression Tests Results.

Dependent Variables: TRGDP

Variable	Coefficient	State Error	t-statistic	Prob.
C	0.191756	0.042043	4.560948	0.0198
TRGRT (1)	0.000248	4.9805	4.974443	0.0156
OSTP (-1)	0.000216	0.000253	0.855946	0.4549
OSOR	-2.053840	0.304135	-6.753058	0.0066
R-Squared	0.990857	Mean dependent var		0.396911
Ady. R-Squared	0.981713	S.D dependent var		0.146382
F-statistic	108.3680	Durbin-Watson stat		1.924644
Prob (F-Statistic)	0.001480			

Source: Author's computation, 2023.

in 2010 with 29.73% (0.29734). This explains the significance (based on its minimum contribution) of the maritime sector to economic growth in Nigeria.

Table 3 shows that TRGRT (1) at led 1 had a t-statistics value of 4.9744 and a p-value of 0.00156 revealing a positive and significant effect on TRGDP. The t-statistics for OSTP(-1) at lag 1 is 0.8559 and a p-value of 0.4549 showed a positive but statistically not significant effect to TRGDP at the chosen level of significance (0.05) because the p-value is higher. The OSOR had a t-statistics value of -6.7553 and a p-value of 0.0066 indicating a negative relationship but statistically significant effect on TRGDP since the p-value is less than 0.05. This result affirms that shipping and transport logistics operations have a positive and significant effect on economic growth. And the positive effects of TRGRT and OSTP on economic growth (TRGDP) is supported by the findings in Osadume and University, (2020); Omoke et al.,(2019); Imide et al., (2023), Turnbull and Hughes, (2017), and Jung,(2011) among others. However, the challenges hampering optimal performance of global maritime transportation were identified in Ozturk and Turan,(2017), Lowe (2012), Prosertek,(2020), Tsaini, (n.d), Edih et al.,(2022b), and Benson and Adekemi, (2018). The implication is that government or policy makers should take urgent steps towards addressing the problems.

Also, the adjusted R-square of 0.3817 means 38.17% change in GDP is caused by the activities of shipping and transport logistics. The F-statistics of 0.00148 which is less than the significant level, 0.05 indicates that at least one of Independent variables can predict or effect a change in the dependent variable.

Conclusion and Recommendations.

The study affirmed that shipping revenue performance (shipping and transport logistics) are critical components and success factors of the global maritime industry. In essence, the world has become more interconnected and interdependent due to the advancement in maritime trade (carriage of goods and persons by sea). More so, shipping activities, and transport logistics have positively impacted the economies of nations doing maritime business and the multiplier effects are; creation of Investments in maritime facilities, construction of hinterlands roads to connect the ports, vast opportunities for employment, improved per capita income, enhanced diversification policy, and increased GDP. However, multiple factors that are limiting the optimal performance of the maritime sector were unraveled. Among such challenges are unforeseen and unexpected global pandemic and recession, political interference (more pronounced in developing economies), insecurity, wars, lack of maritime infrastructure, moribund and non-functional ports, natural disasters causing damage to ports and ships, etc. Based on these limitations hindering full performance of the maritime industry, the following measures have been suggested;

1. A robust maritime reform should be put in place to stabilize the industry. Reforms on maritime security architecture, concession of maritime facilities, to boost revenue generation, revive moribund ports, will necessarily drive sustainable growth in the sector.
2. A robust public private partnership plan (4ps) to accommodate both foreign and indigenous investors. Such joint arrangement would boost capital generation for the building of major infrastructures in the industry. The PPP formula should address negative externalities from the foreign companies in terms of competing with the local firms (using tax waiver).
3. Government should restructure the supervisory agencies (NPA and NIMASA) to enable them to perform maximally. The restructuring model should strengthen the whistle blowing policy to fish out corrupt officers and flush out endemic corrupt practices from the system.

Acknowledgements.

We thank the Central Bank of Nigeria, Bureau of Statistics, Nigeria Port Authority, NPA, and Nigeria Maritime Administration and Safety Agency, NIMASA, for the release of the shipping revenue performance data for the period. We are pleased to declare that the study was not sponsored and that there is no conflict of interests.

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