GPH-International Journal of Applied Management Science
(Online-ISSN 3050-9688)
Volume 06 | Issue 02 | April-June 2026
Published by: Global Publication House
DOI: https://doi.org/10.5281/zenodo.20306707
Available online at www.gphjournal.org
Journal homepage: https://gphjournal.org/index.php/ams/index

Assessment of the Contribution of Blue Economy on Sustainable Economic Development in Nigeria

Daniel Dornubari SUNDAY
Department of Maritime Economics and Finance, Nigeria Maritime University, Delta State, Nigeria.
daniel.Sunday@nmu.edu.ng
Henry ONYEMA
Department of Transport and Nautical Sciences, Nigeria Maritime University, Delta State, Nigeria.

Abstract

This study evaluated the role of blue economy to sustainable economic development in Nigeria. The study was inspired by the desire to seek other avenues in enhancing human wellbeing other than the conventional oil-based growth. In particular, the research analyzed how fisheries output, port throughput, marine tourism revenue and offshore oil and gas impacted the results of human development. It has been pegged on the Resource-Based View, Sustainable Development Theory and Endogenous Growth Theory. Ex-post facto research design was embraced and annual time-series data on the sample population studied period 1990 to 2024. Secondary databases such as international development indicators, national statistical agencies were used to source out data. The study employed descriptive statistics and Augmented Dickey-Fuller unit root test and Johansen cointegration test together with parsimonious error correction model with a level of significance of 5%. The results indicated that port throughput and offshore oil and gas are positively and significantly related with human development whereas fisheries output and marine tourism have positive but insignificant correlations. The results also confirmed that there exist long-run equilibrium relationships among the variables that the blue economy activities have an overall impact on sustainable development in the long run. The paper concluded that the blue economy potential in Nigeria has a huge potential to promote human development, but the impact of the blue economy is still uneven as a result of structural and institutional issues. The study proposed several recommendations among them being the need to allocate more funds in the development of fisheries, to modernize the port infrastructure, to improve the management of oil revenues and to strategically develop the marine tourism. The research adds to the body of knowledge by combining the blue economy indicators with the outcomes of the human development process, which offers a multidimensional approach to sustainable economic development.

Keywords*:*

Blue economy, Human Development Index, Fisheries output, Port throughput, Marine tourism, Offshore oil and gas, Sustainable economic development, Nigeria.

1.0 Introduction

The blue economy has been reflected in the form of a strategic approach towards achieving sustainable development, through efficient and environmentally friendly use of ocean and marine resources. It also involves economic activity, such as fisheries, marine transport, marine tourism and offshore oil and gas that can potentially generate income, job opportunities, and social goodwill and ensure ecological sustainability (Bennett et al., 2019; World Bank, 2017). The blue economy is not the only plausible option to diversification of the economy other than the traditional heavy reliance on oil as is the case of a coastal state like Nigeria which has been blessed with a number of marine resources along the Gulf of Guinea. The structure of the Nigerian economy has largely been reliant on the export of the petroleum products which have continued to play an important role in the Nigerian national output and livelihoods albeit not at its full potential during the period 19902024 (Adewumi & Akinwale, 2020; NBS, 2022).

The concept of sustainable economic development is slowly starting to get quantified, in the form of multidimensional indicators that do not merely just indicate the increase in the level of income, but also human wellbeing. A combination of life expectancy, education and per capita income, which provides the overall measure of the development outcomes, is known as Human Development Index (HDI), the development of the United Nations Development Programme (UNDP, 2023). Nigeria though a blessed country, in terms of resources, the country has been registering relatively low in terms of its performance in terms of HDI which is a reflection of their persistent issues of poverty, unemployment and inequality. That is why, it is necessary to consider some other drivers of growth, such as the blue economy, which could directly improve the outcomes of the human development with the help of inclusive and sustainable resources (Sachs et al., 2022; UNDP, 2023).

The fisheries production, port production, marine tourism production and the offshore oil and gas production are some of the key components of blue economy in Nigeria. Among the factors that support food security and employment in some communities in the coastal areas is fisheries industry which enables contributing to the protein supply as well as incomes of the rural population (FAO, 2022). Similarly, port throughput is the measure of the intensity of maritime trade, the efficiency of logistics, and the higher the amount of cargo moved the higher the economic activity and integration of trade, which are the keys to development (UNCTAD, 2020). The marine tourism is underdeveloped yet with a giant potential to generate income and provide employment in case it is supported with the help of the relevant infrastructures and policy frames (UNWTO, 2021).

The offshore oil and gas is one of the most dominant aspects of the blue economy of Nigeria as it contributes significantly to the government revenue, as well as foreign exchange earnings. However, it has impacted the sustainability development both positively and negatively since it has led to the aggravation of the environment and socio-economic unrests in the oil producing regions (Ite et al., 2013; IEA, 2023). The discussion of the overall contribution of these aspects of blue economy to sustainable economic development in monetary terms of highest developmental index (HDI) within the time horizon 19902024 is critical in terms of how use of marine resources can be maximized to enhance human welfare in Nigeria.

Though the literature on blue economy in Nigeria is still growing, there is yet much to be accomplished, which can be achieved by shaping up the further empirical research. The recent literature in Nigeria has been dominated by literature which has concentrated their focus on the relationship between the elements of the blue economy and the overall economic growth, which is normally measured in terms of GDP or GDP per capita, yet fail to measure the welfare on a broader basis, such as the Human Development Index (HDI). To explain this, recent empirical studies have investigated the contribution of fisheries, maritime transport and coastal tourism to GDP and found positive and significant relationships however, all these studies are limited to the contribution of these industries to GDP without considering the dimensions of human well-being (Obemeata, 2025; Dosunmu, 2025). Similarly, sector-specific studies such as Esin (2025) have been focussed towards the production and economic development of fisheries and therefore not taking into consideration the integrated and multidimensional nature of the blue economy towards generating sustainable development outputs.

In addition, the Nigeria literature is quite incomplete and most of the studies focus on one or more of the components of the blue economy instead of the implementation of a whole-of-system approach to capture fisheries output, port throughput, marine tourism revenues and offshore oil and gas operations. This fails to offer a joint analysis that would allow one to comprehend the joint impact of blue economy sectors on development paths (Oyedele, 2023). Besides, most of the studies have a relatively short or long data, hence, have not been in a position to capture the long run dynamics and structural changes of the Nigerian economy over long periods.

Interestingly, research studies that directly correlate blue economy practice and the outcome of inclusive and sustainable growth are not available yet despite the interest in the world in the concept of inclusive and sustainable growth. This study therefore fills a very critical gap, by encompassing some of the key pointers of the blue economy and analyzing its contribution towards sustainable economic development in terms of the HDI over a long-term period (19902024).

2.0 Literature Review

2.1 Conceptual Framework

2.1.1 Blue Economy

As a safe utilization of ocean and marine resources to achieve economic growth, improved livelihoods and environmental sustainability, it is possible to describe blue economy. It encompasses the economic life like fisheries, maritime transportation, offshore power and coastal tourism in the sustainability context which ensures that the ecosystems are protected and inclusion of the social groups. Bennett et al. (2019) assert that the blue economy should be geared towards creating an equilibrium between economic growth and ocean health, which will in turn alleviate the environmental degradation, and create inclusive development. Similarly, Silver et al. (2015) also put the concept of the blue economy in the context of a model of governance that will be instrumental in regaining the current overexploitation of marine resources and the long-term sustainability goals. Blue economy is increasingly becoming an economic diversifier tool, to be used in cutting over-reliance on oil incomes, in developing nations such as Nigeria. The role played by the marine based industries in creating employment, trade and food security is empirically

supported (Pauly et al., 2020). In Nigeria, however, the benefits cannot be realized due to the low institutional capacity, the environmental conditions as well as because the maritime infrastructure is under-invested (Oyedele and Adebayo, 2022). Therefore, the multi-faceted policy frameworks, technological innovation and the sustainable resource management strategies are needed to make the best out of the blue economy.

2.1.2 Sustainable Economic Development

The concept of sustainable economic development is multidimensional concept, which consists of a combination of economic development and enhancement of human welfare, environmental protection as well as social equity. However, in contrast to the traditional growth models that are geared towards growth of output, sustainable development is geared towards increasing the human capacities and intergeneration equity. The measure of this multidimensionality is the Human Development Index (HDI), and was developed by the United Nations Development Programme, and comprises of life expectancy, education and income indicators (UNDP, 2023). Sustainable development implies the fact that there should be a balance between economic efficiency, environmental sustainability and social inclusion (Costanza et al., 2014). The case of the Nigerian scenario can be used, although it can be argued that in some quarters, the increase in the GDP has been steadily growing, however, the growth in the HDI has been very sluggish, which can be regarded as a pointer of structural inadequacy in the process of transforming the gains of the economy to the human well-being (Alege & Ogundipe, 2014). Moreover, the recent study is also preoccupied with the idea that the diversification of the sector and the use of the resources of the seas and coastal areas, in particular, can become quite an important contributor to the results of sustainable development since they may provide jobs and reduce poverty, as well as increase the quality of life (Adewuyi, 2020). By doing so the operationalization of sustainable economic development in the paper is operationalized in terms of HDI to bring out the connotation of increased welfare of blue economy actions.

2.2 Theoretical Framework

2.2.1 Resource-Based View (RBV)

Barney (1991) developed the RBV theory which involves the effective use of valuable, rare, imitable and non-substitutable resources as driving forces behind economic performance. Strategic resources that might be leveraged to enhance the performance of the national competitiveness and development under the blue economy include marine and coastal resources like fisheries, offshore hydrocarbons and maritime infrastructure. Hart (1995) further extended RBV to natural-resource-based view since the natural resource may be utilized in order to come up with a long-term competitive advantage as it is managed in a sustainable manner. This point of view is shared by Bennett et al. (2019) which posed that countries that possess rich marine resources may be better when the system of government and control over the marine resources is efficient. The critics however go ahead to say that the existence of abundance of resources may also lead to inefficiencies and curse of the resource in case the institutional structures, are weak (van der Ploeg, 2011). The RBV is especially relevant to Nigeria where the marine resource other than the oil and gas have not been fully exploited meaning that the better the management of the marine resource, the higher the level of human development.

2.2.2 Sustainable Development Theory

It is this idea of sustainable development that is able to fulfill the current needs without compromising on the future generations that gave rise to the development of the sustainable development theory which has its roots in the Brundtland Report (WCED, 1987). This theory is an economic, environmental and social theory that has all these spheres in a single economic, environmental, and social theory of policy and development planning. Sachs (2015) builds on this theory, by suggesting that there is need to have sustainable resource management and inclusive growth in the achievement of the long-term development goals. Based on the circumstances of the blue economy, the Sustainable Development Theory urges to balance between economic exploitation of the maritime environment, and nature preservation. Empirical studies have demonstrated that fluctuating use of marine resources can result in destruction of the environment that can adversely impact the economic value in the long-term (Costanza et al., 2014). However, critics point out that during the process of attaining sustainability, there always exists a tradeoff between the economic growth and environmental protection especially in the developing economies (Redclift, 2005). The theory can be highly applicable in Nigeria since the offshore oil exploration, and marine activities have brought about economic gains, and environmental problems in the Niger Delta. By doing so, the theory may be applied to tell whether the activities in the blue economy can be implemented in sustainable human development.

2.2.3 Endogenous Growth Theory

Endogenous growth theory that was developed by Romer (1990) and Lucas (1988) explains the economic growth as being a product of internal factors (such as human capital, innovation and technological advancement) that defines economic growth. The following will be the result of the investments made on knowledge, infrastructure and skills as per the theory; an economic growth that is sustainable and one that is not pegged in external shocks. The innovative maritime technologies, the efficiency of marine ports, fisheries and marine tourism are parts of the areas, where the endogenous growth is promoted within the context of the blue economy. Empirical studies have revealed that both the positive impact of technological innovation and development of infrastructures are both significant and positive on the productivity and the long-term economic growth (Aghion and Howitt, 2009). However, it is criticized that there is a structural constraint in developing countries which includes inaccessibility of technology, and weakness of the institutions that can impede the process of endogenous growth (Acemoglu & Robinson, 2012). The applicability of this theory to Nigeria is that it needs to invest in the maritime infrastructures, human capital research and development so as to maximise the benefits of the blue economy sectors. With innovation and capacity building Nigeria can convert its marine resources to sustainable sources of human development.

2.3 Empirical Review

Obemeata (2025) has tested the hypothesis on the impacts of the blue economy sectors on the economic growth of Nigeria using ex-post facto research design. The data of World bank databases and central bank of Nigeria were used in the analysis to find time series of data between 19812024. They used both the Fully Modified Ordinary Least Squares (FMOLS) as well as Johansen cointegration models. The results indicated that, the fisheries, maritime transport and tourism have

contributed to the growth in the GDP but not all of them have had the same effect in the GDP. The research posited that there was the need to invest more in the fisheries infrastructure, maritime logistics and development of tourism in order to develop more economic diversification.

With a secondary data, Esin (2025) aimed to carry out a study to test how capture and aquaculture fisheries are performing in Nigeria. Results indicated that it is highly influential in determining the economic growth and also it aids in supplying fish in the country through fisheries production. Others of the proposed research recommendations included making more investments in aquaculture, and to make the fisheries value chains more valuable.

Nwaogbe et al. (2020) identified the operational performance of the Nigerian seaports, and adopted a quantitative research design, which has its foundation based on the port performance indicators. The studies were based on secondary operational statistics, and descriptive statistics. The results revealed that port efficiency is one of the most important factors that facilitate trade and economic performance of the maritime industry. To achieve a better productivity of the economy, the paper suggested better cargo handling systems, development of infrastructure and better governance of ports.

Pauly et al., (2020) analysed information about fisheries around the world, using both the time-series data, and statistical modelling. The research found out that the fisheries production is one of the key determinants to the food security and economic development of some countries especially the developing countries. It suggested the better governance and investing in sustainable practices in fisheries.

Nwaogbe et al. (2020) compared the performance of the seaports in Nigeria in terms of operational performance with secondary data and descriptive statistic. The results showed that the port throughput may have great impact on the trade facilitation process, and the economic activities. The analysis suggested modernisation of the port infrastructure, and efficiency of the cargo handling system.

In his time-series regression model of the relationship between oil and non-oil exports and the growth of economy in Nigeria, Adewuyi (2020) performed a time-series regression analysis. The results indicated that it is the diversification of the economy in other non-oil related ways that can lead to a sustainable economic growth. The research showed that the other sectors such as marine resources need to be enhanced.

In the mixed-method empirical methodology, Hamisu (2019) evaluated the potential of the blue economy in Nigeria with the offshore oil and gas to form the centre of interest. The research found out that the offshore oil is a prime source of national income and that it has adverse effects to the environment which undermines on sustainability. This implied that they should diversify and non-oil marine industries and that it has to be stricter on environmental regulations.

Bennett et al. (2019) examined the risks and opportunities of developing the blue economy, in a global empirical synthesis. The research was done as a qualitative, meta-analytical research design, which was informed by the large volume of data and cases of policy. Results indicated that fisheries, maritime industries and offshore resources are important in the economic development of a given

country but a threat to the sustainability when not well managed. The policy change suggested in the research was the change in governance, and sustainable ocean policies.

Silver et al. (2015) have delved into the discourse of the blue economy, as a context of empirical policy studies in a variety of countries. The study found out that blue economy projects have the potential to enhance the process of development in case they are well controlled. It has come up with good and sustainable ocean governance systems.

In their study on their relationship between fishery production and economic growth in Nigeria, Oyakhilomen and Zibah (2013) used time-series data, and regression. The research has determined that fisheries contribute greatly to the economic productivity, and the rural livelihoods. It has come with the recommendation that they need to invest more in the aquaculture industry, more access to credit and fisheries administration procedures should be improved.

3.0 Methodology

This study research design is anchored on the expost facto. This is because the variables of interest had already occurred and could not be manipulated by the researcher. The yearly data of the blue economy (1990-2024) was used to determine the contribution of the blue economy indicators (fisheries output, port throughput, marine tourism revenue and offshore oil and gas) to sustainable economic development in Nigeria, using the Human Development Index. Ex-post facto design was apt since it was capable of assisting the researcher to test the cause-and-effect relationship among the macroeconomic as well as sectoral variables using already existing time-series data. The design, typically is quite flexible when it comes to economic research where the researcher is relying on secondary data created by official institutions and where the researcher cannot control the experiment (Gujarati & Porter, 2009; Wooldridge, 2016; Sunday, 2026).

The philosophy of positivism was the base of this study. The assumptions of positivism are that the social and economic reality might be objectively measured in the form of observable facts, numeric values and interrelations between the facts. The correct one was positivism since it was to be used to test hypothesis, to verify empirically and objectively to interpolate the results since the research was based on quantifiable indicators in terms of HDI, fisheries output, port throughput, marine tourism revenue and offshore oil and gas output. The positivist approach also assisted in the application of the econometric techniques in testing the hypothesis that the changes in the blue economy indicators was a significant explanator of the changes in sustainable economic development in Nigeria. The positivism is better suited when explaining the relationship that exists between the variables by applying structured methods, measurable variables and statistical analysis. (Saunders et al. 2019; Sunday & Olulu-Briggs, 2026).

The research was made up of secondary time-series data of the years 1990-2024. The dependent variable, sustainable economic development was measured using the Human Development Index which can be found in the United Nations Development Programme and other databases that contain information on human development. HDI is also appropriate since it quantifies the aspects of development that include income, education and life expectancy. The blue economy indicators were the sources of right national and international data repositories. The fisheries and aquaculture databases available on FAO and World Bank were used to obtain the fisheries and aquaculture

production indicators of Nigeria. The port statistics of the Nigerian Ports Authority, and other books on maritime statistics were the sources of obtaining the port throughput. Where possible, the data sets used to derive the revenue of marine tourism will be the tourism related data sets including World Bank, UN Tourism and national statistical sources. The data on oil and gas offshore were accessed using the World Bank data sets on energy related issues, Central Bank of Nigeria and in the OPEC statistical bulletins. The Country official development statistics i.e. the fisheries and aquaculture statistics of the country by FAO could be tracked to the World Development Indicators of the World Bank.

The operationalization of sustainable economic development was in the form of Human Development Index (HDI). HPI measure was more appropriate as a measure of development compared to GDP alone because it has the health, education and income outcomes. HDI application is also in line with the development literature that regards sustainable development as improvement of human wellbeing as opposed to simply increasing the national output. The HDI of Nigeria is also included in the list of the required actions of the performance of the human development, due to this reason, it can be appropriate when it is a part of this research (UNDP, 2024).

The first independent variable, which was the fisheries production or fisheries output in metric tonnes was the fisheries output. This variable was an indicator of how the marine and aquatic resources contributed towards food security, employment, household income and development of coastal livelihoods. The second independent variable was the port throughput that is expressed in terms of total cargo throughput the ports in the Nigerian seaports handle and is usually expressed in metric tonnes. The intensity of the maritime trade, the performance of logistics and productive role of ports in blue economy of Nigeria was captured by port throughput. The traceability and relevance of this indicator lie in the fact that the Nigerian Ports Authority publishes the figures of the cargo throughput and port traffic (Nigerian Ports Authority, 2022).

The third independent variable which was measured in terms of tourism receipts or tourism related revenue which could be attributed to the activities of the coastal and marine tourism. This variable was a measure of the impact of the beaches, coastal recreation, marine heritage and waterfront tourism on the income and employment. The fourth independent variable was the offshore oil and gas which was measured by the output of offshore crude oil and gas, the oil revenue or the contribution of offshore crude oil and gas to GDP dependent on availability of data. This variable was chosen since the offshore petroleum activities continue to be a very significant part of the ocean-based economy of Nigeria. Thus, the model for this study is stated as follows:

$$HDI = f(FISO, POTP, MATR, OFOG) \quad 3.1$$

$$HDI_t = \beta_o + \beta_1 FISO_t + \beta_2 POTP_t + \beta_3 MATR_t + \beta_4 OFOG_t + \delta_t \quad 3.2$$

$$\beta_1 - \beta_4 > 0$$

Where: HDI = Human development index, FISO = Fisheries output, MATR = Marine tourism revenue, POTP = Port throughput, OFOG = Offshore oil and gas, β_o = Constant, $\beta_1 - \beta_4$ = Coefficient of the variables, δ_t = Error term of the estimate

The study involved the use of unit root test, Johansen cointegration test and parsimonious error correction model. Unit root test was done to find out whether the variables were at level or differenced. It was due to the fact that the time-series data which are non-stationary can give a spurious regression solution. This formal procedure of testing unit roots in an autoregressive time series process was appropriate since Dickey and Fuller had worked out a formal process of testing unit roots (Dickey & Fuller, 1979). The null hypothesis of ADF test is that the variable has a unitroot yet the alternative hypothesis is the variable is a stationary variable. The variables that were not at level stationary were differenced till the variables became stationary.

The possibility of long run equilibrium relationship between HDI and indicators of the blue economy that were selected was tested using the Johansen cointegration test in the study. The fact that only the models use the maximum likelihood estimation to determine the number of the cointegrating vectors between the variables necessitates the use of multivariate time-series model (Johansen, 1988). To determine whether or not HDI, fisheries output, port throughput, marine tourism revenue and offshore oil and gas moved in the same direction in the long-run, trace statistic and maximum eigenvalue statistic were used.

Lastly, this study made used of the parsimonious error correction model (PCM) given the existence of long-run form among the variables. The PCM was used to verify the speed at which disequilibrium that occurs in the short-run will be corrected in the long-run as well as the ature of the relationship between the dependent and independent variables. For the earlier proposition to occur, PCM coefficient is expected to be negative and significant (Olulu-Briggs & Sunday, 2021a; Olulu-Briggs & Sunday, 2021b). The redundant lags, as well as the relevant variables were also discarded to achieve the parsimonious model that is not only explanatory, but not over-parameterized.

4.0 Results and Discussion

4.1 Results

Table 4.1 Result of Unit Root Test

Variables	ADF T-Stat @ Level	T-Critical @ level	P-value @ level	ADF T-Stat @ 1st Diff.	T-Critical @ 1st Diff.	P-value @ 1st Diff.	Order of Integration
HDI	-1.547724	-2.951125	0.7973	-4.547284	-2.986225	0.0037	I(1)
FISO	0.648239	-2.951125	0.9789	-3.984624	-2.986225	0.0165	I(1)
POTP	-2.762674	-2.951125	0.0874	-7.117482	-2.986225	0.0000	I(1)
MATR	-1.948293	-2.951125	0.3038	-4.961726	-2.986225	0.0003	I(1)
OFOG	1.563460	-2.951125	0.7683	-4.862724	-2.986225	0.0020	I(1)

Source: E-view Output 10

Table 4.1 reveals the results of the unit root that all the variables i.e. HDI, fisheries output (FISO), port throughput (POTP), marine tourism revenue (MATR) and offshore oil and gas (OFOG) are not at the level but are stationary after first differencing. This is evidenced by the fact that, at level, absolute values of the ADF test statistics of all the variables are lower than the respective critical values and the p-values are bigger than 0.05 and it indicates the existence of the unit roots. But, following the first difference, the ADF test statistics is greater in absolute terms as well as the p-value is less than 0.05 in all variables. This is a guarantee that all the variables are integrated of the first order, I(1). It implies that the stochastic properties of the variables are similar, which is why it is suitable to test the relationship between the variables on the long-run basis with the help of the cointegration methods.

Table 4.2 Johansen Co-integration Result

Trend assumption: Linear deterministic trend
Series: HDI FISO MATR OFOG POTP
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.759580	107.4804	69.81889	0.0000
At most 1 *	0.604287	61.86854	47.85613	0.0014
At most 2 *	0.423353	32.20246	29.79707	0.0259
At most 3	0.314164	14.58564	15.49471	0.0682
At most 4	0.075668	2.517881	3.841466	0.1126

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.759580	45.61181	33.87687	0.0013
At most 1 *	0.604287	29.66608	27.58434	0.0266
At most 2	0.423353	17.61683	21.13162	0.1449
At most 3	0.314164	12.06776	14.26460	0.1081
At most 4	0.075668	2.517881	3.841466	0.1126

Source: E-view Output 10

Table 4.2 shows the results of the Johansen cointegration test, which indicate that there are long run relationships amongst the variables. The trace statistic indicates that there are at least three cointegrating equations since trace statistic of the form of "None, at most 1, or at most 2 is greater

than the respective critical values of the trace statistics with p-values less than 0.05. This implies that the variables in the long run move together and are subjected to equilibrium relations. The same is confirmed by the maximum eigenvalue test which confirms that there are at least two cointegrating relationships, the statistics of "None", and At most 1 exceeds the statistics of the critical values and therefore is statistically significant. The presence of cointegration implies that, though the variables are able to vary out of the equilibrium in the short run, the variables are likely to move towards the equilibrium in the long run. This gives a good reason as to why an error correction model should be estimated to provide a short run dynamic as well as long run adjustments.

Table 4.3 Parsimonious ECM Result

Dependent Variable: D(HDI)
Method: Least Squares
Sample (adjusted): 1991 2024
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FISO(-1))	29.13013	18.25127	1.596060	0.1210
D(POTP(-1))	0.004237	0.001602	2.643977	0.0133
D(OFOG(-1))	0.133134	0.045185	2.946430	0.0061
D(MATR(-1))	1.809695	4.108271	0.440500	0.6625
ECM(-1)	-0.850971	0.274255	-3.102844	0.0043
C	0.002687	0.001683	1.596060	0.1210

R-squared	0.910408	Mean dependent var	66217.74
Adjusted R-squared	0.894410	S.D. dependent var	74546.35
S.E. of regression	24223.59	Akaike info criterion	23.18683
Sum squared resid	1.64E+10	Schwarz criterion	23.45618
Log likelihood	-388.1760	Hannan-Quinn criter.	23.27869
F-statistic	56.90573	Durbin-Watson stat	1.890365
Prob(F-statistic)	0.000000		

Source: E-view Output 10

The error correction coefficient ECM (-1) is negative (-0.850971) and statistically significant meaning that about 85 percent of any deviation of the long run equilibrium has been rectified in one period. This means that there is relatively the quick adjustment process in that, shocks to the system are easily corrective.

Port throughput (POTP) on its part influences the HDI in a positive and statistically significant manner, which implies that the beneficial impacts of increases in the activities of maritime trade on sustainable economic development are significant. Offshore oil and gas (OFOG) also has a positive and significant relationship with the HDI that indicates that revenues and activities of offshore petroleum resources positively relate to the human development outcomes. Despite this positive

value, Fisheries output (FISO) is statistically insignificant that means the contribution of this factor towards the HDI is weak in the short-run, probably due to structural inefficiencies or underdevelopment of the sector. Likewise, the revenue of marine tourism (MATR) is positive yet not significant indicating that the industry has not as yet produced significant revenue in human development, probably because it has not been extensively utilized.

The overall model is statistically robust as the value of R-squared is very high (0.91) which implies that the independent variables explain about 91 percent of the variations of HDI. The F-statistic is significant which means that there are both significant together. The value of the Durbin-Watson statistic is about 1.89, which means that there is no severe autocorrelation on the model. Overall, the findings show that, whereas some of the blue economy aspects have a great influence on sustainable economic development, some of the aspects should be developed further to realize the full potential that they have.

4.2 Discussion of Findings

The positive and non-significant correlation of fisheries output against HDI suggests that though fisheries can impact human livelihoods and food security in Nigeria, it has weak impacts on the overall human development. According to resource-based view, marine resources like fisheries, can only create sustainable development when harnessed and incorporated into productive systems in an efficient manner (Barney, 1991). The structural problems, including artisanal production systems, poor storage facilities and absence of value addition has hampered the potential of the sector to influence considerably on the income, education and health impacts. This stance can be substantiated by the empirical evidence. Adewuyi (2020) as an example showed that non-oil sectors in Nigeria, including fisheries related sectors, have potential to grow but they have not been developed, and have few links to the overall welfare outcomes. Likewise, research in the Marine Policy field shows that fisheries can contribute to the employment and food system but they need to be strengthened institutionally to have a significant impact on human development (Pauly et al., 2020). Accordingly, the non-significance can be translated into the inefficiencies and non-use of the developmental potential and not the lack of developmental potential.

The fact that the relationship between port throughput and HDI is the positive and significant one, presupposes the fact that maritime logistics is the powerful factor, which results to the sustainable economic development in Nigeria. This observation has been in accordance with the endogenous growth theory that emphasizes the role of infrastructures, facilitation of trade and productivity as key determinants of the long-term growth processes (Romer, 1990). Efficient ports increase the velocity of trade, decrease the transaction costs and boost the activity in the industries and as a result, create employment and raise the national income. This finding can be supported by empirical evidence in Nigeria. In their econometric analysis, Adedoyin et al. (2021) came to the conclusion that the presence of trade openness and logistics performance have a significant positive impact on development outcomes in Nigeria. In addition, UNCTAD (2020) shows that the more efficient a port is, the more the global trade would be integrated and the welfare of economic entities would be improved. Thus, the significance of port throughput will prove that a maritime transport infrastructure is a very critical transmission mechanism a blue economy can use to influence HDI.

The fact of positive and significant relationship between offshore oil and gas production and HDI, suggests that petroleum-based marine resources will still remain on the development outcomes of HDI. This is in keeping with the Resource-Based View and the Sustainable Development Theory which recognizes the fact that the natural resources can be utilized to support development as long as such resources are managed in an effective manner (Hart, 1995; WCED, 1987). The offshore oil activities result in the generation of government revenues, earnings of foreign exchange, and capacity of finances which can be utilized to finance social services such as health and education. This relationship is substantiated by empirical studies. As an example, Adedoyin et al. (2021) have found that the use of natural resources is one of the biggest contributors to the economic development of Nigeria, yet the benefits can be only attained in cases of good governance. As was highlighted by van der Ploeg (2011) where in a scenario where the institutions are effective in controlling the rents in the resources, the economies rich in resources can develop. Therefore, the immense impact of the offshore oil and gas is a pointer of its tremendous fiscal impact on HDI, but with the problems of sustainability.

The weak yet significant correlation between the marine tourism revenue and the HDI implies that the tourism of the coast has a development potential but has not been developed in Nigeria. The Sustainable Development Theory is based on the notion that tourism can lead to development only when it is inclusive, environmentally friendly, and has a sufficient infrastructure (Sachs, 2015). The poor infrastructure, insecurity, poor destination branding and poor investment by individuals limit marine tourism in Nigeria. This constraint is supported by empirical evidence. Research in the area of the Tourism Management and other related journals have shown that tourism has a major impact on the development of the countries with strong institutional and infrastructural frameworks, but has a minimal effect on the development of the developing economies with weak institutional and infrastructural frameworks (Dogru et al., 2020). Thus, the inability of marine tourism revenue to be significant, is a factor of structural and institutional constraints and not lack of potential.

5.0 Conclusion and Recommendations

5.1 Conclusion

This study investigated the relationship between contribution of the blue economy and sustainable economic development in Nigeria. The results of the study indicated that even though port throughput and offshore oil and gas have significant effect on human development; fisheries and marine tourism show weak and insignificant impacts owing to structural inefficiencies and underdevelopment. The fact that blue economy sectors have long-run relationships confirms that the relationship is collective and such that blue economy sectors influence development outcomes. Thus, the study concluded that blue economy can still be employed as a viable route towards improvement of human welfare in Nigeria as long as it is harnessed through good policies and institutional reforms.

5.2 Limitations of the Study

There are a few limitations to this study. First, analysis was only based on secondary time-series data, which can be subject to measurement errors, inconsistencies or gaps especially in areas where data on marine tourism are minimal in Nigeria. Second, the study merely focused on a small range

of blue economy indicators, such as fishes output, port throughput, marine tourism revenue and offshore oil and gas, and thus, omitted other important elements, including marine biotechnology and renewable ocean energy, due to lack of data. Third, using aggregate data to cover national level, may obscure regional differences, especially between the states along the coastline, where the activities of the blue economy can be more obvious. In addition, the econometric techniques employed also assume that the relationship between variables is linear and this may not necessarily reflect in any way the complexity of the relationship between variables. Finally, institutional and policy variables have not been directly factored in, but they could have contributed towards the successful implementation of blue economy to sustainable development.

5.3 Recommendations

The study put forth the following recommendations based on the findings of the study;

i. The Federal government of Nigeria needs to invest in modern aquaculture systems, cold storage facilities and fish processing industries and enhance regulation infrastructures to fight illegal fishing and increase sustainability. These interventions will boost productivity, decrease the losses incurred after the harvest and increase the income of the coastal communities, hence, improving HDI outcomes. Secondly, the amount of credit and extension services that the small-scale fishers obtain should be increased in order to promote commercialization and value chain integration.

ii. Due to the importance of port throughput, modernization of port infrastructure, such as automation of cargo handling operations, increase in port capacity and enhancement of the hinterland connectivity through rail and road networks should be prioritized by the policymakers. The decrease in port congestion and increase in efficiency will further boost trade flows, employment and government revenue, and thus the positive contribution of the maritime activities to the development of human beings.

iii. In the case of offshore oil and gas, there is a need to enhance management and distribution of petroleum revenues by directing them towards key sectors of the economy like education, healthcare and infrastructure. Current initiatives to ensure transparent governance, environmental control initiatives as well as community development initiatives should be strengthened in such a way as to ensure that the oil wealth will translate into sustainable welfare gains and not environmental degradation and social inequality.

iv. Finally, in order to realize the potential of marine tourism, the Federal government of Nigeria needs to invest in coastal infrastructures, improve the security of tourist destinations as well as promoting Nigeria as a marine tourism destination, by strategic marketing. The environmental conservation measures should be employed to develop the beach resorts, waterfronts and marine recreational services and encourage development of these facilities by encouraging public-private partnerships. These efforts will see marine tourism playing a big role with regard to employment, generation of income and overall human development.

REFERENCES

Acemoglu, D., & Robinson, J. A. (2012). *Why nations fail: The origins of power, prosperity and poverty*. Crown Publishing.

Adedoyin, F. F., Bekun, F. V., Driha, O. M., & Balsalobre-Lorente, D. (2021). The effects of economic growth, tourism, and energy consumption on environmental quality in Nigeria. *Environmental Science and Pollution Research, 28*(3), 1–14.

Adewumi, A. A., & Akinwale, Y. O. (2020). The role of marine economy in economic diversification in Nigeria. *Journal of Sustainable Development in Africa, 22*(3), 1–14.

Adewuyi, A. O. (2020). Oil and non-oil export linkages and economic growth in Nigeria. *Resources Policy, 68*, 101728.

Aghion, P., & Howitt, P. (2009). *The economics of growth*. MIT Press.

Alege, P. O., & Ogundipe, A. A. (2014). Environmental quality and economic growth in Nigeria: A dynamic model analysis. *Environmental Economics, 5*(2), 1–15.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120.

Bennett, N. J., Blythe, J., White, C. S., & Campero, C. (2019). Blue growth and blue justice: Ten risks and solutions for the ocean economy. *Marine Policy, 107*, 103559.

Costanza, R., de Groot, R., Sutton, P., van der Ploeg, S., Anderson, S., Kubiszewski, I., Farber, S., & Turner, R. K. (2014). Changes in the global value of ecosystem services. *Global Environmental Change, 26*, 152–158.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association, 74*(366a), 427–431.

Dogru, T., Bulut, U., Kocak, E., Isik, C., Suess, C., & Sirakaya-Turk, E. (2020). The nexus between tourism, economic growth, and environmental sustainability. *Tourism Management, 76*, 103957.

Dosunmu, A. S. (2025). Harnessing the blue economy for economic diversification in Nigeria. *International Journal of Economics and Business Management, 5*(6), 1–8.

Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica, 55*(2), 251–276.

Esin, J. O. (2025). Blue economy and the fisheries sector in Nigeria: Analysis of capture and aquaculture fisheries. *International Journal of Research and Innovation in Applied Science, 10*(3), 723–737.

Food and Agriculture Organization. (2022). *The state of world fisheries and aquaculture 2022*. FAO.

Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics* (5th ed.). McGraw-Hill.

Hamisu, A. H. (2019). *Nigeria's blue economy potential with particular reference to the oil and gas sector* (Master's thesis, World Maritime University).

Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review, 20*(4), 986–1014.

International Energy Agency. (2023). *Nigeria energy outlook 2023*. IEA.

Ite, A. E., Ibok, U. J., Ite, M. U., & Petters, S. W. (2013). Petroleum exploration and production: Past and present environmental issues in the Niger Delta, Nigeria. *American Journal of Environmental Protection, 2*(4), 78–90.

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control, 12*(2–3), 231–254.

Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3–42.

National Bureau of Statistics. (2022). *Nigerian gross domestic product report*. NBS.

Nigerian Ports Authority. (2022). *Port statistics: Vessel traffic, container traffic and throughput*. Nigerian Ports Authority.

Nwaogbe, O. R., Pius, A., Abduljeli, A., & Alharahsheh, H. H. (2020). An empirical study of Nigerian seaports operational performance. *Transport & Logistics: The International Journal, 20*(48), 1–15.

Obemeata, A. O. (2025). Evaluating the impact of blue economy sectors on Nigeria's economic growth (1981–2024). *American Journal of Humanities and Social Sciences Research*, 9(10), 47–59.

Olulu-Briggs, O. V. & Sunday, D. D. (2021a). Dynamics of remittances and aids on economic development of Nigeria. *International Journal of Economics, Commerce and Management, 9*(4), 23-35.

Olulu-Briggs, O. V. & Sunday, D. D. (2021b). International trade flows determinants: The case of Nigeria. *International Journal of Economics, Commerce and Management, 9*(3), 209-222.

Osuji, C., & Agbakwuru, J. (2024). Marine resources and economic development in Nigeria. *International Journal of Maritime Studies*, 12(2), 210–225.

Oyakhilomen, O., & Zibah, R. G. (2013). Fishery production and economic growth in Nigeria: Pathway for sustainable economic development. *Journal of Sustainable Development in Africa, 15*(2), 99–109.

Oyedele, L. (2023). Blue economy and sustainable development in Nigeria. *Journal of Sustainable Development in Africa*, 25(1), 45–60.

Oyedele, L. O., & Adebayo, O. S. (2022). Blue economy and sustainable development in Nigeria. *Marine Policy, 136*, 104911.

Pauly, D., Zeller, D., & Palomares, M. L. D. (2020). Global fisheries: Catches, trends, and policy implications. *Marine Policy, 117*, 103943.

Redclift, M. (2005). Sustainable development (1987–2005): An oxymoron comes of age. *Sustainable Development, 13*(4), 212–227.

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy, 98*(5), S71–S102.

Sachs, J. D. (2015). *The age of sustainable development*. Columbia University Press.

Sachs, J. D., Lafortune, G., Kroll, C., Fuller, G., & Woelm, F. (2022). *Sustainable development report 2022*. Cambridge University Press.

Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.

Silver, J. J., Gray, N. J., Campbell, L. M., Fairbanks, L. W., & Gruby, R. L. (2015). Blue economy and competing discourses in international oceans governance. *Journal of Environment & Development, 24*(2), 135–160.

Sunday, D. D. & Olulu-Briggs, O. V. (2026). Sectoral bubbles in the Nigerian Exchange Group: evidence and insights. *GPH-International Journal of Social Science and Humanities Research, 9*(3), 91-104.

Sunday, D. D. (2026). Financial sector bubbles in the Nigerian Exchange Group. *GPH-International Journal of Social Science and Humanities Research, 6*(1), 160-174.

United Nations Conference on Trade and Development. (2020). *The potential of the blue economy in developing countries*. UNCTAD.

United Nations Development Programme. (2023). *Human development report 2023/2024*. UNDP.

United Nations Development Programme. (2024). *Human development report 2023/2024*. UNDP.

United Nations World Tourism Organization. (2021). *Tourism and the blue economy*. UNWTO.

van der Ploeg, F. (2011). Natural resources: Curse or blessing? *Journal of Economic Literature, 49*(2), 366–420.

Wooldridge, J. M. (2016). *Introductory econometrics: A modern approach* (6th ed.). Cengage Learning.

World Bank. (2017). *The potential of the blue economy*. World Bank.

World Bank. (2024). *World Development Indicators*. World Bank.

World Commission on Environment and Development. (1987). *Our common future*. Oxford University Press.