

Correlate of Blue Economy Potentials: Challenges and Prospects for Economic Development in Nigeria

Olusegun Onifade Adepoju^{a*}, Ogola Daniel Bekesuomowe^b, Bello Kingdom^c

^a*Department of Transport and Logistics, Nigerian Army University, Biu, P.M.B 1500 Borno State, Nigeria*

^b*Department of Port Management, Nigerian Maritime University, Okerenkoko, Delta State, Nigeria*

^c*Department of Logistics and Transport Technology, Federal University of Technology, Akure, Ondo State, Nigeria*

^a*Email: adese001@yahoo.com*

^b*Email: ogola.bekes@gmail.com*

^c*Email: kingdompeacekingdom@yahoo.com*

Abstract

This paper examined the maritime industry and marine ecosystem in Nigeria with a view to determine the relationship between revenue generated through maritime related activities by the Nigeria Ports Authority and Gross Domestic Product (GDP)-index for economic development. It analyzed the challenges of blue economy in spite of its economic potential. Secondary data from ports revenue and GDP were correlated and random selection of communities where blue economy is to be practiced selected across the littoral States. The communities were selected through stratified sampling techniques around the major Nigerian seaports in Apapa, Tin Can, Bonny Island in Port Harcourt, Old terminal in Calabar, Okerenko in Warri, FOT at Onne, Ilaje in Ondo State and Yenegoa in Bayelsa State. 186 respondents were able to provide information on challenges that blue economy concept may face in Nigeria. Results revealed that, there is no correlation between revenue and GDP though with progressive revenue over the years which made us to accept the null hypothesis. The challenges of blue economy ranging from habitat degradation (30%), over exploration (14%), bunkering (13%), over fishing (9%) among others were identified. The research recommended the exploration of blue economy concept without degrading the marine ecosystem with policy initiatives.

Keywords: blue economy; potentials; challenges; marine; development; prospect; Nigeria.

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* Corresponding author.

1. Introduction

Economy is about the production and consumption of goods and services with the supply of money within a state, country or region [1]. Among several countries of the world, the determinant factors considered to be for economic growth are: land, capital, labour and technology which are limited in an attempt to satisfy unlimited human wants [2]. Economy dictates the level of poverty, health, income, nutrition, literacy, energy and other basic needs of sustainable development goals. Due to low production or lack of it, economy depends on another economy to survive. Sometimes, what makes economy to depend on another economy is the quality of production or service and efficiency in production that has reduced the cost of production to give quality at lower price. The major occupation and of course naturally available means of production before the discovery of oil in Nigeria was agriculture (land). Nigeria is the eighth in the ranks of oil producing countries in the world and the largest oil and gas producer in Africa [3]. Oil and Gas are natural resources extracted from crude oil. According to history, oil was first discovered at Oloibiri in Delta State by Shell in Nigeria. Nigeria is ranked to be 7th in the production of crude oil. Crude oil is very useful all over the world as there are various products that can be extracted to form other products or use in the industry. The various uses are: Pharmaceutical, Bitumen for road construction, Wax for candle, Gasoline, Kerosene, Liquefied Petroleum Gas, Compressed Natural Gas (CNG), Petrol (PMS), AGO, Aviation fuel e.t.c

The upstream sector is responsible for the excavation of the crude oil from the oil field while the downstream is for the refinement and separation of crude oil, including storage and transportation to various depots. It is a known fact that, the crude oil from which oil and gas are extracted comes from oil field within the maritime domain. Secondly, maritime transport is responsible for oil and gas carriage on international voyage as the only mode to transport the crude oil or products effectively at cheaper rate. Regrettably, out of 53 African countries, 38 are net oil importer [4]. The supply chain of crude oil products from cargo throughput of import-export in Nigeria in particular is worrisome. The oil price fluctuation is not only affecting the country's economy but also the entire world. What kills Nigeria's oil and gas faster is lack of accountability, theft, sharp practices and corruption [5]. Succinctly describe the problem of oil and gas sector in Nigeria as fraud. Fraud he said can be regarded as activities such as theft, corruption, conspiracy, embezzlement, money laundering, bribery and extortion [5]. Oil contracts, movement, storage and exploitations are executed with selfish motives without national interest. In fact, as at today; Nigeria is yet to fathom out solution to the problem of crude oil exploration, storage, importation, exportation and distribution. This is a sector that is the nervous system of the economy. Gas is used by market women for cooking, commercial drivers depend on fuel to operate their business, trucks depend on diesel to carry goods, ships make use of fuel for international voyage and as vital as it is; every phase of its production and distribution is suffering from corruption. Attempts that have been made till date in solving the problems of oil and gas industry in Nigeria in form of changing from government's name to private, establishment of equalization body for effective distribution, creating subsidy, modular refineries, downstream and upstream, petroleum products marketing services and various licenses for operators. The transactions in the sector are full of treachery and it will take a courageous leader to solve the problem [1].

According to [6], Nigeria used to export starch, ginger, cashew nut and shell, flower buds, cotton, cocoa among other agricultural produce to countries like Brazil, France, Senegal, Germany, Italy, U.S.A before the discovery

of crude oil. It is critical to observe that, the presence of natural resources and other factors of production position a country, state or region on a better platform of economic buoyancy. However, *“a white man called Lewis observed that “a country which is considered to be poor in resources may be considered very rich in resources in some later time not merely because unknown resources are discovered but; because new methods to utilize; manage and explore are discovered for the known resources. Japan is deficient in resources but one of the most advanced countries of the world because it has been able to discover methods to utilize the limited resources [1]”*. According to [7], Nigeria neglected and out rightly lagging behind in cultivation and benefits of agricultural sector to which it started its economy to the new oil boom discovered in 1970s. Oil revenue for Nigeria rapidly increased the growth and development of the Nigerian economy until the Nigerian Civil war. Regrettably, the discovery of oil exploration which facilitated a number of investors and companies to Nigeria, producing refined products like gasoline, Liquefied Petroleum Gas (LPG), kerosene, petrol, pharmaceuticals now witnessed oil thefts, vandalisation, bunkering, militancy among other social unrest [8]. The unfortunate incident of Nigeria’s bad refineries which successive government could not repair, privatize at least for now or sell to private investors with dwindling oil revenue from the global market, need to pay for subsidy and industrial actions because of too much dependent of Nigeria’s economy on crude oil among other challenges necessitated the concept of “Blue Economy” in Nigeria. While *Blue economy* has been defined by different authors to connote divergent views about the use of ocean and other sea resources for the enhancement of life’s quality and other environmental benefits, it is mainly on how to nurture, grow and develop aquaculture, transportation, plant engineering, pharmaceuticals, seawater, renewable energy and biodiversity conservation [9]. Sequel to the above, this paper aimed at determining whether or not marine or ocean resources are optimally utilized and also to identify potential areas of blue economy to explore for the benefit of Nigeria’s economic growth and development. The motivation behind this study is to examine the correlation between annual revenue by Nigerian maritime industry and the country’s Gross Domestic product. Secondly, is to identify the challenges accruable to the concept of Blue Economy in Nigeria.

2. Literature Review and Conceptual Underpinnings

2.1 Concept of Economy and Development

One of the most controversial concepts and theories among researchers in the world is the term development. How do we classify development? Or what are the characteristics of a developed society? What distinguished developed economy from developing and underdeveloped ones? These are some of the fundamental questions when the need to define development arises. Development, according to [10] is a value and improvement in the ability to meet basic needs [11]. opined that, development is regarded as meeting the basic standard of living, living a health life and being knowledgeable. From another point of view, it was referred to as having freedom from servitude, leading to equity and social justice [12]. said that, development is the act of raising highest value of Gross National Product by accumulating capital and industrialization. It has also been described as the capacity of a nation to increase her static economy so as to be able to generate and sustain annual Gross National Product [13]. explained that, development is not all about per capital income; rather also it is sustainable improvement in the standard of living through gain employment and availability of social and economic infrastructures. Development has been seen from various perspectives from Karl Max, Durkheim,

Comte and other sociologists as ability to share resources and movement of society from communism to socialism and capitalism [14]. noted that, there must be reasons why some countries are developed whereas others are under developed [15]. expressed that, development is difficult to define. Conceptually, the meaning of development connotes improvement in the condition of human existence in all ramifications. It is mostly used to depict the removal of inequality, access to good things of life and sustainable way of consumption. Economic development has been seen as progress made towards increase in income, employment rate, productivity, wealth and social welfare. This connotes total human well-being and happiness and used by economists. It is often difficult to measure economic development directly, therefore in most cases, indicators like income, GDP and productivity are used. However, there are criticisms against these indicators [16]. An example of such criticism is that, most measures used only considered market value. Other factors like health, friendship, environmental quality, pride, position are not factored as agent of characteristics of economic development. At any rate, there is still a wide gap in what average Nigerian aspires the economy should be and what it is as more than 90% of citizens lives below 5.5\$US per day [17].

2.2 Reviews on Blue Economy

Ocean is the major focus of blue economy. Oceans in the world has been said to be covering over 70% in Earth's space [18]. One of the functions of ocean is to provide salt, regulate the climate and assist human with seabed natural and mineral resources. Oceans and seas are used for transportation of bulky goods over long distance across continents at lowest cost. Seas and oceans are used for recreation and centre of attraction [19]. It was even said in the olden days and even till now that, sea or seashore as places for spiritual healings and spars. Without healthy ocean, there is no place for our lives and livelihoods [20]. Blue economy is mostly about the recognition and use ocean potential resources without compromising ocean health and sustainability. Ocean economy on the other hand is about the economic activities directly or indirectly taking place in the ocean with focus on economic gains [21].

Examining the oceans and water bodies on the planet earth from natural and applied sciences, oceans are responsible for provision of oxygen, absorption of heat and recycle the water we drink [22]. We cannot over emphasize the importance of ocean in waste recycling. Ocean can be used for generation of energy to the benefit of mankind. The mineral and non-renewable energy in form of oil and gas are derived mostly from the oceans. Off-shore wind can also be used to generate energy as well [23]. The use of ocean resources in pharmacy, chemical industries, marine plant services, seawater utilization and biodiversity cannot be quantified.

In spite of the aforementioned benefits of oceans to mankind, it is regrettable to note that man exerts so much pressure on ocean and abuse it. The abuse used to come in form of pollution, (waste pollution, oil pollution, sewage pollution), over fishing, exploration among others. Increase in population, industrialization and landuse encroaching the oceans further put pressure and the resultant effects are ocean-habitat degradation [22].

The major challenge in sustainable maritime blue economy is to strike a balance on how to explore ocean resources (fishes, hydrocarbons and other resources) without destroying them through pollution, sewage disposal and other activities with a view to keeping them perpetually. This calls for ocean governance and

strategic policy for ocean resources sustainability. In the call for ocean governance, various concepts developed ranged from Marine Spatial Planning, Ecosystem Based management an Integrated Coaster Management.

The concept of blue or ocean economy was introduced by United Nations Conference on Sustainable Development in the year 2012 [24]. This is a concept that centralizes all economic activities around exploration of water resources (ocean, rivers, lake, seas, e.t.c). Many people do not understand what “blue economy” is all about [25]. However, a lot of people understand what “green economy” means. Blue economy connotes the use of sea, river, ocean, lake and its resources for the purpose of sustainable economic development in Nigeria. Meanwhile, green economy is all about how to reduce carbon emissions and environmental risks or hazards for the purpose of sustainable economic development. The “blue” name was given because of the spectrum of light by sunlight on water which causes ocean to become bluish in colour and at the same time the sky having the same colour. Meanwhile, ocean appears blue only in clean water otherwise it may represent other colours. The work of [26] titled blue economy significantly showcased the essence and the need to further explore the concept of blue economy. In his treatise, he proposed a model for supply of low cost of product, job creation at local level with respect for the disruption of environment. The categories of concept as postulated by some scholars like [27, 28, 29] are as follows:

1. That concept of Blue economy is about using ocean resources for the growth of economy, improvement of people’s lives, provision of jobs and general well-being of ocean ecosystem
2. To generate wealth from all marine and allied services or operations without disrupting or affecting marine ecosystem
3. Deals with how to think deeply to fathom out viable method of biological solutions to industrial processes that can reduce contamination
4. It seeks to suppress biodiversity loss and stimulate economic interest by integrating both economic and environmental interests.
5. It connotes commercialization of ocean resources for sustainable development
6. Blue economy concept can foster irrigation for year-in, year out plant development
7. It can be used for marine exhibitions and tourism across littoral states
8. It can be used for the generation of renewable energy
9. It can also enhance shipbuilding technology, hydrogen fuel and bio-fuel development
10. Providing food securing and sustainable climate change

The blue economy concept in Nigeria was brought to the limelight by the Director General of Nigerian Maritime and Safety Agency few years ago. The idea is to diversify Nigerian economy from solely dependent on crude oil to the optimal utilization of sea resources for sustainable economic development of the nation. According to [30], Nigeria as country is richly blessed with mineral, natural and material resources to drive the economy of the nation. [31] Explained that, roughly 5.4 million jobs are produced through blue economy with a gross added value of about €500billion in a year [32]. Explained the opportunities in blue economy to cut across food production, energy, mineral extraction, biotechnology, tourism and recreation, transportation and scientific research. According to these researchers, the concept of Blue economy has about four different facets. These are: Blue, Economy, Blue Growth, Marine Economy and Ocean Economy. In all, these concepts are almost the

same as blue Growth encapsulates Blue and circular economy. In the process of exchange or exploration of Growth economy, three major attributes are the same which are renewable energy, waste management and climate change. However, the difference in the blue and circular economy can be seen as fisheries for blue economy and water for circular economy. Blue Economy is generally an economic development concept for improvement of health, ocean ecosystem and provision of jobs for the sustainability of a nation’s economy. Blue growth- is about the economic growth of the ocean, seas and other water bodies for the purpose of exploitation of marine resources and management of socio-ecological system without degradation or excessive use of it or any form of marine pollution [33].

Marine economy is related to governance of marine resources and its ecosystem for functional development of nation’s economy and environmental sustainability. Ocean economy is related to evolving economic development concept offering opportunities through the use of water bodies like oceans, rivers, sea, lakes and mitigating the attendant risks and challenges.

2.3 Empirical review on Blue economy

Some of the authors who have worked on Blue economy have been observed and their findings are as noted in the Table I

Table I: Reviews and findings by other authors.

Author	Objective	Methodology	Findings
[34]	Role of Blue Economy in Singapore	Policy Analysis	The Blue economy has potential in the renewable energy as well as other sectors like tourism, food and other sustainable development goals areas
[35]	Defining the Blue Economy	Cluster Analysis	Measurable items must be determined to monitor the progress of blue economy from clusters of benefits without degradation to ocean ecosystem.
[36]	Energy and Blue economy	Metadata Analysis review with R	Rising trend in global research on renewable energy through blue economy
[37]	Blue economy literature review	Review	Dimensions on social, economic, technology, cultural, environmental and their effects cum impacts
[38]	Network approach to Blue economy policy	Metadata computerized based policy arrangement with graph Foresight technique (scanning, scenario ,strategic) by scientists with guidelines	Policy overlaps and aquaculture taking the lead in most policy by governments
[39]	Future and innovation direction in Blue Economy		Seven scenarios were observed with varying degrees of impact of blue economy across selected countries through the scientists
[40]	Potential growth of Nigerian Economy	Review	Corruption is the cause of most economic problems and there is need for political reforms for good leadership and governance
[41]	Planning Strategies in Blue Economy for African Union and Regional Economic Communities	Thematic Analysis	Blue economy is not restricted to monetary rewards alone but also provides job, tourism, food, etc among other SDGs.

3. Methodology

The methodology for this research was descriptive research design. The secondary data on the revenue from maritime sector in Nigeria from the Nigerian Bureau of Statistics (NBS) updated to the last quarter of 2022 with the Gross Domestic Data of Nigeria produced by Statista- a global web-based data repository was extracted for the purpose of this research. These are in line to achieve the objectives of the study to examine the correlation between annual revenue by Nigerian maritime industry with the country’s Gross Domestic product. Secondly to identify explore able areas for economic benefits and lastly the challenges accruable to concept of Blue Economy in Nigeria. Questionnaire was distributed to selected communities through stratified sampling techniques with the return of 186 responses from 231 sampled. Inferential correlational statistics was used to determine the correlation between revenue from the maritime sector and the Nigeria’s GDP while descriptive statistics was used to explain the outcome of communities’ responses to the likely challenges of blue economy concept in Nigeria.

4. Results and Discussions

The collected data is presented in the Table II for the revenue generated by the maritime industry through the Nigerian Port Authority as derived from various secondary data sources and the Gross Domestic Product all indicated in USD. Since the data did not follow normal distribution unit the non-parametric test was used to test the hypothesis. The result of One-sample T-test is shown in the Table III.

Table II: Revenue vs GDP in maritime industry through NPA.

Year	Amount real billion Naira	GDP US Billion S
2010	101	369.06
2011	115	414.10
2012	136	460.95
2013	157	514.97
2014	172	568.5
2015	177	492.44
2016	182	404.65
2017	265	375.74
2018	270	421.74
2019	277	448.12
2020	317	429.42
2021	256	441.42
2022	361	477.38

[42, 43, 44, 45]

Examining the Table II affirmed the fact that, the progressive Gross Domestic Product witnessed from 2010 to 2014 nosedived and was inconsistency with a very sharp decline in 2017. The data also shows that, the revenue from the maritime industry was consistently progressive with alteration to the positive revenue trend in 2021 probably because of offshoot of the COVID 19 pandemic within that year. Last year, has the highest level of revenue in the industry with this data and with innovation and investment in “Blue economy” there is potential for more revenue in the industry.

Table III: One Sample Hypothesis testing.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of revenue is normal with mean 214.308 and standard deviation 81.52.	One-Sample Kolmogorov-Smirnov Test	.721	Retain the null hypothesis.
2	The distribution of GDP is normal with mean 447.576 and standard deviation 55.95.	One-Sample Kolmogorov-Smirnov Test	.997	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

In order to confirm the correlation between the two variables i.e revenue by NPA and the country’s GDP, the sig. values shows that they are in both cases greater than acceptable significance level of 0.05. Therefore, it can be concluded that, there is no correlation.

If the economic condition of Nigeria is not growing or positively correlated as witnessed in the Table 4 of the correlational analysis below, then it should be resumed that, revenue should be geared up in this sector through exploration of blue economy concept.

Table IV: Correlation between NPA revenue and Nigeria’s GDP.

Correlations		revenue	GDP
revenue	Pearson Correlation	1	-.016
	Sig. (2-tailed)		.958
	N	13	13
GDP	Pearson Correlation	-.016	1
	Sig. (2-tailed)	.958	
	N	13	13

In fact, what could have led to the decline in GDP when the revenue increases? Though, the sig. level indicated that, there is no significance as the p-value is more than 0.05 with 0.958; therefore, it shows that there is no correlation.

The summary of responses and percentages about the challenges can be seen in the Figure 1 histogram and Figure 2 pie chat respectively.

Figure 1 and Figure 2 presented the 186 respondents across selected communities on the likely challenges that will come up with the implementation of blue economy concept across the littoral states in Nigeria. The larger percentages of the people are of the opinion that, habitat degradation takes the lead with 30%, over exploration took 14%, bunkering 13%, over fishing 9%, safety and security 8% and preservation of marine resources, finance and boundary on water respectively took 6%, 5% and 4%.

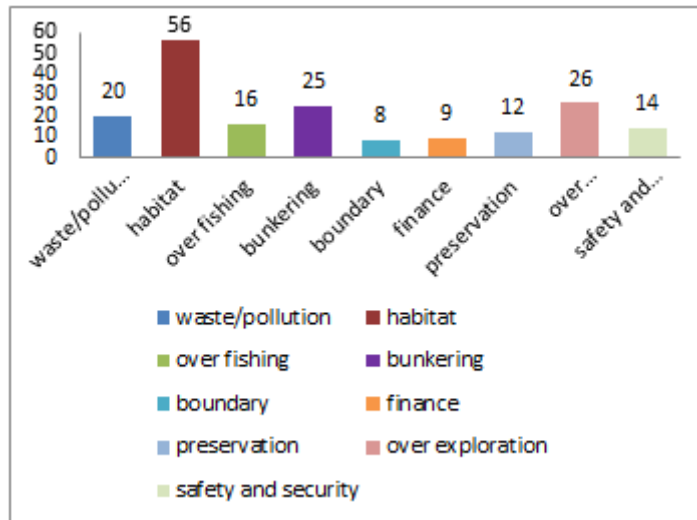


Figure 1: Responses chart.

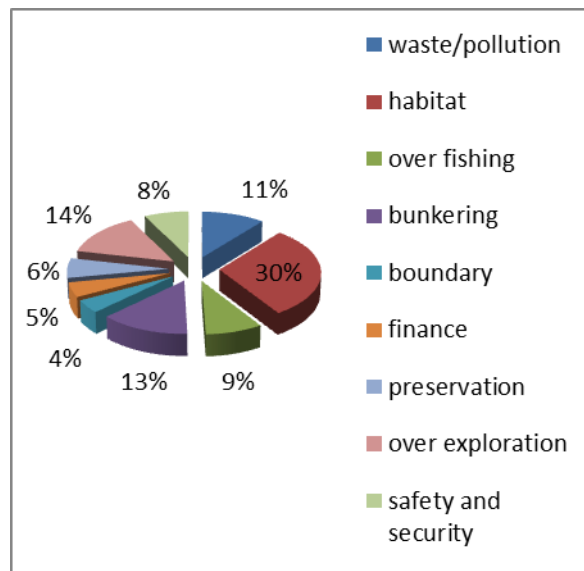


Figure 2: Percentages of response.

People believe that as human encroaching the marine habitat with the concept of “Blue economy” it may provide opportunity to have access to the exploration of the resources more than previously known which may cause a change to the habitat or marine ecosystem. The second challenge as observed from the responses is to gauge how much of exploration to be tapped from the marine ecosystem that will not be termed “over exploration”. The natural and mineral resources regeneration of ocean or marine resources may be depleted if care is not taken for the possibility of over exploration. In possibility of bunkering and marine pollution through waste disposal and oil spillage were represented. The prevention of overfishing and preservation of juvenile fishes for sustainability with adequate security to guarantee successful blue economy can be critical. Among the committee of nations, the demarcation of boundary and financial requirements for all aforementioned challenges cannot be over emphasized. It is a known fact that, when concept is developed, the realities of its challenges may not surface immediately. Identifying some of the challenges stated above should be observed. However, the

dimensions each of the challenges will take may not be ascertained. This posed a limitation to this research as there can later be a research to assess the impact of blue economy if and when it is fully implemented in Nigeria. More importantly, the policy makers and implementers should realize that some of these mentioned factors should be considered. It is not easy to strike a balance between the prospect and opportunities that will be accruable to Blue economy and challenges involved. For Nigeria to get it right; there may be need for collaborations, think-tank strategic group with innovators to harness policy divergence for possible harmonization of concept of opportunities in “blue economy” and inherent challenges.

V

Discussion
Security and safety of lives in Nigerian water is very important for the exploration of blue economy. For exploration, discovery, extraction and environmental control, safety and security must be considered. Apart from this, the issue of piracy, robbery, and other forms of attacks when the blue economy thrives are challenges. Other areas that need to be strengthened are communication, personnel, and mobility infrastructures.
The unregulated, unreported and illegal fishing and over fishing are tendencies if the blue economy project is not properly articulated. In order words, there may be over lapping of issues and functions as areas to be explored are many and should be streamlined to kick against conflict of interest. Marine Protected Area concept must be guided for the rejuvenation of marine ecosystem against over exploitation.
The blue economy project requires finance for constant dredging. There will be need to constantly removing debris on our waterways. The siltation and method of excavating sea sand for other benefits must be explored.
This is in line with recognizing those commodities to be pushed to international market. There is need for us to conduct research on how Nigerian goods can be preserved and packaged in a manner that will be acceptable in the international market. Of importance is for Nigerians to patronize locally produced items which will be affordable, fresh and more dignifying.
The financial requirements for facilities, infrastructures and personnel across the littoral states cannot be over emphasized. When the financial and political will to drive the “blue economy” project is not available, it may not be sustainable and the resources and present commitment ill turn to waste of invaluable human and material resources.
The un-going challenge against maritime law of the sea of 1958 (UNCLOS) stating the reasons for extension of the followings: the normal baseline, contiguous zone, exclusive economic zone or continental shelf. Examples include Nigeria-Cameroon, Nigeria –Benin, e.t.c
Illegally taking away marine resources to neighboring countries because of porous border and lack of stringent enforcement are the concern of many communities even in the event that blue economy is fully operational.
The FAO estimates that approximately 57 percent of fish stocks are fully exploited and another 30 percent are over-exploited, depleted or recovering. Fish stocks are further exploited by illegal, unreported and unregulated fishing, responsible for roughly 11 to 26 million tons of fish catches annually, or US\$10-22 billion in unlawful or undocumented revenue [46].
Activities like mining, deforestation, pollution, sewage disposal, run-offs and debris affecting the coater habitat
As human activities continue to gain advancement through technology in industrial, personal and collective facets of life, waste are also increasingly being generated. The unfortunate aspect of this inevitable aspect of human life is the management of this waste.

5. Conclusion and recommendations

The Nigerian maritime industry is one of the revenue generating industries in Nigeria. It can be observed that, Nigeria needs to explore the opportunities and potentials of marine resources to boost the GDP of her economy through the Blue economy concept. However, the challenges are many along the way to explore this opportunities. In an attempt to diversify economy, it is important to strategize on how the challenges can be overcome while developing the potentials of blue economy. Some of the recommendations are as follows:

1. Policy initiation for ocean governance and sustainability can examine: Regulated fishing, Control of

- disposal of sewage and ballast water, pollution control measures and mining control management
2. Surveillance patrol and community sensitization
 3. Engage and empowering local communities
 4. Develop data monitoring strategies to understand progress or otherwise
 5. Developing a best strategy to improve the lives of the poor and marketability of ocean resources without any negative consequence on sustainability
 6. Seek for investors in growing various aspect of blue economy. World Bank has assisted Oman, Vietnam, Sri Lanka Morocco and Indonesia. This and other directions may be sought for possibility of concept of Blue economy finance
 7. Go for localized items and use locally produced goods (Cabotage, fashion, tourism, etc)

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