



Analyzing The Contributions Of Blue Economy To National Development Through Theoretical Lens: Illustration From Nigeria

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Abstract

Following the emergence of the Blue economy concept, there were growing suppositions on its potentials to diversify Nigeria's economy and be used as alternative source of revenue for national economic development. This paper qualitatively examined the prospect and challenges of the concept through reviews and practices by nations that have ventured into it. It unlocks the areas of opportunities and contributions of the exploitation of blue economy in strengthening the development of Nigeria. The study reveals that oil and gas sector has been and is still the major source of revenue for Nigeria's economic development in spite of the enormous potential offered by other sectors of the blue economy which can be harnessed to enhance the economic development of the country. It further revealed that blue economy can be developed to generate energy thereby solving the power generation, transmission and distribution challenges that bedeviled the country over the years, which could act as a catalyst for the economic development of the country. The study uncovered technical capacity building, weak institutional arrangement and misplaced priority as challenges militating against the development of blue economy growth in Nigeria. The need for a more innovative blue enterprise initiative of empowering stakeholders in the maritime industry in order to strengthen their capacity to fully harness the potentials of marine resources so as to boost the socio-economic development of Nigeria is suggested. The need for the nation to value the contribution of natural oceanic capital to the welfare of her citizenry with the intents of making right policy decisions including trade-off between the different sectors of the ocean assets are further suggested.

Keywords: Blue Economy, Contribution, National Development, Theoretical Lens, Nigeria.

1.1 Introduction

The Blue Economy is a concept that has gain global acceptance in the last decade in deliberations that are centered on sustainable management and governance of marine resources (Choi, 2017). As a ecological alternative to the "traditional ocean economy" (Brears, 2021), the Blue Economy tries to bring together ocean-based development opportunities with environmental stewardship (Voyer et al., 2018) by conveying increased awareness of the socio-ecological connections between human activity and the wellbeing of ocean systems (Cheung, 2019). Likewise, the Blue Economy links the health of 'blue' natural ecosystems (i.e., oceans, seas, and coastal areas) to human fortune (Bennet el al., 2019; Laffoley et al., 2020).

Although the use of the term 'Blue Economy' can be traced back to 2010 publication by Gunter Pauli; it however began to gain global significance during the 2012 United Nations Conference on Sustainable Development (UNCSD) held in Rio de Janeiro (Rio +20). Asides setting up the universal process leading to the adoption of SDGs in 2015, the 2012 UNCSD reiterated the commitment of world leaders to inter alia,

promote 'Green Economy' (UNEP, 2011) and address the sustainable management of oceans and marine biodiversity. During the conference, leaders from Small Island Developing States (SIDS) questioned the relevance and applicability of the concept of 'Green Economy' to them and argued that the world oceans and seas require more in-depth attention and coordinated action; in essence calling for the adaptation of 'green economy' to the 'blue world'. Thus, the concept of the 'Blue Economy' integrates the principles of the 'Green Economy' into a paradigm of shift in the management of coastal water bodies and related resources in a sustainable manner by conceptualizing oceans and other water bodies as 'developing spaces' providing an opportunity for sustainable development.

The Blue Economy has a greater potential to contribute to higher and faster Gross Domestic Product (GDP) growth in any country and in the Nigerian economy. But evidence abound that efforts to harnessing the potentials of the blue economy has not been sufficiently exploited considering the practical implications of diversifying the economy of the nation. This situation denies Nigeria economies potential revenues for her developmental drives, particularly at a time when many countries in the world are looking for alternative revenue streams for funding their economic growth agenda. The Blue Economy offers a suite of opportunities for the nation for sustainable, clean, and equitable blue growth. Nigeria as a country enjoys vast maritime resources which include ocean, lakes and rivers which have potential in fisheries, tourism, maritime transport, and off-shore mining among others. Nigerian Government recognizes these marine ecosystems as its natural capital and protects and maintains them accordingly. It has been reported that 95 per cent of Nigerian trade, by volume, and more than 70 per cent of its value moves around aboard ships and is handled by seaports nationwide (Alari, 2018). This amounts to a yearly sum of six billion dollars in revenue, and is bound to rise as the demand for international trade increases, with shipping as the most cost-effective and safest method for the transportation of goods. The blue economy is a call for the diversification of the Nigerian economy from over reliance on the oil industry to other sources of revenue. The call is due to a steady decline in economic returns from the crude oil attributable to a number of reasons amongst which are:

- i) The global search for more eco-friendly alternatives to crude oil like biofuels
- ii) The instability of oil prices due to the price feud between the Organization of Petroleum Exporting Countries (OPEC) led by Saudi Arabia and non-OPEC producers led by Russia, among other reasons.
- iii) A lack of demand for oil witnessed in the year 2020 as a result of commercial inactivity during the lockdown stage of the Covid-19 pandemic.

These issues have created a sense of urgency around the exploration of alternative sectors to boost the growth of Nigerian economy, like agriculture, telecommunications, and the maritime sector. In this connection, a decisive step of diversifying Nigerian economy was taken on January 17, 2022 through the inauguration of the Expanded Committee on Sustainable Blue Economy in the country. This is aimed at preparing the grounds to explore the potential that blooms the country's ocean, rivers, lake, creeks, estuaries and tributaries for optimal economic benefits and improvement of the lives of citizens. The potential, which is to be found under, above and around the waters – blue and brown – have remained largely untapped.

Blue Economy is generally understood to consists of, and include fisheries, coastal tourism, marine transport, off shore renewable energy, marine based blue economy, marine mineral resources, waste management, climate change and blue biotechnology. Indeed, the World Bank (2017) has highlighted that in order to qualify as components of Blue Economy, activities must:

- i) Provide social and economic benefits to the current and future generations
- ii) Restore, protect and maintain the diversity, productivity, resilience, core functions and intrinsic value of marine ecosystem
- iii) Be based on clean technologies, renewable energy and circular material flows that will reduce waste and promote re-cycling of materials.

During the inauguration of the expanded committee on sustainable blue economy in Nigeria on January, 2022, the former Vice President of Nigeria, Prof. Yemi Osinbajo noted the areas of benefits of the blue economy that would be further explored to include fishing, tourism, renewable energy, marine biotechnology, training, ports, and oil and gas sectors. According to The Guardian (2021), Blue economy is capable of generating revenue, providing jobs for unemployed youths and foster Foreign Direct Investments. The Gross Domestic Product of Nigeria can actually be boosted by the frightening force of Blue economy. The benefits of blue economy in national development are still evolving. This is because, when sea and water resources are being utilized for the economic progress of a nation, economies of scale in terms of innovations and allied industries development will undeniably emerge. As stated by David Hume (2020):

“A nation that trades with large export and import must generate abundant number of industries and enjoy luxuries and delicacies than a nation or kingdom that rest and contented with its native commodities without exploration and exportation. Such a nation will grow powerful, richer and happier”

Validating David-Humes assertion, Hamisu (2019) recapped the number of employment that can be generated with the use and implementation of blue economy in Nigeria while Garland, Axon, Morrissey, Graziano, and Heidkamp, (2019) forecasted that the annual economic value of maritime-related activities will reach 2.5 trillion Euros per year by end 2020, making world's oceans, seas and rivers as the major source of wealth, creating trillions of dollars' worth in goods and services as well as employing billions of people. The Economist Intelligence Unit report (EIU, 2015), of China shows that the country's sea economy contributed \$962 billion or 10 per cent of GDP in 2014 employing 9 million people. Similarly the United States valued its sea economy at \$373 billion in 2018 or 1.8 per cent of the gross domestic product.

It is therefore undisputable that Nigeria can diversify its economy through blue economy starting with littoral states without much dependence on crude oil. Given the fact that the extent to which blue economy can be useful has not been revealed in Nigeria, this study qualitatively examines the possible contributions and challenges of blue economy to the national development of Nigeria.

1.2 Origins of Blue Economy

The concept of the blue economy was coined in the early 2000s when sustainable development was gaining prominence globally. The term "blue economy" was devised by Gunter Pauli, a Belgian entrepreneur and sustainability advocate, in his book entitled "The Blue Economy: 10 Years, 100 Innovations, 100 million Jobs", published in 2011 (Smith-Godfrey, 2016). In his book, Pauli introduced the concept of a new kind of economy based on the efficient and sustainable use of ocean resources. Pauli (2011) contended that the oceans are a source of unexploited treasure that could solve many of the world's environmental and economic problems, such as climate change, energy scarcity, and poverty. Pauli suggested a new business model that replicates the functioning of natural systems and produces value from waste and by-products. He underscored the potential of aquaculture, renewable energy, and biotechnology sectors to drive economic growth while promoting environmental sustainability and social inclusion (Pauli, 2011).

Flowing from Pauli's proposition, the blue economy concept was brought into the public discourse by international organizations' such as the United Nations and the World Bank, and the governments', academia, and the private sector. The concept has become a key engine of sustainable development and a conduit to achieving the United Nations' Sustainable Development Goals (SDGs), particularly SDG 14, which focuses on the conservation and sustainable use of oceans, seas, and marine resources (Rees et al., 2018). Besides Gunter Pauli's contributions to developing the blue economy concept, other influential thinkers and initiators have contributed to its evolution. For instance, the 1992 United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, led to the adoption of Agenda 21, a comprehensive plan of action for sustainable development that acknowledged the significance of the oceans, seas, and coasts in stimulating sustainable development. The conference highlighted the need for the integrated management and sustainable use of ocean resources and ecosystems (McCammon, 1992).

Also, the 2002 World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa, highlighted the importance of the ocean economy as a stimulant of economic growth and poverty decline. The summit led to the establishment of the Global Program of Action for the Protection of the Marine Environment from Land-based Activities, which aims to reduce the impacts of human activities on the marine environment (Nath, 2005). The blue economy has in recent time garnered motivation as a vital strategy for achieving sustainable development. While The European Union, for instance, has developed a blue growth strategy that promotes the sustainable use of marine resources, the African Union on the other hand has equally launched the Blue Economy Strategy, which aims to promote sustainable economic growth, food security, and job creation by developing marine resources (Bond, 2019; Henderson, 2019). Largely, the blue economy concept has its roots in the broader sustainable development schema and has evolved to become a vital pathway to achieving environmental sustainability, economic growth, and social development.

1.3 Conceptual Clarification

The "Blue Economy" concept has become increasingly popular. The international community considers the tripartite scope of blue economy viz-a-viz: the economy addressing the global water crisis (McGlade, et al., 2012), the innovative growth economy (Pauli, 2009), and the development of the marine economy (Behnam, 2012). Indeed, the interest in the Blue Economy has increased around the world, getting attention from the public and policymakers. Although, there is still no accepted definition of the Blue Economy

(Choi, 2017); (Silver, et al., 2015); (Voyer, et al., 2018), some of the widely used definitions of the concept are presented in Table 1.

Table 1: Definitions of blue economy and related concepts

Author(s)	Definition
The Economist (2015)	"A sustainable ocean economy emerges when economic activity is in balance with the long term capacity of ocean ecosystems to support this activity and remain resilient and healthy".
World Bank (2017)	"The Blue Economy is sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem."
European Commission (2018, n.p.)	"All economic activities related to oceans, seas and coasts. It covers a wide range of interlinked established and emerging sectors."
UNEP (2014, p.2)	"improvement of human well-being and social equity, while significantly reducing environmental risks and ecological scarcities."
CisnerosMontemayor et al. (2019, p. 2)	"Blue Economy defined as ocean resource-based development that is socially equitable, environmentally sustainable, and economically viable."
Christiansen (2021, p. 95)	"since the discourse of the blue economy is so fractured, the best way of generalising it as a whole is that it signifies an attentiveness to new modes of ocean governance, which actively acknowledges the ocean as a space human activity"
Lee, Noh and Khim (2020, p. 1)	"Economic activity that is in balance with long term capacity of ocean ecosystems to support the activity in a sustainable manner."
Voyer et al. (2018, p. 595)	"marry ocean-based development opportunities with environmental stewardship and protection"
Smith-Godfrey (2016, p. 61)	"A blue economy is a sea-based economic development that leads to improved human well-being and social equity while reducing environmental risks and ecological deficits."
Spalding (2016, p.16)	"The blue economy refers to a sustainable ocean-based economic model and employs environmentally-sound infrastructure, technologies and practices that support sustainable development."
Brears, 2021	"the set of economic sectors and related policies that together determine whether the use of ocean resources is sustainable".
The World Wildlife Fund (WWF)	"For some, the blue economy means using the sea and its resources for sustainable economic development. For others, it simply refers to any economic activity in the maritime sector, whether sustainable or not."
The Commonwealth	"an economic activity that uses the sea directly or indirectly as an input".
Australian Government (2012)	"the substance of the blue economy is to promote the development of marine industries that benefit ecologically, economically, and socially from the marine ecosystem and ensures that the ecosystem-based management model should be at the heart of the decision-making process for industrial and community development".

Source: Authors Compilation (2024)

The above definitions reveals that there is a general focus of blue economy concept on 'triple bottom line objectives' of social, environmental and economic sustainability (Schutter et al., 2021; Voyer et al., 2018); however, it is argued that the economic growth pillar is often prioritized at the expense of other pillars (Christiansen, 2021; Hadjimichael, 2018). Rather, based on its original purpose, greater focus on people's wellbeing and social equity dimensions is advocated to be central to the Blue Economy evolution (Bennet et al., 2021; Cisneros-Montemayor et al. 2019) with prominence given to technological innovation (Choi, 2017; Keen, Schwarz, and Wini-Simeon, 2017; Smith-Godfrey, 2016; Spalding, 2016; Voyer et al., 2018) with the sustainability aspects of these innovations not always certain.

The foregoing definitions portend that while economic growth is one of the pillars of all nations' development and safety, the blue economy has recently emerged as a framework used in understanding the

economic contribution(s) of the ocean-based sectors which produces a nation's overall economic resources to the nation's economic development.

2.1 Dimensions of Blue Economy

The blue economy is typically conceptualized as having six dimensions. Each of these dimensions is characterized by principles and practices that aim to ensure the sustainable use of ocean resources for both the benefit of the present and future generations (Lee et al., 2021; Sarwat, 2022). These dimensions' are:

i) Economic Dimension

The economic dimension of the blue economy focuses on producing economic growth and development while promoting sustainability. This dimension incorporates a range of activities such as fishing, aquaculture, marine biotechnology, tourism, shipping, and renewable energy. The principles of this dimension geared at creating value from ocean resources, stimulating innovation, and developing sustainable business models that support local communities.

ii) Social Dimension

The social dimension of the blue economy is concerned with ensuring that the benefits of ocean resources are shared equitably among all stakeholders. This dimension encompasses a range of social issues, such as human rights, labor standards, gender equality, and community development. The principles of this dimension focus on building partnerships, engaging with local communities, and ensuring that the social impacts of economic activities are considered.

iii) Environmental Dimension

The environmental dimension of the blue economy focuses on protecting the health and resilience of ocean ecosystems. This dimension embraces series of environmental issues such as biodiversity conservation, climate change mitigation and adaptation, pollution prevention, and ecosystem-based management. The principles of this dimension aimed at guaranteeing that economic activities do not impede the ecological sustainability of ocean resources.

iv) Technological Dimension

The technological dimension of the blue economy is designed at evolving and applying new technologies to enrich sustainable economic activities in the ocean. This element comprises a variety of technical areas, such as marine robotics, sensors, artificial intelligence, renewable energy technologies, and biotechnology. The principle of this dimension is concern with promoting innovation, fostering technology transfer and diffusion, and encouraging responsible and sustainable use of new technologies.

vi) Cultural Dimension

The cultural dimension of the blue economy is geared towards identifying and preserving cultural legacy and traditional knowledge of ocean resources. This aspect of the blue economy contains a range of artistic practices such as fishing, seafaring, storytelling, and cultural tourism. The principles of this dimension is concerned with respecting and cherishing cultural diversity, identifying the cultural dimensions of ocean resources, and supporting cultural exchange and cooperation.

vii) Governance Dimension

The governance dimension of the blue economy focuses on fashioning effective governance devices that promotes the sustainable management of ocean resources. This dimension covers an array of governance issues, such as institutional frameworks, policy coordination, and stakeholder engagement. The principle of this dimension is concerned with creating transparent, participatory, and accountable governance mechanisms that encourage the sustainable use of ocean resources.

Studies on the blue economy seek to uncover the interconnections between these three dimensions and to ascertain pathways for promoting sustainable development that balances economic growth with environmental and social sustainability. The major investigative areas include ocean governance, marine policy, ecosystem services, climate change adaptation, and sustainable business models. Recent blue economy studies aims to create a comprehensive framework that supports the sustainable use of ocean resources that would meet the needs of the present and future generations.

2.2 The Effect of the Blue Economy on National Development

A number of estimates and projections indicate the potential impact of the blue economy (Wenhai et al., 2019) on revenue generation. A report by the OECD in 2016 shows that the ocean economy contributed around USD 1.5 trillion to the global economy, equivalent to 2.5% of the worldwide GDP. The report further projected that the ocean economy could double its contribution by 2030 if the right policies and investments are made. The report specifically underscored the potential of emerging sectors such as offshore wind energy, aquaculture, and marine biotechnology to drive economic growth and create jobs (Rigaud et al., 2018). Recent report by the World Wildlife Fund (WWF) in 2019 estimated that the blue economy could generate up to USD 3 trillion in value and create up to 40 million jobs by 2030. The report emphasized the need for a sustainable blue economy that balances economic growth with environmental and social sustainability and stresses the potential of sustainable fishing, coastal tourism, and marine renewable energy to create economic opportunities (Pendleton et al., 2020). An additional study by the European Commission in 2019 revealed that the blue economy generated around 5.4 million jobs and generated around EUR 750 billion to the EU economy in 2018. The study also estimated that the blue economy could contribute up to EUR 1.3 trillion to the EU economy by 2030 when the right policies and investments are made (Dalton et al., 2019). These wide-ranging estimates and projections suggest that the blue economy can meaningfully contribute to the global economy; mainly if the resources of the blue economy are developed sustainably and responsibly.

Nigerian economy depends heavily on revenue from crude oil. Accordingly, the economy is susceptible to the volatility of the global oil prices, which is presently distressing the nation economy as the country recently entered downturn due to Covid-19 pandemic. Nonetheless, the maritime economy is becoming increasingly considerable source of improving revenue generation and prosperity to humanity (OECD, 2016). Peterside (2019) noted that:

“Revenue is crucial to economic development of any nation. A rapidly increasing population, dearth of national infrastructure, dwindling oil revenue in the face of increasing unemployment and other social economic demands all make the Blue Economy initiatives as advanced by NIMASA inevitable. Maritime professionals insist that the maritime industry has the capacity to fund Nigeria’s annual budgets if well managed and structured to take advantage of its huge untapped resources”.

It can be deduced from Peterside observation that developing blue economy resources is indeed, very crucial in the generation of the needed revenue for the socio-economic development of Nigeria. World Bank report (2019) for Blue economy resilient for Africa, reported that Blue economy generated over \$300billion for African continent in the year 2018 and generated about 49million jobs with other benefits like food security, livelihoods and tourism. According to The Guardian (2021), Blue economy has the wherewithal of generating revenue, providing jobs for unemployed youths and enhances Foreign Direct Investments. The Gross Domestic Product of Nigeria can actually be boosted by strengthening the development of Blue economy as the benefits of blue economy are still evolving. This is because, when sea and water resources are being utilized for the economic progress of Nigeria, other innovations and allied industries development will definitely emerge.

Across Africa, fishing is a major economic activity in the oceans, lakes, rivers and fish farms. According to a UNDP report, fishing — which is a major source of income for fishing communities in the continent — employs about 12.3 million people between the ages of 15 – 64 years either as full or part time. According to the European Commission staff-working document on blue growth report 2015, Europe’s maritime sector employs over five (5) million jobs generating almost EUR 500 billion a year, with a potential to create many more jobs. Offshore renewable energy is now a major contributor to employment, accounting for 150,000 jobs. The case of Nigeria and to large extent Africa is no difference as the blue economy has created quite a number of jobs to its citizenry. The sectors of the blue economy comprises of fisheries, ports, aquaculture, tourism, transport, coastal mining, and energy. It has breed anglers, fishmongers, traders in fishing gears, oil and gas officers, shipping clerks, seamen, seafood processing companies and the likes. The Organization for Economic Co-operation and Development (OECD) predicts that looking to 2030; many ocean-based industries have the potential to outperform the global economy as a whole, both in terms of value added and employment.

3.0 Sources of Data

This study used literature based research methodology to explore the initiatives for enhancing revenue generation through blue activities in Nigeria. This has become essential in order to acquire a thorough understanding of the phenomenon under study. Exploration of literature and the development of concepts is more desirable in acquiring the in depth understanding and information needed to come up with practical recommendations. As indicated by Creswell (1994), a literature based study is library based research to understand and conceptualize a social or human problem formed through the consultation and content analysis of the extant literature.

4.0 Contribution of the Blue Economy to National Development

i) Employment Generation

Studies have shown that the number of people who earns a living on the blue economy cannot be underrated and overlooked as it cuts across so many sectors like fisheries, oil and gas, shipping amongst others. For instance, the European Commission staff-working document on blue growth report (2015) stated that Europe's maritime sector hires over five (5) million jobs generating almost EUR 500 billion a year, with a prospect to generate several more jobs. Offshore renewable energy is now a major contributor to employment, accounting for 150,000 jobs. This is also applicable to Nigeria as the blue economy sectors (fisheries, ports, aquaculture, tourism, transport, coastal mining, and energy) have generated reasonably number of jobs to its citizenry. It has breed anglers, fishmongers, traders in fishing gears, oil and gas officers, shipping clerks, seafarers', seafood processing industries and allied establishments amongst others. Report by the Organization for Economic Co-operation and Development (OECD) estimates that by 2030, several ocean-based industries would have the potential to outperform the global economy as a whole, both in terms of value added and employment.

ii) Acceleration of trade and commerce

The blue economy accelerates the movements of goods and services from the producers to the consumers adding to the value chain of such goods and services. It is the blue economy that is the provider of convenient transport routes in logistics as over 90% of all trade between countries in the world are carried by ships. The blue economy aids the transportation of items ranging from food and fuel to construction materials, chemicals, and household items in world trade. Incontrovertibly, shipping is the safest, most secure, most efficient and most environmentally effective medium of bulk transportation with reduce rates of fatalities, improving turnaround of ships and considerable reductions in pollutants discharges to the sea or atmosphere. This is made possible because of the International Maritime Organization's (IMO) regulations, technological advances and industry initiatives.

Oil remains central to the Nigerian economy with two-thirds of Nigeria's government revenues coming from oil. The oil contributes almost 85% to the country's GDP (Ite et al., 2013). Nigeria supplies about 2.7% oil to the worlds market when compared with Saudi Arabia, Russia and the United States of America which contribute 12.9%, 12.7%, and 8.6% respectively (OPEC, 2018). The Nigerian economy consists of different key sectors as: Primary - (Agriculture, Oil and Gas, Mining and Forestry), Secondary - (Light and Heavy Industries) and Tertiary - (Service) (FMF, 2018). All these sectors greatly impacts the blue economy as almost 100% of Nigeria's crude and refined products are both exported and imported through the oceans, making Nigeria to firmly depend on the blue economy not only for its huge oil deposits but also for maritime transportation. World seaborne trade has grown exponentially regardless of the global economic crisis and this is likely to continue. This informs why the country has made several efforts in recent time to position its littoral states in terms of port facilities and capacities to cater for this growing trade demands and optimize their attendants' benefits.

ii) Source of food and medicine

The blue economy serves as a source of food and medicine for households' in the coastal areas; as the entire nation are clearly fed with the various reservoirs of fishes in the oceans. Aquaculture is the fastest growing global food sector now providing 47% of the fish for human consumption. Sea foods that are considered useful for mankind are usually caught from the oceans and rivers around us in Nigeria. In the United States, seafood supported 1.2 million jobs. . World Bank, (2016) identified seafood as one of the income generating sources for the Gross Domestic Product of Portugal as all restaurants dealing with tourists in the land must make use of seafood to welcome their customers. It has been established that over half of the fish trade originated from the waters of developing countries. Available data indicates that fish used for human

consumption grew by more than 90 million tonnes in the period 1960-2009 (from 27 to 118 million tonnes) and aquaculture is projected to soon exceed capture fisheries as the main provider of such protein. Growth in aquaculture sector in Asia, which accounts for more than 89% of global production, is more than 5% a year.

Nigeria has best seafood species which are rich in calcium and other organic minerals. Fishes, Cray fish, crabs, prawn, periwinkles and other kinds of seafood's are not only nutritious, but are also recommended for healthy living (Adepoju, 2023). Blue economy can provide seafood to both the local areas and afar the shore lines at reasonable rate for social and economic development of Nigeria. Matching the local intake of seafood in Nigeria against the country's population, it is clear that there is need for the country to put more effort in the development of the fishery sub-sector of the blue economy. The seafood should be sustainable exploited in a way that it does not impair the ecosystem but in such that outside the seabed, local fishers' and other related seafood can be developed. This will not only provide affordable protein for healthy living but also jobs for economic development.

The benefit of blue economy in the production of pharmaceuticals and ancillary services through biotechnology cannot be over emphasized. The production of chemicals and health care products with the development of bio-medical services is the advantage of blue economy. This, as opined by Adepoju (2023) may further enhance research and development in herbal and natural medicine. In Nigeria and some parts of Africa, the sea is medicinal aiding the curing of some notable diseases like stomach pain, bacterial infections, digestion ailments, and even used to help fight liver and kidney problems. The curative benefits of the blue economy cannot be undervalued or ignored as it has contributed significantly especially to the poor who could not afford the cost of modern medicine. The medicine from the ocean at times proves more efficiently than the orthodox medicines. Aquaculture offers vast prospects for the provision of food and medicine to the citizenry of the nation, though undue values in provision of feed to aquaculture need to be appreciated, including reduced fish protein oil and increased plant protein content, if the industry under the blue economy is to be sustainable.

iv) A foundation of tourism and recreation

The blue economy as well contributes to national development by serving as a foundation of tourism and recreation. Coastal tourism is a very critical sector to the Nigerian economy and several developing countries. Tourism and recreation is a key global industry that does not only yield revenue to the nation but also serves as an engine that draws investors into the country. Tourism has been a major provider of global jobs and has produced trillion of dollars to the contributors. International tourism has grown from 25 million in 1950 to 1,035 million in 2012 and further growth of 3-4% in 2013 and the UNWTO further forecasted growth for 2030 to be around 1.8 billion. Trends in aging populations, growing incomes and comparatively low transport costs will make coastal and ocean locations ever more striking and lucrative. Average annual passenger growth rates in the tourism sector are in the region of 7.5% and passenger expenditures are estimated in the order of US\$ 18 billion per year, thereby making vacation trip tourism as the fastest growing sector in the leisure travel industry.

Tourism is an area that has not been fully explored in Nigeria. Recreation centers are sources of income for individual and can also be enhanced through blue economy for the purpose of commercialization by the government. Areas that can be developed in blue economy for tourism include Cinemas, sport and ferry services which are built around serene water environment. Currently, Singapore uses Deep Tunnel Sewage System to produce very clean sustainable water. This involves the collection of disposed used water from industries, homes and businesses which is treated to meet the clean water needs of the island (Yin, 2018). Tourism can be classified into natural, cultural, indigenous, rural, business, medical, sport and coaster tourism. All forms of tourism are tangentially related to blue economy and none that is fully exploited in Nigeria due to weakness in operational procedures.

v) Energy and submarine mining

Energy and Submarine mining is another area where the blue economy contributes to national development. Deep sea oil drilling is not recent as it has been in existence for long, but market pressures are making the exploration for and tapping of ever more remote reserves cost effective, bringing the most isolated areas under consideration. Although Oil will remain the dominant energy source for many decades to come, the ocean offers enormous potential for the generation of renewable energy – wind, wave, tidal, biomass, and thermal conversion and salinity gradients. Of these, the offshore wind energy industry is the most developed of the ocean-based energy sources. Deep-sea mining has always been appealing and attractive to many countries of which Nigeria is not excluded as a means of revenue generation for economic development.

Blue economy can be developed to generate electricity throughout all the littoral states in Nigeria. Presently, Nigeria is facing challenges in the area of power generation, transmission and mainly in distribution (Manohar and Adeyanju, 2009) in spite of the abundant rivers, dams and lakes that can be employed for power generation more than it is currently that abounds in the nation. Sharma and Sharma (2003) railed how prospective hydro-power sites are underdeveloped in Nigeria leaving Kainji, Jebba and Shiroro as the major hydro-generating electricity stations whereas other power plants like Sapele, Egbin, Afam and Ughelli are gas generating stations under their respective generating companies (GENCOS). Evidence abounds of how Singapore was able to explore blue economy by generating solar power through the use of ocean around the country. Of note was the siting of Tidal Energy Site at Sentosa Boardwalk in September 2019 which converts kinetic energy in flowing water into electricity for the purpose of charging batteries and other local use which is concept known as Ocean Renewable Energy (ORE) that harnessed power from waves, tidal current, and temperature and ocean salinity gradients. In 2018, Singapore was able to generate solar power through solar photovoltaic (PV) and offshore wind.

“In March 2021, Sunseap Group installed a 5MWp offshore floating solar farms in Singapore. As one of the largest floating PV projects in the world, it is expected to produce around 6 million kWh of energy per year and offset an estimated 4,258 tonnes of carbon dioxide- Quirapas-Franco et al (2021)”.

A Canadian company (Nautilus Minerals), and the Independent State of Papua New Guinea in April 2014 signed a treaty to begin the world's first deep sea mining for ores of copper, gold, and other valuable metals (Nautilus Minerals, 2014). Mining companies, and national governments, have charters to explore verge sediments for phosphates off Namibia, New Zealand, and Mexico (Mengerink et al., 2014). The reverse being the case in Nigeria where Oil and Gas sector is still the major source of income for Nigeria since the discovery of crude oil in the '70s (AFDB, 2009). There should be possibility of change in narrative with the blue project through economic recovery plan which will showcase vast segments in offshore and on-shore activities as it will pave way for private partnership and private investors for the purpose of economic recovery and employment generation (DESA, 2017).

WTO (2010) observed that between 2000 and 2010, the price of many non-energy raw materials increased annually by about 15%, mainly as a result of consumer demand in emerging economies. Advances in technology, as well as apprehensions and unease over security of supply have encouraged mining companies to reflect on what the seabed can provide. It is estimated that by 2020, 5% of the world's minerals, including cobalt, copper and zinc could come from the ocean floors, which could rise to 10% by 2030. Global annual turnover of marine mineral mining is projected to grow from virtually nothing to €5 billion in the next 10 years and up to €10 billion by 2030 (EC, 2012). Nigeria government needs to adequately prepare to meet and solve marine challenges in order to accumulate substantial benefits from resources in their own exclusive economic zones, which will go a long way in contributing to national development.

vi) Facilitates Innovation and technological advancement

The Blue Economy facilitates innovation and the adoption of new technologies to support sustainable use of ocean resources which can lead to the establishment of new trades and the emergence of new products and services that meets the needs of ocean users (Spalding, 2016). Besides this, Blue Economy allows businesses to diversify their activities beyond traditional sectors as it offers opportunity for businesses to explore new markets in marine-based renewable energy, biotechnology, and marine tourism, leading to new revenue streams and job creation (Hussain et al., 2017) which contributes to national development.

5.0 Challenges of Harnessing Blue Economy Potentials in Nigeria

While the Blue Economy offers many opportunities, it also presents several challenges that bedeviled its development. Some of the main challenges include:

i) Environmental Deterioration

The overexploitation of ocean resources, pollution, climate change, and other environmental factors can lead to the degradation of ocean ecosystems and biodiversity loss with negative impacts on the long-term viability of the Ocean Economy.

ii) Ineffective Regulation and Governance

The weak, complex and fragmented regulation and governance of ocean resources with overlapping jurisdictions and limited enforcement mechanisms in Nigeria can pose uncertainty and risk for businesses operating in the Blue Economy. This may severely hinders the full exploitation of the blue economy resources and thus retards national economic development.

iii) Limited Access to Finance:

Financing for Blue Economy projects can be limited, particularly for small and medium-sized enterprises. This can hinder the development of new businesses and innovative projects with attendants' effects on national development. Added to this is the huge cost of the development of infrastructure, such as ports, harbors, and coastal facilities which are often critical for the growth of the Blue Economy. However, inadequate infrastructure can be a significant obstacle to the development of some sectors of the blue economy.

v) Limited Human Capacity

The exploitation of the Blue Economy resources requires a huge skilled and technical know-how, particularly in areas such as marine science, technology, and engineering which demands a need for more trained professionals in these fields.

vi) Technology Transfer

Weak technology can severely limit access to blue economy resources particularly in deep sea mining and the extraction of renewable energy that requires modern technology. The lack of modern technology and innovation and technical know-how can limit the ability of the government to fully explore the ocean resources and to compete and grow in the global Blue Economy. There is an urgent need for the government to investment in research and development, infrastructure, and human capacity building in order to overcome these challenges. Additionally, promoting sustainable practices and developing new technologies and business models that reduce the negative impacts of economic activities on the ocean can be indispensable to ensure the long-term viability of the Blue Economy to national development.

6.0 Conclusion and Recommendations

It is evident from the foregoing that Blue Economy can positively contributes to national development by providing opportunities for diversification which may results in improve revenue generation and job creation, expand innovation and technological advancements, increase market access and acceleration of trade amongst others if the ocean resources are sustainable exploited. The study has also unraveled the strategic position of the blue economy in projecting the path of national development in Nigeria. The study identifies some of the challenges that hinder the full realization of the potentials of blue economy in Nigeria to include: weak institutional arrangement, limited access to finance, technology transfer and limited human capacity development.

In view of the foregoing, it is recommended that the blue economy in Nigeria should be a very firm concern and responsibility of the government of Nigeria while the private sector should be made to participate fully in its conservation. The government should show seriousness and commitment to preserve the natural and great economic force of the nation. Education of all stakeholders should be taken serious, as majority of the ocean users are not well informed about the dangers of their activities to the blue economy. If the blue economy is accorded a critical importance, it surely can be a driver for Nigeria's economic development. For this reason, the governments must realize that reformation in blue economy policies and laws is a justification for judicious use of the economic force.

References

- Adepoju, O.O., Abdullahi, M.S. & Maji, A. (2023). Concept of blue economy - A qualitative review for sustainable economic development in Nigeria. *European Journal of Theoretical and Applied Sciences*, 1(4), 668-681. DOI: 10.59324/ejtas.2023.1(4).61
- Australian Government (2012). Australia's submission to the Rio20 Compilation Document.
- Behnam, A., (2012). "Building a blue economy: strategy, opportunities and partnerships in the Seas of East Asia," Changwon: The East Asian Seas Congress.
- Bennett, N. J. (2018). Navigating a just and inclusive path towards Sustainable Oceans. *Marine Policy*, 97, 139-146. <https://doi.org/10.1016/j.marpol.2018.06.001>
- Bennett, N. J., Blythe, J., White, C. S. & Campero, C. (2021). Blue growth and blue justice: Ten risks and solutions for the ocean economy, *Marine Policy*, vol. 125, p.104387, Available Online: <https://doi.org/10.1016/j.marpol.2020.104387>.
- Bond, P. (2019). Blue Economy Threats, contradictions and resistances seen from South Africa. *Journal of Political Ecology*, 26(1). <https://doi.org/10.2458/v26i1.23504>.
- Brears, R. C. (2021). Developing the blue economy, Springer International Publishing, Available Online: <https://doi-org.ludwig.lub.lu.se/10.1007/978-3-030-84216-199> (Accessed 22 August, 2023).
- Cheung, W. W. L. (2019). Predicting the future ocean: Pathways to global ocean sustainability, in *Predicting Future Oceans*, pp.3–15.
- Choi, Y. R. (2017). The Blue economy as governmentality and the making of new spatial rationalities, *Dialogues in Human Geography*, vol. 7, no. 1, pp.37–41.
- Christiansen, J. (2021). Fixing fictions through blended finance: The entrepreneurial ensemble and risk interpretation in the blue economy, *Geoforum*, vol. 120, pp.93– 102.
- Cisneros-Montemayor, A. M., Moreno-Báez, M., Voyer, M., Allison, E. H., Cheung, W. W. L., Helsing-Lewis, M., Oyinlola, M. A., Singh, G. G., Swartz, W. & Ota, Y. (2019). Social equity and benefits as the nexus of a transformative blue economy: A sectoral review of implications. *Marine Policy*, vol. 109.
- Dalton, G., Bardócz, T., Blanch, M., Campbell, D., Johnson, K., Lawrence, G., Lilas, T., Friis- Madsen, E., Neumann, F., Nikitas, N., Ortega, S. T., Pletsas, D., Simal, P. D., Sørensen, H. C., Stefanakou, A., & Masters, I. (2019). Feasibility of investment in blue growth multiple-use of space and multi-use platform projects; results of a novel assessment approach and case studies. *Renewable and Sustainable Energy Reviews*, 107, 338–359. <https://doi.org/10.1016/j.rser.2019.01.060>.
- DESA. (2017). Towards sustainable development for all. United Nation Bulletin.
- EC. (2021). The EU blue economy report 2021. Publications office of the European Union, Available Online: <https://op.europa.eu/en/publication-detail/-/publication/0b0c5bfd-c737-11eb-a925-01aa75ed71a1> (Accessed June 10, 2022).
- Economist Intelligence Unit, (2015). "The blue economy: Growth, opportunity and a sustainable ocean Economy." An economist intelligence unit briefing paper for the World Ocean Summit 2015. The Economist.
- European Union, (2016). Scientific, technical and economic committee for fisheries (STECF) – Monitoring the performance of the common fisheries policy (STECF-Adhoc-21-01). Brussels, European Commission.
- Garland, M., Axon, S., Morrissey, J., Graziano, M., & Heidkamp, C. P. (2019). The blue economy: Identifying geographic concepts and sensitivities. *Geography Compass*, 1-21. <https://doi.org/10.1111/gec3.12445>.
- Hadjimichael, M. (2018). A call for a blue de-growth: Unraveling the European Union's fisheries and maritime policies. *Marine Policy*, vol. 94, pp.158–164.
- Hamisu, A. (2019). A study of Nigeria's blue economy potential with particular reference to the oil and gas sector. An unpublished dissertation submitted to the World Maritime University in partial fulfillment of the requirement for the award of the degree of MSc in Maritime Affairs.
- Hume, D. (2020). Of money. In Edward W. Fuller (ed.), *A source book on early monetary thought* (260-266). Edward Elgar Publishing.
- Henderson, J. (2019). Oceans without history? Marine cultural heritage and the sustainable development agenda. *Sustainability*, 11(18), 5080.
- Hussain, M. G., Failler, P., Karim, A. A., & Alam, M. K. (2017). Major opportunities of blue economy development in Bangladesh. *Journal of the Indian Ocean Region*, 14(1), 88-99.

- Ite, A. E., Ibok, U. J., Ite, M. U., & Petters, S. W. (2013). Petroleum exploration and production: Past and present environmental issues in the Nigeria's Niger Delta. *American Journal of Environmental Protection*, 1(4), 78- 90.
- Keen, M. R., Schwarz, A.-M. & Wini-Simeon, L. (2018). Towards defining the blue economy: Practical lessons from pacific ocean governance. *Marine Policy*, vol. 88, pp.333– 341.
- Laffoley, D., Baxter, J. M., Amon, D. J., Claudet, J., Hall-Spencer, J. M., Grorud-Colvert, K., Levin, L. A., Reid, P. C., Rogers, A. D., Taylor, M. L., Woodall, L. C. & Andersen, N. F. (2020). Evolving the narrative for protecting a rapidly changing ocean, postCOVID- 19, *Aquatic Conservation: Marine and Freshwater Ecosystems*, vol. 31, no. 6, pp.1512–
- Lee, K.-H., Noh, J. & Khim, J. S. (2020). The blue economy and the United Nations' sustainable development goals: challenges and opportunities. *Environment International*, vol. 137, p.105528.
- Lee, K.-H., Noh, J., Lee, J., & Khim, J. S. (2021). Blue economy and the total environment: Mapping the interface. *Environment International*, 157, 106796.
- Manohar, K. & Adeyanju, A.A. (2009). Hydro power energy resources in Nigeria. *Journal of Engineering and Applied Sciences*, 4(1), 68-73.
- McCammon, A. L. T. (1992). United nations conference on environment and development, held in Rio de Janeiro, Brazil, during 3–14 June 1992, and the '92 global forum, Rio de Janeiro, Brazil, 1–14 June 1992. *Environmental Conservation*, 19(4), 372-373. <https://doi.org/10.1017/s0376892900031647>
- McGlade, και συν., 2012. Measuring Water Use in a Green Economy. A Report of the Working Group on Water Efficiency to the International, Nairobi: UNEP.
- Nath, B. (2005). Education for sustainable development: The Johannesburg summit and beyond. *The World Summit on Sustainable Development*, 275-298. https://doi.org/10.1007/1-4020-3653-1_12
- Nautilus Minerals (2014). Nautilus minerals and state of PNG resolve issues and sign agreement. News Release, April 14, 2014. <http://www.nautilusminerals.com/s/Media-NewsReleases.asp?DateRange=2014/01/01...2014/12/31> (Retrieved 28 April 2017).
- OPEC (2018). Member countries. Nigeria facts and figures.
- Pauli, G. A. (2011). *The blue economy*. Paradigm Publications.
- Pendleton, L., Evans, K., & Visbeck, M. (2020). We need a global movement to transform Ocean Science for a Better World. *Proceedings of the National Academy of Sciences*, 117(18), 9652-9655. <https://doi.org/10.1073/pnas.2005485117>
- Pauli, G., (2009). *The blue economy: A report to the club of Rome.*, Nairobi: UNEP.
- Pauli, G., (2010). *The blue economy: 10 years, 100 innovations, 100 million jobs*. S.I Paradigm publications.
- Quirapas-Franco, M.A., Low, M. & Ng, A. (2021). The role of the blue economy in Singapore's sustainable energy transition. *ESI Policy Brief*, 43, 1-4.
- Rees, S. E., Foster, N. L., Langmead, O., Pittman, S., & Johnson, D. E. (2018). Defining the qualitative elements of Aichi Biodiversity target 11 with regard to the Marine and coastal environment in order to strengthen global efforts for marine biodiversity conservation outlined in the United Nations Sustainable Development goal 14. *Marine Policy*, 93, 241-250. <https://doi.org/10.1016/j.marpol.2017.05.016>.
- Rigaud, K. K., de Sherbinin, A., Jones, B., Bergmann, J., Clement, V., Ober, K., Schewe, J., Adamo, S., McCusker, B., Heuser, S., & Midgley, A. (2018, March 19). Toward a blue economy. Open knowledge repository. Retrieved February 1, 2023, from <https://openknowledge.worldbank.org/handle/10986/29461>
- Sarwat, S. (2022). Blue economy, a key to achieve sustainable development: The Bangladesh Perspective. *Bangladesh Journal of Law*, 20(2).
- Schutter, M. S., Hicks, C. C., Phelps, J. & Waterton, C. (2021). The blue economy as a boundary object for hegemony across scales. *Marine Policy*, 132(104673).
- Sharma, V.C. & Sharma, A. (2021). Development of hydro-power in Nigeria. *Energy*, 6(6), 475-478. [https://doi.org/10.1016/0360-5442\(81\)90052-9](https://doi.org/10.1016/0360-5442(81)90052-9)
- Silver, J. J. και συν., (2015). Blue Economy and Competing Discourses in International Oceans Governance. *The Journal of Environment and Development*, 24(2), pp. 35-160.
- Smith-Godfrey, S. (2016). Defining the blue economy. *Maritime Affairs: Journal of the National Maritime Foundation of India*, 12(1), 58-64.
- Spalding, M. J. (2016). The new blue economy: The future of sustainability. *Journal of Ocean and Coastal Economics*, 2(2). <https://doi.org/10.15351/2373-8456.1052>

- The Economist (2015). World Ocean Summit (2015). Available Online: <https://events.economist.com/events-conferences/ocean-summit-2015/> (Accessed June 10 2023).
- UNEP. (2014). Blue economy concept paper. Available Online: <https://www.unep.org/resources/report/blue-economy-concept-paper> (Accessed August 21, 2023).
- Voyer, M., Quirk, G., McIlgorm, A. & Azmi, K. (2018). Shades of blue: What do competing interpretations of the blue economy mean for oceans governance? Journal of Environmental Policy & Planning, [e-journal] 20 (5), 595–616.
- Wenhai, L., Cusack, C., Baker, M., Tao, W., Mingbao, C., Paige, K., Xiaofan, Z., Levin, L., Escobar, E., Amon, D., Yue, Y., Reitz, A., Neves, A. A., O'Rourke, E., Mannarini, G., Pearlman, J., Tinker, J., Horsburgh, K. J., Lehodey, P., Yufeng, Y. (2019). Successful blue economy examples with an emphasis on international perspectives. Frontiers in Marine Science, 6. <https://doi.org/10.3389/fmars.2019.00261>
- World Bank. (2017). What is the blue economy?, World Bank, Available Online: <https://www.worldbank.org/en/news/infographic/2017/06/06/blue-economy> (Accessed June 10, 2023)
- World Bank. (2019). A blue future for Costa Rica's fisheries. Blogs.worldbank.org, Available Online: <https://blogs.worldbank.org/latinamerica/blue-future-costaricafisheries?cid=SHRBlogSiteTweeta>.
- WWF, (2018). Principles for a sustainable blue economy. WWF Baltic ecoregion programme.
- Yin, R. K. (2018). Case Study Research and Applications: Design and Methods (6th ed.). Thousand Oaks, CA: Sage.

