BLUE ECONOMY AND UNEMPLOYMENT IN NIGERIA

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ABSTRACT
This study empirically investigates the impact of the blue economy on economic development in Nigeria spanning 1990–2024, with emphasis on sustainable resource utilization and inclusive growth. The blue economy was proxied by fishery production, aquaculture production, renewable freshwater resources, marine transportation, and marine tourism, while gross domestic product per capita and the poverty rate were employed as measures of economic development. Time-series data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and the World Bank's World Development Indicators (WDI) were analyzed using the Augmented Dickey-Fuller (ADF) test for stationarity and the Auto-Regressive Distributed Lag (ARDL) bounds testing model to explore short- and long-run relationships among variables. The findings reveal that the blue economy significantly influences Nigeria's development path in the long run. Specifically, aquaculture production exhibited a significant but negative relationship with unemployment, implying structural inefficiencies and limited absorptive capacity in the sector. Conversely, renewable freshwater resources and marine tourism demonstrated positive and significant impacts on unemployment reduction, reflecting their strong potential for job creation, foreign exchange earnings, and rural empowerment. However, fishery production and marine transportation recorded insignificant long-run effects, indicating untapped potential constrained by infrastructure and governance bottlenecks. The study concludes that optimizing Nigeria's blue-economy sectors is critical for achieving macroeconomic stability, employment generation, and sustainable development. It recommends that the Federal Ministry of Marine and Blue Economy, in collaboration with the Federal Ministry of Agriculture and Rural Development, NIMASA, and the Nigerian Ports Authority, implement innovation-driven, climate-resilient, and inclusive maritime policies aligned with Sustainable Development Goals (SDG 8 and SDG 14) to unlock Nigeria's aquatic wealth and accelerate long-term economic transformation.

Keywords: *Fishery Production, Marine Transportation, Renewable Freshwater Resources, Aquaculture Production, Marine tourism, Unemployment*

INTRODUCTION
Unemployment has long been one of the most intractable socioeconomic challenges confronting Nigeria, undermining inclusive growth, political stability, and human development. According to the National Bureau of Statistics (NBS, 2023), Nigeria's unemployment rate stood at approximately 33.3%, while youth unemployment reached over 40%, making it one of the highest in Sub-Saharan Africa. This persistent rise in joblessness has

been attributed to structural weaknesses, overdependence on crude oil, policy inconsistency, and insufficient diversification of the economy (Adewumi & Ogundipe, 2022). The International Labour Organization (ILO, 2024) defines unemployment as the situation in which persons of working age are without work, are currently available for work, and are actively seeking employment. Within the context of this study, unemployment is operationalized as the unemployment rate—the proportion of the total labor force that is unemployed—reflecting the standard adopted by the ILO and the World Bank (2023) for cross-country comparability.

It is imperative to note that Nigeria's unemployment crisis carries profound social and economic implications. Okafor (2021) argues that high unemployment in Nigeria not only exacerbates poverty and social inequality but also fuels insecurity and migration pressures. Adebayo and Akanbi (2022) observed that youth unemployment contributes significantly to rising social vices and erodes social trust in public institutions. In addition, Anyanwu (2023) noted that the persistent increase in unemployment despite various governmental intervention programs such as N-Power, the Youth Empowerment Scheme, and the Nigerian Maritime Administration and Safety Agency (NIMASA) entrepreneurship initiatives reflects the absence of sustainable employment sources within the economy's productive sectors. To address this employment paradox, scholars and policymakers have increasingly turned to the blue economy as an innovative pathway for sustainable job creation and economic resilience. The term "blue economy," first popularized by Pauli (2010) and subsequently expanded by institutions such as the World Bank (2017) and United Nations Conference on Trade and Development (UNCTAD, 2023), refers to the sustainable use of ocean, sea, and aquatic resources for economic growth, improved livelihoods, and employment while preserving the health of aquatic ecosystems.

The Organisation for Economic Co-operation and Development (OECD, 2020) define it more specifically as "all economic activities that depend on the sea and coastal areas, including marine biotechnology, fisheries, renewable energy, shipping, tourism, and marine mineral resources." This study therefore conceives the blue economy as a multi-sectoral framework encompassing fishery production, aquaculture production, renewable freshwater resources, marine transportation, and marine tourism. These subsectors represent Nigeria's key ocean and inland water resource-based industries capable of reducing unemployment through direct and indirect job creation. The approach aligns with the perspective of Voyer, et al (2018), who emphasized that the blue economy offers not only environmental benefits but also social inclusion and employment opportunities, particularly for coastal and rural communities. Similarly, Keen, et al (2022) asserted that sustainable blue growth can serve as a "triple-win" model, generating employment, preserving marine biodiversity, and stimulating innovation in maritime technologies.

Globally, the blue economy has proven to be a significant employment driver. The OECD (2020) estimated that ocean-based industries contribute about US$1.5 trillion annually to the global economy, providing employment for more than 350 million people worldwide. The World Bank (2023) projects that this figure could double by 2030 if sustainable ocean governance practices are adopted. Smith and Wescott (2021) observed that in developing economies such as Indonesia, Kenya, and South Africa, targeted investments in blue-economy sectors like aquaculture, marine logistics, and coastal tourism have significantly reduced youth unemployment and expanded local income sources. These examples demonstrate that ocean-based industries can be powerful tools for inclusive economic transformation when properly

managed. Nigeria's coastal and aquatic endowments present vast opportunities to replicate such success. With over 850 kilometers of coastline along the Gulf of Guinea, extensive inland waterways, and rich marine biodiversity, Nigeria possesses the natural assets to develop a thriving blue economy (Nwilo,et al 2019). According to FAO (2023), the fisheries and aquaculture sector in Nigeria employs over 1.48 million people and contributes significantly to food security and poverty reduction.

However, Okonkwo and Oguamanam (2023) lament that the sector remains underdeveloped due to poor infrastructure, limited access to finance, and regulatory inefficiencies. Similarly, Akinsanya and Bello (2024) noted that marine transportation in Nigeria, despite its potential to create thousands of jobs through shipbuilding, port management, and logistics, is constrained by inadequate port facilities and maritime insecurity. They further highlighted that marine tourism, which has proven to be a key employment generator in other coastal nations, remains largely untapped in Nigeria because of pollution, coastal erosion, and safety concerns. From a policy standpoint, Eneji and Eyo (2022) argue that the blue economy could serve as a major instrument for achieving the Sustainable Development Goals (SDGs), particularly SDG 8 (decent work and economic growth) and SDG 14 (life below water), if properly integrated into Nigeria's national development agenda. Moreover, Adewale (2023) maintained that blue-economy expansion could stimulate backward and forward linkages in related sectors such as manufacturing, trade, and renewable energy, thereby multiplying employment effects across the economy.

Despite its potential, empirical literature on the relationship between the blue economy and unemployment in Nigeria remains sparse. Most studies have concentrated on its contribution to GDP and trade (Eneji & Eyo, 2022; Nwilo et al., 2019) rather than its direct impact on labour-market outcomes. Few have adopted a holistic approach integrating fisheries, aquaculture, renewable freshwater resources, marine transport, and marine tourism to assess their collective influence on unemployment trends. This gap in scope and methodology underscores the need for an empirical investigation that captures the dynamic relationship between blue-economy indicators and unemployment in Nigeria over an extended period. Against this background, this study seeks to empirically examine the impact of the blue economy on unemployment in Nigeria from 1990 to 2024, focusing on five major blue-economy indicators: fishery production, aquaculture production, renewable freshwater resources, marine transportation, and marine tourism. By employing a robust econometric framework, the study aims to provide evidence-based insights into how sustainable blue-economy development can serve as a policy tool for reducing unemployment and promoting inclusive growth

LITERATURE REVIEW

Conceptual Literature

Blue Economy

The blue economy has emerged as one of the most innovative paradigms in contemporary development discourse, redefining how societies perceive and utilise aquatic resources for sustainable growth. The term transcends traditional maritime or marine-based economies by emphasizing an integrated approach that harmonizes economic prosperity, social inclusion, and environmental sustainability. According to the World Bank (2017), the blue economy represents "the sustainable use of ocean resources for economic growth, improved livelihoods,

and jobs while preserving the health of ocean ecosystems." This definition has gained wide institutional traction because it connects environmental stewardship with economic opportunity, offering a pathway for developing nations to transform their coastal and marine resources into engines of inclusive growth. Yet, studies have shown that while this definition is aspirational and mobilizes cross-sectoral collaboration, its effectiveness depends heavily on measurable governance indicators and coherent institutional frameworks (Independent Evaluation Group [IEG], 2024).

Expanding on the above perspective, the United Nations Environment Programme (UNEP, 2024) defines the blue economy as an economic system that promotes "the sustainable use of ocean and freshwater resources to enhance human well-being and social equity while significantly reducing environmental risks and ecological scarcities." This definition introduces a broader moral and ecological dimension—framing the blue economy as a pathway toward ecosystem restoration, biodiversity protection, and community resilience. It aligns closely with the Sustainable Development Goals (SDGs), particularly SDG 14, which advocates for the conservation and sustainable use of the oceans, seas, and marine resources. However, researchers caution that although this ecosystem-based perspective provides a strong ethical and environmental foundation, it risks becoming overly normative unless accompanied by clear policy tools, spatial planning, and quantifiable performance metrics (UNEP, 2024; OECD, 2024). Scholars such as Elston, et al (2024) argue that this version of the blue economy is conceptually compelling but must be grounded in tangible governance mechanisms to avoid the pitfalls of what they term "bluewashing"—labeling projects as sustainable without sufficient evidence of ecological or social benefit.

In contrast, the European Union's conception of the blue economy—often referred to as "blue growth"—emphasizes the role of oceans as frontiers for economic innovation, industrial diversification, and technological advancement (European Commission, 2023). This definition focuses on stimulating investment and job creation in marine sectors such as tourism, fisheries, renewable energy, and biotechnology. Empirical assessments reveal that the EU's blue growth agenda has successfully increased GDP contributions from marine industries and fostered technological competitiveness across Europe (OECD, 2024). However, it has also faced criticism for prioritizing economic expansion over environmental thresholds, leading to subsequent policy reforms that integrate sustainability safeguards and marine spatial planning (European Commission, 2023). Thus, while the EU's growth-oriented framing has proven effective in stimulating innovation and industrial development, its long-term success depends on balancing economic dynamism with ecosystem protection.

In essence, the blue economy should be conceptualized as an evolving paradigm that bridges environmental ethics, social justice, and economic pragmatism. The World Bank's development-oriented view provides a practical blueprint for policy implementation, UNEP's ecological definition embeds moral and sustainability imperatives, and the EU's innovation-driven approach energizes technological advancement and global competitiveness. Together, they form a complementary triad—a holistic vision of human progress anchored in the oceans and inland waters. The convergence of these expert perspectives illustrates that the blue economy is not merely a policy slogan but a transformative model for inclusive and sustainable development. By embedding science-based governance, local participation, and technological innovation into its operational framework, nations—particularly developing coastal states such

as Nigeria—can harness the blue economy as a catalyst for both environmental resilience and economic renaissance.

Unemployment

Unemployment has remained one of the most pervasive socio-economic challenges confronting both developed and developing nations (Uford, 2017; Akpan & Uford, 2024). The International Labour Organization (ILO, 2023) defines unemployment as a situation where individuals within the working-age population are without work, available for work, and actively seeking employment. This definition underscores three critical elements—absence of work, willingness to work, and active job search—making it the most widely adopted standard in labour economics. Similarly, the World Bank (2024) describes unemployment as the proportion of the labour force that is jobless but seeking work and available to start within a specified reference period, highlighting the dynamic nature of labour-market participation. Building on these institutional perspectives, Todaro and Smith (2020) view unemployment as "a macroeconomic condition that reflects the inability of an economy to generate adequate employment opportunities for its labour force at existing wage levels." Their view situates unemployment within the broader structure of economic development and growth, suggesting that it arises not only from labour-market inefficiencies but also from inadequate investment and poor macroeconomic management. Complementarily, Keynes (1936) in his General Theory asserts that unemployment results primarily from deficient aggregate demand, implying that government intervention through fiscal and monetary policies can restore full employment.

However, recent empirical studies have expanded these theoretical lenses. O'Higgins (1997) re-conceptualized unemployment as a multidimensional phenomenon, emphasizing its psychological, social, and institutional dimensions rather than purely economic ones. Contemporary scholarship has reinforced this idea: Elston, et al (2024) argue that the persistence of unemployment in modern economies is not merely cyclical but structural, arising from technological disruptions and the evolving demands of Industry 4.0. the study demonstrates that machine-learning models can now predict unemployment dynamics by integrating variables such as automation, digital skills, and educational mismatch—showing how innovation reshapes traditional unemployment theory. Empirical evidence supports these views. A systematic analysis by the OECD (2024) reveals that youth unemployment rates remain persistently high in emerging economies due to skill mismatches, poor labour-market information systems, and regional disparities. In the Nigerian context, research by Adewale and Eze (2023) attributes rising unemployment to declining industrial output, insecurity, and limited entrepreneurial financing.

These findings echo the ILO's (2023) warning that unemployment, when left unaddressed, translates into poverty, social unrest, and long-term productivity loss. Thus, contemporary understanding of unemployment integrates classical, Keynesian, and structuralist perspectives. Unemployment can no longer be viewed merely as a count of jobless individuals but as a complex socio-economic condition reflecting imbalances between labour supply, demand, and institutional adaptability. The synthesis of expert definitions and recent research suggests that effective policy responses must simultaneously address cyclical demand shortfalls (Keynes, 1936), structural rigidities (Elston et al., 2024), and technological adaptation (Chukwuere, 2024). In essence, unemployment today represents not only an economic indicator but a measure of social resilience and institutional performance. The convergence of expert definitions and scholarly views reveals that sustainable employment creation demands a

combination of macroeconomic stability, innovation-driven growth, skills development, and inclusive labour-market governance.

Theoretical Framework

Blue Economic Theory

The blue economy was proposed by Paul in 2010. The theory argue that the ocean is an underutilized economic frontier with immense potential to contribute to global and national economies. Proponents of the theory believe that by investing in sectors like fisheries, maritime transport, tourism, marine biotechnology, and renewable energy (such as offshore wind), countries can significantly boost their GDP while also addressing environmental challenges. For instance, proponents highlight how sustainable fishing practices can both protect marine ecosystems and ensure the long-term viability of the fishing industry. A country like Norway, which has implemented stringent regulations on fishing quotas and practices, is often cited as an example where the blue economy has been successfully integrated into national policy, leading to a thriving fishing industry that supports local economies while preserving fish stocks. Proponents argue that advancements in marine biotechnology, such as the development of pharmaceuticals from marine organisms, can lead to new industries that provide economic benefits without degrading marine ecosystems. For example, the discovery of new compounds in marine organisms has led to the development of novel drugs and treatments, showcasing the potential of the blue economy to contribute to human health and economic growth simultaneously.

However, the application of Blue Economic Theory in Nigeria is not without its challenges, and critics argue that several assumptions of the theory may not hold in the Nigerian context. One major concern is the risk of overexploitation of marine resources. Despite regulations, illegal fishing practices are rampant in Nigeria, leading to declining fish stocks and damaged ecosystems. The assumption that economic growth and environmental sustainability can go hand in hand is challenged by the reality that weak enforcement of fishing regulations and the lack of sustainable practices threaten the long-term viability of Nigeria's fisheries. This overexploitation also disproportionately affects small-scale and artisanal fishers, who rely on these resources for their livelihoods. Another criticism is the significant infrastructural and investment barriers that Nigeria faces in fully realizing the potential of its blue economy. The maritime transport sector, for example, suffers from inadequate port facilities, outdated infrastructure, and logistical challenges. These issues limit Nigeria's ability to compete in global maritime trade and hinder the efficient movement of goods. This theory is relevant to the study because by focusing on blue economy—such as fisheries, coastal tourism, and renewable marine energy—this theory underscores the transformative power of the sea in enhancing livelihoods and creating jobs. Imagine a thriving coastal community where vibrant fisheries, bustling seaside resorts, and innovative marine energy initiatives not only boost the economy but also protect the precious ecosystems that sustain them. Embracing this holistic approach can unlock new avenues for growth while ensuring that the beauty and richness of Nigeria's maritime heritage are preserved for generations to come.

Endogenous Growth Theory

Romer in 1986 proposed the endogenous growth theory. The focuses on the idea that economic growth is primarily driven by internal factors within an economy rather than external influences. Unlike earlier growth theories that emphasized external factors like technological progress as exogenous (outside the control of the economy), endogenous growth theory argues that policies, innovation, knowledge, human capital, and investment in research and development (R&D) within the economy are the key drivers of long-term economic growth.

One of the central assumptions of endogenous growth theory is that knowledge and human capital are crucial drivers of growth. The theory posits that investments in education, training, and R&D lead to innovations and improvements in technology that fuel economic growth. The proponents of endogenous growth theory Lucas (1988); and Rebelo (1991) also believe that government policy plays a vital role in sustaining economic growth. They argue that government interventions in the form of subsidies for education, investment in infrastructure, and support for research and development can help overcome market failures and ensure that the benefits of innovation and knowledge spill over to the broader economy. For example, in the European Union, policies aimed at fostering innovation and knowledge-sharing across member states, such as the Horizon Europe program, are designed to promote sustained economic growth across the region by encouraging R&D collaboration and technological advancement. However, opponents of endogenous growth theory like Solow (1956), raise several criticisms, questioning the validity of some of its assumptions.

One major criticism is that the theory may overestimate the role of human capital and knowledge in driving growth, while underestimating the importance of external factors, such as global trade, foreign investment, and technological diffusion from other countries. The critics argue that many developing countries, despite investing in education and R&D, struggle to achieve sustained growth due to their reliance on external technologies and knowledge. For instance, in many African countries, despite efforts to improve education and promote innovation, economic growth remains constrained by a lack of access to advanced technologies and the global market, as well as by structural issues such as poor infrastructure and governance challenges. In summary, endogenous growth theory provides a framework for understanding how internal factors like human capital, innovation, and government policy can drive sustained economic growth. Proponents argue that investments in education, R&D, and supportive government policies are essential for fostering innovation and maintaining long-term growth. However, opponents raise concerns about the theory's assumptions, particularly regarding the role of external factors, the potential for diminishing returns on investments in knowledge, and the risks associated with government intervention. These debates highlight the complexities of achieving sustained economic growth and the need for a nuanced approach that considers both internal and external factors.

Empirical Review

Eto and Okon (2025) examined the impact Assessment of Maritime Transportation Infrastructure on Nigeria's Economic Growth and Development". Their study covered the period from 1990 to 2020 and analyzed the relationship between maritime infrastructure development and economic performance in Nigeria. Variables included GDP growth rate, number of functioning seaports, cargo handling capacity, and maritime capital expenditure. Data were collected from the National Bureau of Statistics and analyzed using Ordinary Least Squares (OLS) regression analysis. The results showed that improved maritime infrastructure had a statistically significant and positive effect on Nigeria's GDP. The authors concluded that robust investments in port infrastructure, equipment, and policy frameworks are critical to driving economic growth. Similarly, Eyüboğlu and Akmermer (2024) analysed the effect of fisheries production on economic growth by employing the Auto Regressive Distributed Lag (ARDL) model from 1990-2019. The results showed a positive relationship between fisheries production and economic growth in the long-term. We hope this paper will support the policy-makers and development agencies in their efforts to reshape the industry in Türkiye towards an increased role in economic development in a sustainable manner.

Osuji and Agbakwuru (2024) examined ten important blue economic components and evaluate their contributions to the sustainable development of Nigeria using various secondary data acquisition. Data obtained reveals that out of the ten (10) blue economic components studied, oil/gas exploration, maritime transport/shipping and fisheries dominate the blue economic contributions with the oil/gas exploration contributing 90% of the blue economic value in Nigeria. This work has shown that efforts are required both from the government and private sectors to pursue the huge opportunities available especially in the non-oil/gas exploration components to sustainably improve the economic base of the nation and generate huge employment opportunities for the large growing Nigerian population. Also, Amao et al. (2024). Maritime piracy and the sustainable development of Nigeria's blue economy. Àgídìgbo: ABUAD Journal of the Humanities, 12(2), 605–620. The study examined how piracy in the Gulf of Guinea adversely affects fishing, maritime tourism, and trade. Through mixed-methods (key informant interviews and stakeholder surveys), a strong negative correlation was found between piracy incidents and blue economy performance. The authors recommended enhanced maritime security diplomacy and regional cooperation.

Eyo et al. (2024). Sustaining the blue bounty: fish, food, and nutrition security in Nigeria's evolving blue economy. AIMS Agriculture and Food, 9(2), 500–530. This study explored fisheries' role in national food security and blue economy growth. It reviewed dietary data and fisheries output, concluding that fish provides ~40% of national protein intake and that sustainable fisheries expansion is vital for meeting SDG 2 (Zero Hunger). Additionally, Umenweke and Bielu (2024). The introduction of the blue economy and its implications on the Nigerian tax regime. International Journal of Comparative Law and Legal Philosophy. This doctrinal legal analysis examined how broadening the tax base to include blue economy sectors (fisheries, aquaculture, maritime transport, coastal tourism) could enhance revenue while ensuring ecosystem sustainability. It concluded tax reforms should align fiscal frameworks with sustainable maritime asset utilization. Still, Oti et al. (2024) investigated the implications of blue economy to industrial growth in Port Harcourt Metropolis, Rivers State, Nigeria. African Banking and Finance Review Surveying 180 stakeholders across fisheries, tourism, transport, and policy, the study found blue economy contributes ~35% to Rivers State's GDP. Challenges include environmental degradation, infrastructural deficits, and weak regulation.

Olaniyi et al. (2024) examined the effect of blue economic practices and its potential implications on Nigeria's socio-economic development: a comprehensive analysis. The study employed policy and sectoral analysis to assess fisheries, aquaculture, maritime transport, oil/gas, and tourism. It found blue economy practices boost employment, food security, and foreign exchange earnings, but face threats from overfishing, pollution, and weak infrastructure/regulation. Correspondingly, Uzonwanne et al. (2023) investigated the impact of Fish Production on the Gross Domestic Product in Nigeria," focused on the national level. Variables included fish production, gross fixed capital formation, labor productivity, and GDP. Data were collected from secondary sources like the World Bank and analyzed using ordinary least squares (OLS) regression. Findings showed that fish production and capital formation positively influence GDP, while labor productivity had a negative impact. The study concluded that fish production can boost GDP and requires policy support. Consequently, Umar and Bello (2023) evaluated access to microcredit and performance of small-scale fish farmers in Zamfara State" used variables such as loan amount, repayment rate, fish output, and income level. Data were collected from 100 microcredit beneficiaries and analyzed using regression analysis. The study found a positive relationship between microcredit access and fish production. The conclusion emphasized the need for expanding microcredit programs.

Onuwa et al. (2023) examined the impact of catfish productivity among smallholders in Ekeremor, Bayelsa State, Nigeria," focused on smallholder catfish farmers in Ekeremor. The variables used included quantity of feed, labor, capital input, pond size, and revenue. Data were collected through structured questionnaires. Methods of data analysis included descriptive statistics, cost-benefit analysis, and Total Factor Productivity (TFP). The findings showed that catfish farming is profitable, with a net farm income of ₦478,000 per cycle, though 68.3% of farmers were sub-optimally productive. The study concluded that access to quality feed and markets is crucial for improving productivity. Furthermore, Bamidele and Bolarinwa (2023) explored the role of Government Policies in Enhancing Aquaculture's Contribution to Economic Development". This study covered the period 1999 to 2020 using time-series data. The main variables were government spending on aquaculture, aquaculture output, GDP, and employment. The ARDL bounds testing approach was applied to determine long-run relationships. Findings showed that public investment significantly influenced aquaculture output and, by extension, economic growth. The study concluded that stable and supportive government policies are critical to unlocking the economic potential of aquaculture.

Akinyemi and Alege (2023) explored the effect of Shipping Trade on Economic Growth in Nigeria: The Vector Error Correction Model Approach." The study focused on the Nigerian economy and explored the impact of shipping trade on economic growth using data spanning from 1981 to 2019. The key variables included GDP as the dependent variable, and independent variables such as shipping trade index, port throughput, and maritime investment. The study employed secondary data sourced from the Central Bank of Nigeria and the Nigerian Ports Authority. The analysis was carried out using the Vector Error Correction Model (VECM). The findings revealed that shipping trade positively and significantly influenced economic growth in both the short run and long run. The study concluded that investing in maritime infrastructure and policy reforms could bolster Nigeria's economic development.

Similarly, Maria et al. (2023) evaluated the impact of fish production on the gross domestic product (GDP) in Nigerian by using time series data ranging from 1981-2021. In the method, Solow version of Neo-classical theory was used for theoretical framework. The study adopted ordinary least square techniques for the regression analysis. Aside the two main variables of this study which is fish production and GDP, some control variables were also used (Labour productivity and gross fixed capital formation) to control GDP. The main contribution of this study therefore lies in the result that shows that fish production and GFCF has positive and significant impact on economic growth in Nigeria while labour productivity has negative impact on the Nigeria economic growth. This means that labour productivity does not contribute to economic growth in Nigeria. Hence, the study recommends that the Nigerian government should encourage fish production in order to bring more inflow of funds which will help to trigger economic growth. This as a matter of fact could be achieved by reducing the contamination of the seas and oceans for a better output of aqua products in Nigeria.

Obasi and Adeoye (2022) evaluated the impact of capture and aquaculture Fish Production in Nigeria", focusing on the trends and contribution of aquaculture to domestic fish production from 2006 to 2019. The variables considered were aquaculture output, capture fisheries output, and total fish production. Secondary time-series data were sourced from the FAO and Nigeria's Federal Department of Fisheries. The authors used descriptive statistics and growth trend analysis. Their findings showed that aquaculture's contribution rose from 13% in 2006 to 31% in 2015, highlighting aquaculture's growing role. The study concluded that aquaculture can fill the domestic supply gap if supported by favorable policies and investments. Furthermore, Odeyemi and Balogun (2022) investigated the effect of climate change effects on fishery production in South-West Nigeria." Variables used were temperature, rainfall, fish catch

volume, and species diversity. Data were collected through climate records and surveys with local fishers and analyzed using correlation and regression analysis. The study found a significant negative impact of increasing temperature on fish catch and diversity. It concluded that adaptation strategies like early warning systems and sustainable fishing practices are urgently needed.

Olaifa et al. (2022) investigated the effect of Oil Spillages and Captured Fish Production in the Niger Delta of Nigeria" focusing on the Niger Delta region. Variables included oil spillage, fish output, population, and infrastructure. Data were collected from secondary sources and analyzed using the Auto-Regressive Distributed Lag (ARDL) bounds testing approach. Findings indicated that oil spillages negatively affect fish production and that the speed of adjustment to equilibrium is low. The study concluded that sustainable exploitation and management of oil resources are vital for preserving the fishing industry. Still, Ogoun (2022) assessed Maritime Transport as a Tool of Economic Growth of a Nation (Nigeria)", investigated how maritime transport contributes to national development. The study focused on Nigeria from 2000 to 2020, using variables such as GDP, port activities, number of vessels, and employment in the maritime sector. Secondary data were obtained from government publications and analyzed using multiple regression techniques. The findings indicated that maritime transport activities, particularly port operations and vessel traffic, significantly contributed to economic growth. Ogoun concluded that a well-structured maritime transport sector can enhance trade, generate employment, and boost economic output.

Finally, Ahmed and Eze (2022) investigated the impact of fish value chain development on economic empowerment in Niger State." Variables included production quantity, value-added processing, marketing channels, and profit margin. Data were collected through field surveys and analyzed using value chain analysis framework. The findings revealed underutilized potential in fish processing and weak market linkages. The study concluded that empowering processors with training and infrastructure could improve rural incomes.

Gap and Value Addition

A critical review of the above empirical studies reveals that while extensive research has been conducted on the blue economy and its influence on economic performance, significant gaps remain concerning the relationship between blue economy indicators and unemployment in Nigeria. Most of the studies, such as those by Eto and Okon (2025), Akinyemi and Alege (2023), and Ogoun (2022), concentrated on the contribution of maritime transportation to economic growth, using variables like GDP growth rate, port throughput, and maritime investment, but ignored unemployment as a core measure of economic development. Similarly, studies such as Eyüboğlu and Akmermer (2024), Maria et al. (2023), and Obasi and Adeoye (2022) examined fisheries and aquaculture output in relation to GDP, without exploring their employment-generating potential. Consequently, the existing literature largely equates economic growth with development, overlooking the crucial dimension of job creation which is central to Nigeria's sustainable development goals.

In terms of scope, most studies either examined specific subsectors (e.g., fisheries, aquaculture, or maritime transport) or broader blue economy themes without integrating the five key variables—fishery production, aquaculture production, renewable freshwater resources, marine transportation, and marine tourism—into a unified framework. While Osuji and Agbakwuru (2024) and Olaniyi et al. (2024) recognized the employment potential of the blue economy, their analyses were largely descriptive and did not empirically quantify how these components affect unemployment reduction. Furthermore, studies like Oti et al. (2024) and Odey (2023) were regionally focused on areas such as Rivers State and the Niger Delta, which

limits the generalizability of their findings to the national level. This creates a geographic gap, as the unemployment implications of blue economy activities across Nigeria remain underexplored despite regional variations in marine and inland resources.

Methodologically, the majority of studies applied descriptive statistics, correlation analysis, and Ordinary Least Squares (OLS) regression (e.g., Eto & Okon, 2025; Maria et al., 2023; Uzonwanne et al., 2023), which may not effectively capture both the short-run and long-run dynamics among variables that are potentially cointegrated. Although a few studies such as Eyüboğlu and Akmermer (2024) and Olaifa et al. (2022) used more advanced models like the Auto-Regressive Distributed Lag (ARDL) approach, their focus was confined to production or environmental outcomes rather than unemployment. Moreover, most existing works failed to test for causality, thus leaving the direction of influence between blue economy activities and employment outcomes uncertain. Hence, despite the growing body of literature, there remains a clear empirical gap in studies that comprehensively investigate how blue economy components—specifically fishery production, aquaculture production, renewable freshwater resources, marine transportation, and marine tourism—affect unemployment in Nigeria using robust econometric techniques. The existing research is either sector-specific, regionally limited, or growth-focused rather than employment-oriented. Therefore, the present study fills this gap by employing time series data spanning from 1990 to 2024 and using the ARDL bounds testing approach to examine both the short-run and long-run effects of blue economy indicators on unemployment in Nigeria, thereby offering a holistic and policy-relevant contribution to sustainable economic development discourse.

METHODOLOGY

Secondary data, which were gathered from the Central Bank of Nigeria (CBN), statistical Bulletin and World Bank's World Development Indicators, 1990 to 2024, are the primary source of information for this research. Fishery Production (FPD), Aquaculture Production (ACP), Renewable Freshwater Resources (RFR), Marine Transport (MTP) and Marine Tourism (MTR), were used to proxy the blue economy while the dependent variable is unemployment (UNE), and Poverty (POR) were used to capture economic development The Augmented Dickey Fuller (ADF) method was used in order to do the unit root test on the model that was developed. Taking into consideration the results of the ADF, the research used the Auto-regressive Distributive Lag (ARDL)

Model Specification

Following the specific objectives of this study, the functional form of the model is specified as follows:

Blue Economy and Unemployment Model

$$UNE = f(FPD, ACP, RFR, MTP, MTR) \quad (1)$$

$$UNE = \pi_0 + \pi_1 FPD + \pi_2 ACP + \pi_3 RFR + \pi_4 MTP + \pi_5 MTR \quad (2)$$

$$UNE = \pi_0 + \pi_1 FPD + \pi_2 ACP + \pi_3 RFR + \pi_4 MTP + \pi_5 MTP + U_t \quad (3)$$

Where:

UNE = Unemployment**, FPD =** Fishery Production**, ACP** = Aquaculture Production, **RFR** = Renewable Freshwater Resources, **MTP =** Marine Transport, **MTR** = Marine Tourism, π_0 = constant parameter, $\pi_1 - \pi_5$ = slope parameters, U_t = *Error Term*

Apriori Expectation: $\beta 1, \beta 2, \beta 3, \beta 4$ and $\beta 5 < 0$,

The signs of β1, β2, β3, β4 and β5 are expected by theory to have a negative relationship with unemployment rate in Nigeria. Since increase in FPD, ACP, RFR, MTP and MTR through the blue sub-sectoral activities is capable of creating diverse job opportunities in coastal and marine sectors, encouraging skill development, and supporting economic growth in related industries. These sectors can absorb both skilled and unskilled labour, providing employment across various levels and helping to alleviate unemployment, especially in coastal regions thereby reducing unemployment rate in the country.

$UNE_t = \pi_0 + \pi_1 LFPD_t + \pi_2 LACP_t + \pi_3 LRFR_t + \pi_4 LMTP_t + \pi_5 LMTR_t + U_t$ .....(4)

RESULT AND DISCUSSION

Data Analysis

Unit Root Test

The Augmented Dickey Fuller (ADF) unit root test is use to establish the stationarity of the time series data used in the study. The result in table 1 are shown below;

Variables	Levels		First Difference		Order of Integration	P-value
	ADF Statistics	5% Critical Value	ADF Statistics	5% Critical Value		
UNE	-3.534833	-2.963972			I(0)	0.0138
LFPD	-0.898623	-2.957110	-7.666076	-2.950411	I(1)	0.0000
LACP	-0.671632	-2.963972	-2.987287	-2.963972	I(1)	0.0476
LRFR	-3.668148	-2.986225			I(0)	0.0114
LMTP	-1.551790	-2.957110	-4.060781	-2.967110	I(1)	0.0036
LMTR	-4.504851	-3.004861			I(0)	0.0019

Source: ***Author Computation 2025**** Level of significance at 5%

This study employs the Augmented Dickey-Fuller (ADF) unit root tests to check the order of integration of the variables and the results are presented in Table 1 The results of Augmented Dickey-Fuller (ADF) showed that the variables are integrated in different order or a combination of I(0) and I(1) series. The ADF result revealed that UNU, LRFR, and LMTR were stationary at levels 1(0) while, LFPD, LACP, and LMTP, are stationary after first differencing 1(1). This condition makes the Autoregressive Distributive Lag (ARDL) Bounds test approach to co-integration appropriate for investigating the long-run relationship among these variables.

Bound Test to Co-integration Result

Table 2: ARDL Bound Test Co-integration Result for Model One (FPD, ACP, RFR, MTP, MTR)

Test Statistics	Value	K
F-statistics	**5.121375**	**5**

Significance	I (0)	1(1)
10%	2.57	3.85
5%	3.12	4.60
1%	4.53	6.37

Source: Authors computation 2025

From table 2 the bound test result indicates that there exist long run relationships amongst the variables as the F-statistic value of 5.121375 exceeds both the lower and upper bound critical values. Thus, we therefore reject the null hypotheses of no long run relationship and accept its alternative. This means that there is a long-run relationship between blue sub-sectorial activities and unemployment in Nigeria.

Short and Long-Run Estimation Results for UNE

The results of the short and long-run dynamics association of model one are presented in table 3 below

Table 3: ARDL Short and Long-run Result for UNE

Short Run Coefficient				
Variable	Coefficient	Std. Error	t-Statistics	Prob
LOG(FPD(-1)	0.560366	0.138440	4.047723	0.0014
LOG(ACP(-1)	0.173805	0.037939	4.581176	0.0005
LOG(RFR)	0.029885	0.008687	3.448225	0.0043
LOG(MTP()	0.464474	0.953192	0.237803	0.8157
LOG(MTR)	-1.05E-09	2.88E-10	-3.655604	0.0029
ECM(-1)	-0.404113	0.063760	-6.339038	0.0000
Long Run Coefficient				
Variable	Coefficient	Std. Error	t-Statistics	Prob
LOG(FPD)	-0.350227	0.538826	0.649981	0.5216
LOG(ACP)	-0.938039	0.290095	-3.233561	0.0034
LOG(RFR)	0.653226	0.279787	2.334729	0.0274
LOG(MTP)	0.185811	0.749464	0.247926	0.8062
LOG(MTR)	2.36E-09	7.85E-10	3.001871	0.0060
C	0.406961	0.063883	6.370418	0.0000
Adj R^2 = 0.693869, F-statistics = 5.108161 (0.002515), DW = 2.279546				

Source: *Authors computation using E-view 13 2025.*

The coefficient estimates for the error correction term, ECM (-1) has a negative value and is significant at the 0.05 level. It suggests that the model will reach long-run equilibrium at a rate of 0.40% every year. This means that a yearly adjustment speed of 0.40% may fix the mistake from the previous year. The independent variables (LFPD, LACP, LRFR, LMTP & LMTR) explain 69% of the total variance in the dependent variable (UNE), according to the adjusted R-Square (R2) value. As a whole, the model is noteworthy since the F-statistic is significant at the 5% level of significance. Without serial correlation, the model would not work, according to the Durbin-Watson statistics of 2.279546, which is close to 2.

Table 3 displays the model's short-and long run outcome. The coefficient of the logarithm value of fishery production (LFPD), log value of aquaculture production (LACP); and log value of renewable freshwater resources (LRFR), has a significant positive effect on unemployment (UNE) while the logarithm value of marine tourism (LMTR) had a positive but insignificant relationship with unemployment (UNE). However, the log value of marine tourism (LMTR) is negative but significantly related with unemployment (UNE) in the short-run

Table 3, shows the outcome of the long-run result that the coefficient of the logarithm value of f renewable freshwater resources (LRFR) and log value of marine tourism (LMTR) has a significant positive effect on unemployment (UNE) while the logarithm value of aquaculture production (LACP), is significant but negatively related with unemployment (UNE). However,

Marine transportation (LMTP) is reported to be positive but insignificantly related with unemployment (UNE) in Nigeria while the log value of fishery production is negative and insignificantly related with unemployment in the long-run.

Table 4: Ramsey Reset Test, Serial Correlation LM Test and Homoscedasticity Test Results

	F-Statistic	Prob-Value
Ramsey Reset Test	10.14028	0.0754
Breusch-Godfrey Serial Correlation LM Test	0.269665	0.7724
Breusch-Pagan-Godfrey Heteroskedasticity Test	1.687221	0.2270

Source: Authors computation 2025

From Table 4, the results of the diagnostic test show that the linearity test using Ramsey Reset test indicates that the f-statistic (10.14028) with computed p-value of 0.0754 which is greater than 5 percent (0.05) critical value, hence the study reject the null hypothesis and conclude that the model is correctly specified.

The result of the Serial or Autocorrelation Test using Breusch-Godfrey Serial Correlation LM Test shows that the f-statistic is 0.269665, with a Chi-Square probability value is 0.7724. This indicates that the probability value of about 77 percent (0.7724) is greater than 5 percent (0.05) critical value; hence the study confirms no serial correlation in the model.

The result of the heteroscedasticity test using Breusch-Pegan-Godfrey test shows that the f-statistic is 1.687221 with a Chi-Square probability value of 0.2270. The result suggests that there is no evidence of heteroskedasticity in the model since the probability Chi-square value is more than 5 percent (P >0.05). So, residuals do have constant variance which is desirable in regression meaning that residuals are Homoscedastic

Figure 1: Normality Test

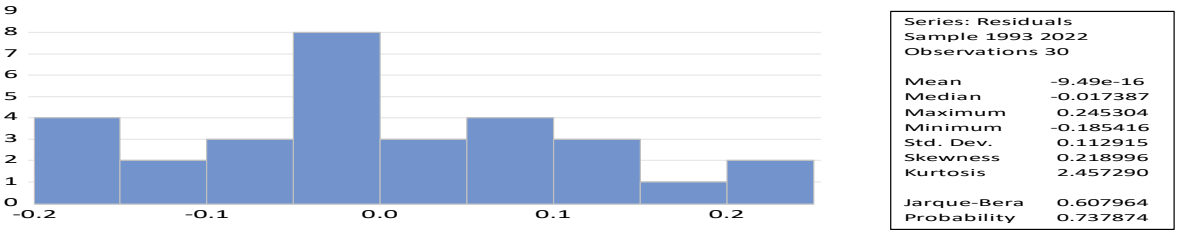

Figure 1, shows summary of the normality test with Jarque-Bara value of 0.607964 and a corresponding probability value of 0.737874 more than 0.05 level of significance, indicating that the residuals are normally distributed.

Figure 2: Stability Test

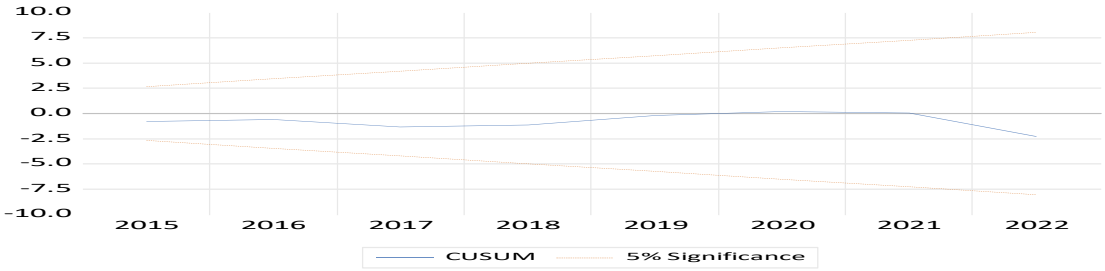

Figure 2, shows a summary of the stability of the model. The graph showed that the model is stable, this is evident by the fact that the blue line inside the graph is in between the two red lines. This also indicates that it is less than 0.05 level of significance.

Discussion of Findings

The long-run results of the regression analysis using the Auto-Regressive Distributive Lag (ARDL) method showed that fishery production (FPD) has a negative association with unemployment (UNE) in the long. It supports economic theory. It was expected that increased fishery production creates more job opportunities in harvesting, processing, and distribution, thus helping to reduce unemployment levels and support economic stability, particularly in coastal and rural areas. Also, the result from the p-value shows that fishery production (FPD) has a statistically insignificant impact on unemployment. Therefore, the analysis concludes that the null hypothesis that FPD and UNE are not significantly related is correct.

Aquaculture Production and Unemployment in Nigeria

A negative association between aquaculture production (ACP) and unemployment (UNE) was inferred in the long-run using regression analysis. It is consistent with economic theory that aquaculture production has a negative connection with unemployment (UNE). It was expected that increase in aquaculture production generates job opportunities in areas such as breeding, feeding, and processing, thereby helping to reduce unemployment and support economic development, especially in rural communities. Aquaculture production (ACP) has a statistically significant effect on unemployment (UNE), according to the p-value of the finding. Therefore, the analysis concludes that the null hypothesis that aquaculture production (ACP) and unemployment (UNE) have no significant link is incorrect.

Renewable Freshwater Resources and Unemployment in Nigeria.

Also, in the long-run worth of data, we see that the link between renewable freshwater resources (RFR) and unemployment (UNE) is positive. Economists' predictions about a negative correlation between renewable freshwater resources (RFR) and unemployment (UNE) are not spot on. It is anticipated that access to reliable freshwater resources can boost productivity and economic growth, thereby reducing unemployment and promoting sustainable livelihoods. The result's p-value, however, suggests that renewable freshwater resources (RFR) has a statistically significant effect on unemployment (UNE). Accordingly, the study's results disapprove the null hypothesis that the correlation between the RFR and UNE is not statistically significant.

Marine Transport and Unemployment in Nigeria

From what we can see, in the long-run that there is a positive link between marine transport (MTP) and unemployment (UNE). Economic theory predicts a negative correlation between

MTP and UNE. It is believed that by facilitating trade and economic activity, marine transport helps lower unemployment and supports economic growth, particularly in coastal regions. Marine transport (MTP) have a statistically insignificant effect on unemployment (UNE), according to the p-value of the outcome. Since the research found an insignificant link between marine transport (MTP) and unemployment (UNE), the null hypothesis that there is no relationship between the two is true.

Marine Tourism and Unemployment in Nigeria

From what we can see, in the long-run that there is a positive link between marine tourism (MTR) and unemployment (UNE). Economic theory predicts a negative correlation between MTR and UNE. It is believed that by facilitating trade and economic activity, marine tourism helps lower unemployment and supports economic growth, particularly in coastal regions. Marine tourism (MTR have a statistically significant effect on unemployment (UNE), according to the p-value of the outcome. Since the research found a significant link between marine tourism (MTR and unemployment (UNE), the null hypothesis that there is no relationship between the two is not true.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study examined the impact of blue economy on unemployment in Nigeria. The findings of the study showed that fishery production, aquaculture production, renewable freshwater resources, and marine transport had significant impact on unemployment, based on the findings of the study, it is concluded that blue economy significantly contribute to the economic development in Nigeria.

Recommendations

i. The Federal Ministry of Agriculture and Rural Development prioritize inclusive, eco-friendly fishery and aquaculture programms to boost income, create jobs, and foster long-term development.

ii. The Federal Ministry of Water Resources (FMWR) and the River Basin Development Authorities (RBDAs) should prioritize investments in dams, reservoirs, irrigation systems, and water treatment plants to maximize the availability and efficient use of renewable freshwater resources.

iv. The Nigerian Maritime Administration and Safety Agency (NIMASA) and the National Inland Waterways Authority (NIWA) should support local shipbuilding and ship repair industries through incentives, funding, and training programs.

v. The Federal Ministry of Power, Ministry of Blue Economy, and the Nigerian Electricity Regulatory Commission (NERC) should design integrated policies that link investments in fisheries, aquaculture, renewable freshwater, marine transport, and marine tourism to rural electrification programs, ensuring that gains in the blue economy translate into improved access to electricity.

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