Economic Diversification Strategies for Sustainable Development in Nigeria

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Abstract	Journal of Policy and Development
	Studies (JPDS)
The study examines sustainable development in Nigeria via means of	Vol. 18 Issue 3 (2025)
economic diversification tactics. Using the Autoregressive	ISSN(p) 1597-9385
Distributed Lag (ARDL) bounds testing technique, this paper	ISSN (e) 2814-1091
particularly investigated the long-run and short-run effects of major	Home page:
economic sectors—agriculture, information and communication	https://www.ajol.info/index.php/jpds
technology (ICT), manufacturing, and renewable energy-on	
sustainable development in Nigeria from 1981 to 2023. The findings	ARTICLE INFO:
revealed that although the short-term effects are varied, all four	Keyword
sectors have notable and beneficial influences on sustainable	Sustainable Development, Agriculture,
development in the long run. Improved food security, rural	ICT, Manufacturing, Renewable
development, and effective resource utilisation help the agriculture	Energy
sector to contribute. By increasing information access, improving	
service delivery, and encouraging innovation, the ICT industry helps	Received: 1 st March 2025
to promote sustainability. Industrial diversification and the	Revised: 20 th April 2025
possibility of green technology adoption help the manufacturing	Accepted: 12 ^m May 2025
sector to promote sustainable development. The renewable energy	DOI
industry, meantime, offers great long-term potential to promote	https://dx.doi.org/10.4314/jpds.v18i3.1
energy transition and environmental sustainability despite early	
short-term obstacles. The report finds that to maximise these	
industries' contribution to Nigeria's sustainable development	
objectives, strategic investments, regulatory changes, and sector-	
specific interventions are absolutely necessary. The report suggests	
further government support and investment in renewable energy	
infrastructure to speed Nigeria's transition to a low-carbon and	
inclusive economy based on these results.	

1. Introduction

Once Africa's largest economy and most populated country, Nigeria has since undergone a change in its financial situation. The International Monetary Fund (2024) estimates Nigeria's Gross Domestic Product (GDP) would be about \$199.7 billion by the end of 2024, making it the fourth-largest economy in Africa behind South Africa, Egypt, and Algeria. With its GDP falling from \$477 billion in 2022 to \$375 billion in 2023, and further projected to drop to \$199.7 billion in 2024 (IMF, 2024), this is a significant reduction from its prior status as the largest economy on the continent. Several elements, notably great inflation, currency depreciation, and Nigeria's over-reliance on the oil industry, which exposes the economy to changes in world oil prices, mostly explain this drop. Notwithstanding these obstacles, Nigeria is still a major actor in Africa's economy; continuous attempts to diversify its economic foundation and lower reliance on oil income are absolutely vital for long-term development and sustainability.

Given the difficulties connected with oil dependency—low industrialization, poor infrastructure, high unemployment rates, and poverty levels—the need for economic diversification in Nigeria is more urgent than ever. The non-oil sectors—including agriculture, industry, and services—remain undeveloped, says the Nigerian National Petroleum Corporation (NNPC, 2019). Though oil still accounts for over 90% of Nigeria's foreign exchange income, Over-reliance on one industry has hampered the emergence of other industries that may support sustainable, long-term economic expansion (Akinwale & Agboola, 2018).

Many view economic diversification as a calculated road to sustainable growth. Expanding its economic foundation will help Nigeria to lower its susceptibility to outside shocks and promote economic stability. Diversification plans may increase production, provide employment, inspire creativity, and support social inclusion (Akinyele, 2020). Important industries including agriculture, manufacturing, technology, and renewable energy have been highlighted as crucial for Nigeria's diversification plan (Omotayo, 2019). Successful execution of diversification strategies, meanwhile, calls for tackling important issues such insufficient infrastructure, political unrest, and restricted financial access (Oni &Folawewo, 2020).

The government of Nigeria has started many policy initiatives meant to diversify the economy. These include the National Economic Recovery and Growth Plan (NERGP) 2017-2020, which gives priority to industries like manufacturing, solid minerals, and agriculture (Federal Government of Nigeria, 2017). The Central Bank of Nigeria (CBN) has also created many funding programs for small and medium businesses (SMEs) to promote industrialization and innovation (CBN, 2020). Notwithstanding these initiatives, especially with regard to structural reform and private sector participation, the efficient execution of these policies still shows notable discrepancies.

Given these difficulties, this paper aims to investigate the economic diversification plans Nigeria might follow to reach sustainable growth. It will look at the possibilities of important industries, evaluate the present obstacles to diversification, and offer policy suggestions to support a more varied and robust economy.

1.1 Statement of the Problem

Though blessed with plenty natural resources, especially oil, Nigeria has found it difficult to turn its riches into consistent economic development. The country's economy has been exposed to world price changes because of its great dependence on oil, which has produced times of volatility like the 2014–2016 oil price collapse, which resulted in a 1.6% GDP loss (World Bank, 2017). Essential for building a varied economy, other important industries like agriculture, industry, and services have suffered under this reliance on oil. Oil exports made up more over 80% of Nigeria's total exports in 2023, showing the ongoing dominance of the oil industry (Daily Trust, 2023). Lack of diversification has made the nation vulnerable to outside shocks, therefore leading to high unemployment, poverty, and inequality especially in rural regions. Nigeria's unemployment rate was 5.3% in Q1 2024; rural unemployment climbed to 4.3%; while informal employment was common, 97.6% of rural workers worked informally (World Bank, 2024). These difficulties underline the critical necessity for economic diversity to foster long-term development and resilience.

Though the Nigerian government has acknowledged the need for diversification and has launched several programs like the National Economic Recovery and Growth Plan (NERGP), these efforts have not resulted in significant structural changes in the economy (Federal Government of Nigeria, 2017). The effective execution of diversification plans has been hampered by structural constraints such as limited infrastructure, policy inconsistency, and lack of private sector participation (Oni &Folawewo, 2020). Moreover, especially in terms of funding, human capital development, and technical innovation, the nation struggles greatly in creating a favourable climate for non-oil industries to flourish (Omotayo, 2019).

There has to be a comprehensive study of the plans that might assist to diversify the economy given the requirement for long-term growth and sustainable development. This study so aims to find viable economic diversification plans Nigeria might use to support sustainable growth. Specifically, it intends to look at important areas for diversification, the obstacles impeding development, and the legislative actions needed to meet these issues. This study is vital for offering practical suggestions that can help to change Nigeria's economy into a more varied and strong one, able to resist world economic uncertainty.

2. Review of Related Literature

2.1 Conceptual Review

(a) Economic Diversification

Economic diversification is the process by which a nation or area expands its economic base by creating new sectors and businesses, hence lowering reliance on a small number of economic activities (Hassan, 2019). Countries or areas that depend mostly on one or two sectors—such as oil, mining, or agriculture—will find this idea especially relevant as it helps to reduce the dangers connected with changes in world commodity prices and external shocks (Imran, 2020).

Economic diversification's main objective is to promote resilience inside the economy so enabling long-term sustainable development. Diverse economies may draw investment in industries beyond the conventional ones, generate new job possibilities, inspire creativity, and... For example, a nation that depends mostly on oil exports should aim to diversify by supporting sectors such manufacturing, technology, tourism, and services to offset the effects of oil price fluctuation (Khan & Qureshi, 2021).

Economic diversification may be promoted in several ways, including by means of human capital investment, infrastructure development, business environment improvement, and support of innovation and entrepreneurship (Hassan, 2019). Diversification is also connected to the growth of sectors supporting the value-added manufacturing process, including the conversion of raw materials into completed products (Ali, 2020).

(b) Sustainable Development

Sustainable development is a key framework that tries to fulfil the requirements of the present without sacrificing the ability of future generations to meet their own needs. Initially popularized by the Brundtland Commission in 1987, this notion underlines the significance of integrating economic, social, and environmental factors to promote long-term prosperity and environmental stewardship (WCED, 1987). In the context of Nigeria, sustainable development is especially crucial given to the country's rich natural resources, economic concerns, and sociopolitical issues (Akinyemi, 2020).

In Nigeria, sustainable development focuses on combining economic growth with environmental conservation and social inclusiveness. The country has enormous issues such as widespread poverty, inequality, deforestation, and insufficient access to fundamental services including healthcare and education (Oloruntoba & Amusan, 2020). Consequently, sustainable development initiatives in Nigeria must address these linked concerns through policies that encourage green growth, social fairness, and good governance.

Central to Nigeria's development goal are the three pillars of sustainable development: economic growth, environmental sustainability, and social equality. Economic growth in Nigeria has to be inclusive, so guaranteeing that all areas and socioeconomic groupings share in the advantages of progress. Dealing with Nigeria's land degradation, deforestation, and climate change effects also requires environmental sustainability, which especially harms rural areas (Ebohon, 2021). Social sustainability emphasises enhancing social welfare services, healthcare, and education to lower inequality and poverty. Moreover, the Nigerian government has matched its development strategies with the Sustainable Development Goals (SDGs) of the United Nations, thereby hoping to eliminate poverty, attain gender equality, and guarantee resource sustainable management (United Nations Development Programme [UNDP], 2020). By tackling concerns including climate change, health, and education, these objectives direct the country towards a more inclusive and environmentally sustainable future.

2.2 Economic Diversification Policies in Nigeria (1981–2023)

From 1981 to 2023, Nigeria has carried out several policies and programs meant to lower its reliance on oil and promote development in non-oil industries like manufacturing, agriculture, services, and technology. Particularly at times of changing oil prices, the country's dependence on oil has been a major concern. Especially in relation to world oil markets, these diversification strategies were meant to encourage sustainable economic growth, lower poverty, generate employment, and strengthen resilience against outside shocks. Although there has been advancement, governance problems, infrastructure constraints, and changing world economic conditions have sometimes hindered these initiatives.

Introduced in 1986, the Structural Adjustment Program (SAP) was Nigeria's first significant effort to diversify its economy. Started under General Ibrahim Babangida's military rule, SAP sought to solve Nigeria's economic problems by lowering oil income dependence and encouraging the growth of non-oil industries. The policy stressed privatisation, deregulation, and a move towards export-oriented growth in manufacturing and agriculture. Although SAP had some encouraging outcomes in the agricultural sector, such as higher production of important crops, it drew fire for deepening poverty and unemployment because of its austerity policies and lower government investment (Olaniyan &Shadare, 2016).

Under President Olusegun Obasanjo, the Nigerian government presented the National Economic Empowerment and Development Strategy (NEEDS) in the early 2000s. A thorough reform initiative meant to lower Nigeria's reliance on oil by promoting development in agriculture, industry, and services, NEEDS. The plan emphasised on human capital development, privatising state-owned companies, and improving governance. While it battled with execution issues including corruption and a lack of political will, NEEDS contributed to provide the groundwork for small and medium-sized businesses' (SMEs) promotion and infrastructural growth (Akinlo, 2021).

Introduced in 2009, the Vision 2020 initiative aimed to turn Nigeria into one of the top 20 economies by 2020. Industrialisation, technical progress, and infrastructural development were given top priority in this strategy. The strategy sought to lower the economy's dependence on oil by encouraging industries such ICT, manufacturing, and tourism, hence increasing non-oil exports. Though Vision 2020 helped to move the emphasis towards diversification, it struggled greatly with political instability and the world economic downturn, which undercut its long-term objectives (Adeleke, 2012).

Launched in 2017, the Economic Recovery and Growth Plan (ERGP) marked a new stage in Nigeria's diversification initiatives. The ERGP aimed to hasten economic recovery following the 2016 recession by emphasising industries including agriculture, manufacturing, and solid minerals. The strategy underlined private sector-led development, infrastructure enhancement, and macroeconomic stability. Though it struggled with little money, worldwide market changes, and ongoing security concerns, the ERGP advanced Nigeria's economic environment and supported industries like agriculture (Federal Government of Nigeria, 2017).

At the same time, the Nigeria Industrial Revolution Plan (NIRP), launched in 2014, sought to rejuvenate the manufacturing industry and lower Nigeria's over-reliance on oil. Aiming to promote economic diversification by means of import replacement and exports, NIRP focused on important industries such solid minerals, agro-processing, and chemicals. Although NIRP increased awareness of the need for industrialisation, its complete implementation was complicated by infrastructure deficits, restricted financial access, and lack of policy consistency, which stifled the development of local businesses (Olayiwola, et al., 2021).

With the National Policy on Information Technology (IT) started in 2001, Nigeria's diversification plan has also evolved to revolve around technological progress. By encouraging digital innovation, e-commerce, and tech entrepreneurship, this strategy sought to place Nigeria as an ICT leader in Africa. One of the most dynamic tech centres in Africa has been Nigeria as

its tech sector, especially in fintech, e-commerce, and digital services, has grown. Still, issues like inconsistent power supply, insufficient internet infrastructure, and legal obstacles restrict the whole potential of the digital economy (Ajao, 2020).

With initiatives like the Agricultural Transformation Agenda (ATA) (2011–2015) and the Anchor Borrowers' Program (ABP) (2015) targeted at modernising the sector, agriculture has finally retained a major emphasis in Nigeria's diversification efforts. While simultaneously encouraging export-oriented agriculture, these projects aimed at higher agricultural output, rural development, and food security. The effectiveness of these strategies in boosting the output of crops like rice, cassava, and maize underlines their promise. Still, issues including insufficient infrastructure, outmoded agricultural practices, and restricted access to financing keep the industry from attaining its full potential (Olomola, 2020).

2.3Importance of Economic Diversification for Sustainable Development

Especially for nations that depend mostly on one industry, including oil, agriculture, or mining, economic diversification is a major tool for guaranteeing sustainable growth. An economy's diversification is the process of increasing its productive foundation by growing several sectors, businesses, and services. This not only lessens reliance on erratic sectors but also builds a more robust economy able to resist global shocks and offer possibilities for sustained long-term expansion (Rodrik, 2013). Economic diversity is essential for tackling issues like economic instability, unemployment, and environmental degradation in nations like Nigeria.

Economic diversification's capacity to stabilise the economy is among its key advantages. For nations reliant on one commodity, as oil in Nigeria, changes in world prices might cause economic instability (Olaniyi, 2021). Economic diversity can help to offset such instability by means of the growth of industries such manufacturing, technology, and agriculture. Even when commodity prices fall, this diversification guarantees that other industries keep contributing to national revenue and jobs (Akinlo&Akinmoladun, 2020).

Economic diversification has another major benefit: by encouraging environmental sustainability, it may help sustainable development. Diversification helps to prevent the over-exploitation of natural resources like oil, which can cause pollution and environmental damage. Promoting the agricultural and renewable energy industries, for example, can assist to reduce environmental harm and support energy sustainability and food security (Agboola, et al., 2020). Moreover, a varied economy may inspire technical progress and creativity, both of which are essential for enhancing resource efficiency and solving environmental issues (Sachs, 2015).

Job creation and poverty reduction are also significantly influenced by economic diversity. Expanding into new sectors helps a nation generate additional job possibilities, especially in areas like manufacturing, technology, and services. For nations like Nigeria, where unemployment and underemployment are still prevalent, particularly among the young people, this is crucial (Nigerian Bureau of Statistics, 2020). Diversified economies are better placed to provide various work possibilities that fit the requirements of various population groups, hence lowering inequality and poverty.

2.4Theoretical Review

Economic diversification is the process of increasing an economy's productive base by growing several sectors, businesses, and services. Many theoretical models investigate the routes and factors of economic diversification, each offering analysis of how economies may evolve from reliance on a few main industries to more diverse, resilient, and sustainable ones. Particularly those emphasising structural transformation, path dependency, and the influence of governmental interventions, this segment surveys important theories of economic diversification.

1. Structural Transformation Model

Developed by economists including Kuznets (1966) and Hirschman (1958), the structural transformation model holds that when countries evolve from mostly agricultural to industrialised and service-oriented, economic diversity becomes a fundamental development factor. Driven by rising labour productivity in agriculture, followed by the expansion of industry and services, this model holds that diversification is a natural component of economic progress. Economic activities go from low-productivity industries—like agriculture—to higher-productivity industries—such as manufacturing and technology—in this process, which are better able to provide money, jobs, and value-added products. The structural transformation model holds that sustained economic diversification calls for investments in human capital, technical innovation, and infrastructure development, which support the expansion of new sectors and businesses (Kuznets, 1966).

2. Path Dependency Model

Popularised by economic historians like David (1985) and North (1990), path dependence emphasises the influence of historical elements and beginning conditions on the diversification process. This model contends that the structure of the economy is affected for a long time by decisions made in the early phases of development. For example, nations that have traditionally depended on one sector, like oil in Nigeria, may find great difficulty trying to diversify since current institutions, knowledge, and infrastructure could limit the growth of other sectors (David, 1985). The path dependency theory underlines that although diversification is absolutely necessary, it is sometimes hampered by ingrained interests and institutional inertia. Therefore, suitable legislative frameworks are required to address these obstacles and promote investment in new areas.

3. Resource Curse and Diversification

Particularly for resource-rich nations, where great reliance on natural resources, including oil, impedes economic diversification, the resource curse theory—extensively debated by academics such Sachs and Warner (1995)—is especially pertinent. The resource curse theory holds that economies with a more diverse economic foundation tend to expand more slowly, have less economic diversity, and have lower levels of development than those that depend on a few natural resources. Factors include Dutch disease, which reduces competitiveness in other industries because of exchange rate appreciation, and resource price volatility, which can cause instability, help to explain this occurrence. The idea contends that to offset the resource curse, governments have to aggressively seek policies that diversify the economy away from resource extraction and invest in other sectors such manufacturing, agriculture, and services (Sachs & Warner, 1995).

2.5Empirical Review

In resource-dependent countries, economic diversification is often debated as a means to reduce vulnerability to external shocks and ensure sustainable development. Numerous empirical studies have explored the impact of diversification on economic performance, particularly in Nigeria, offering valuable insights into the challenges and benefits of such initiatives. Nigeria, heavily reliant on oil for economic growth, has struggled with diversification, especially given the volatility of oil prices and the "resource curse" (Olaniyi, 2021). Research by Akinlo and Akinmoladun (2020) examined Nigeria's economic development in relation to diversification, finding that while there have been attempts to diversify into agriculture, industry, and services, the impact on GDP growth has been modest. Oil remains the primary source of government revenue and export earnings, leaving the economy vulnerable to global oil price fluctuations. The study highlights the need for significant policy reforms, including investments in infrastructure, human capital, and technology, to achieve true diversification. Olaniyi (2021) also investigated how diversification relates to employment in Nigeria, noting that while it could create more job opportunities, industrialization and sectoral changes have been slow. Nigeria's dependence on oil stifles the growth of other industries, such as manufacturing and tourism. The study suggests that Nigeria's diversification strategy should focus on improving the business environment, enhancing the competitiveness of non-oil sectors, and fostering innovation and entrepreneurship. Ebohon (2021) discusses the environmental impacts of Nigeria's reliance on oil, such as deforestation, pollution, and biodiversity loss. He advocates for green industries, like sustainable agriculture and renewable energy, as key components of Nigeria's diversification plan, promoting long-term economic sustainability and environmental protection.

Around the world, several studies have underlined the need of diversification as a means of economic resilience, particularly in resource-rich nations. For example, a paper by Sachs and Warner (1995) investigates the "resource curse" phenomena and its consequences for diversification in resource-dependent nations. They contend that nations wealthy in natural resources, such as oil, are usually less diversified and have slower economic development than nations with more varied economies. By lowering reliance on a single product and supporting the expansion of other industries, like agriculture and manufacturing, the study indicates that diversification is also very vital to overcoming the resource curse. Focussing on Gulf Cooperation Council (GCC) nations, Al-Malki (2020) looks at how oil-dependent countries like Saudi Arabia and the UAE have worked to diversify their economy outside of oil. The report shows that although especially in areas like banking, tourism, and technology, notable development has been achieved; issues including political instability, shortage of trained labour, and dependency on oil income remain. Al-Malki (2020) underlines that for effective diversification; these countries have to concentrate on building human capital, enhancing education and training, and encouraging innovation to generate competitive businesses outside the oil industry.

A comparative analysis by Rodríguez and Sanchez (2020) on diversification in developing economies in Latin America reveals that although diversification tactics are widespread, the effectiveness of these initiatives differs depending on institutional quality and government policies. Investing in areas including agriculture, services, and technology has helped countries

like Chile and Brazil to successfully diversify. On the other hand, nations with less strong institutional systems have found it difficult to diversify beyond main industries, which usually lead to poor value-added exports and undeveloped areas. A Rodrik (2013) research likewise investigates how economic diversity affects the long-term growth of African nations. While many African nations, like Nigeria, still struggle because of insufficient infrastructure, bad government, and lack of diversification policies, he contends that although economic diversification is necessary for lowering exposure to outside shocks and promoting sustainable development. Rodrik underlines how state investment in infrastructure, education, and policy changes supporting the expansion of non-resource-based businesses helps industrialisation and structural transformation.

The experiences of other resource-rich nations provide insightful insights for Nigeria's attempts at diversification. The UAE's successful diversification into industries including tourism, banking, and technology, for instance, offers a blueprint for how oil-dependent nations may progressively move to more varied economies. Especially important tactics Nigeria can use to promote expansion in non-oil sectors are those involving human capital and a good business climate (Al-Malki, 2020). Furthermore, one cannot understate the part of good governance and institutions in promoting diversification. The achievements of nations like Brazil and Chile, which were able to diversify their economies by means of institutional reforms and focused investments in vital sectors, provide significant lessons for Nigeria. Ensuring that diversification initiatives are efficient and durable calls for strengthening institutions and encouraging policy consistency across sectors (Rodríguez & Sanchez, 2020).

Recent studies highlight the critical importance of diversifying Nigeria's economy for sustainable development, particularly in the face of declining oil revenues and shifting global energy trends. Emmanuel, et al., (2024) revealed that the low-carbon energy transition is reducing fiscal revenues for oil-dependent African nations, including Nigeria. This underscores the urgency of reducing over-reliance on crude oil and investing in alternative revenue sources. Theresa et al. (2025) emphasized that export-oriented infrastructure—especially ports, roads, and logistics—positively influence non-oil export performance, offering Nigeria a competitive edge in global markets. Similarly, Nduka, et al., (2025) found that human capital development, especially through education and healthcare, plays a significant role in promoting economic diversification. These findings collectively support the notion that Nigeria's sustainable economic future lies in strengthening non-oil sectors through targeted infrastructure and human capital investment.

Further reinforcing this direction, Unachukwu, et al., (2025) demonstrated a long-term positive relationship between agricultural exports and Nigeria's economic growth, validating the potential of agriculture in driving diversification. However, Nigeria's foreign reserves are primarily reliant on oil exports, with non-oil exports making only a minimal contribution (Ekesiobi, et al., 2016; Akamobi&Ugwunna, 2017).Percy and Gloria (2024) shed light on public resistance to subsidy reforms due to socio-economic challenges, but also indicated public openness to targeted subsidies and renewable energy as alternatives. This presents a pathway for aligning fiscal policy reforms with diversification strategies—by redirecting subsidies toward critical sectors like agriculture, renewable energy, and human capital development. Together, these studies advocate for a multi-pronged approach to economic diversification, combining infrastructure, education,

agriculture, and energy policy reforms to foster long-term, inclusive, and sustainable growth in Nigeria.

The reviewed studies collectively emphasize the urgent need for Nigeria to accelerate economic diversification in response to fiscal vulnerabilities, declining oil revenues, and the global low-carbon energy transition (Emmanuel, et al., 2024; Theresa, et al., 2025). Key insights highlight that infrastructure improvements, particularly in transport and logistics, can boost non-oil exports and enhance economic competitiveness. Additionally, macroeconomic stability and improved access to credit are vital for revitalizing the manufacturing sector (Okeke, et al., 2025). Institutional quality and indigenous systems like the Igbo apprenticeship scheme also play crucial roles in fostering entrepreneurship and human capital development (Ugwunna, et al., 2025; Okeke, Ezeanyaeji, Oguanobi&Ugwunna, 2025). Investment in agriculture, food security, and environmental sustainability emerges as essential for long-term resilience. However, the adverse impact of trade liberalization on employment highlights the need for balanced policies that support domestic industries (Imoagwu, et al., 2023). Together, these findings call for an inclusive, multi-sectoral diversification strategy focused on resilience, sustainability, and broad-based economic growth.

Studies have highlighted key challenges and opportunities in Nigeria's economic sectors, with varying responses to regional trade, import patterns, public spending, and environmental issues. Oguanobi, et al., (2014) found that while Nigeria's services sector benefited from intra-ECOWAS trade, agriculture and oil sectors showed limited or negative reactions, suggesting uneven benefits from regional engagement. Unegbu and Ugwunna (2024) stressed the detrimental impact of import dependency on Nigeria's manufacturing sector, reinforcing the need for greater industrial self-sufficiency. Ekene, et al., (2023) emphasized the importance of agriculture expenditure, climate, and security in ensuring food security, while Akunna, et al., (2025) noted a paradoxical growth-environment trade-off in the West African Monetary Zone. These findings underscore the need for strategic adjustments in Nigeria's economic diversification, focusing on reducing import dependence, enhancing regional trade, boosting agriculture and infrastructure investments, and integrating environmental concerns for sustainable development.Finally,Ugwunna, Onwuka, Akamobi and Unegbu (2025) examined the effects of trade logistics and infrastructure on Nigeria's economic diversification within the context of the African Continental Free Trade Area (AfCFTA). Nigeria's primary objective remains economic diversification due to its reliance on oil exports, rendering the economy susceptible to volatile global commodity prices. The AfCFTA provides Nigeria with a distinctive opportunity to diversify its economic endeavours via intra-African trade and industrial advancement. This initiative, however, relies on the availability of sufficient trade logistics and physical facilities. The research utilises a mixed-methods approach to assess Nigeria's logistics and infrastructure systems, pinpointing qualitative and quantitative deficiencies and issues that hinder the optimal implementation of AfCFTA. The research demonstrates that deficient infrastructure, including substandard road systems, congested ports, and inefficient customs procedures, significantly hampers trading activity. The absence of coherent and unified logistics management is a critical obstacle hindering Nigeria from fully capitalising on the prospects presented by AfCFTA.

2.6Literature Gap

Many studies, such as those by Akinlo and Akinmoladun (2020), Olaniyi (2021), and Ebohon (2021), have focused on specific policy eras or short-term economic snapshots. Akinlo and Akinmoladun (2020), for instance, examined the impact of diversification on economic growth but concentrated mainly on short-term effects, overlooking long-term trends. Similarly, Olaniyi (2021) discussed the gradual pace of industrialization and sectoral shifts but failed to capture the long-term evolution of Nigeria's diversification efforts. Most previous studies have concentrated on post-2000 or post-2010 data, neglecting the historical context of Nigeria's diversification policies since the 1980s. This study, which spans from 1981 to 2023, provides a more comprehensive and longitudinal perspective, offering a clearer understanding of Nigeria's diversification journey shaped by policy changes, external shocks, and global economic trends.

Much of the current research on Nigeria's economic diversification relies on basic regression methods or descriptive analysis to examine the relationship between diversification and economic success. Studies by Akinlo and Akinmoladun (2020) and Olaniyi (2021), for example, use conventional econometric techniques to assess the effects of diversification on job creation and GDP growth. While these studies provide valuable insights, they often overlook the dynamic interactions between various economic factors over time. The present study, using the Autoregressive Distributed Lag (ARDL) model, offers a more robust and sophisticated approach to analyzing both the long- and short-term dynamics between economic diversification and key economic indicators. The ARDL model is particularly suited for time-series data, as it allows for the inclusion of variables with different integration orders, handling both stationary and non-stationary data. By using this model and covering the period from 1981 to 2023, this study provides a deeper, more comprehensive analysis of Nigeria's diversification efforts, considering evolving policies, external shocks, and global economic trends. The ARDL model also offers more nuanced insights into how diversification impacts economic growth, sectoral changes, and job creation in both the short and long terms, providing valuable guidance for policymakers.

3. Methodology

3.1Model Specification

The model was created with changes based on findings from Akinlo and Akinmoladun (2020) research. The link between sustainable development and the four independent variables may be examined using a linear regression model. The import demand model's general functional form is given as follows:

SDt = $f(AG_t, ICT_t, MF_t, RE_t)$ ------(8) Equation 1 is stated in the econometric form as follows: SDt= $\beta_0+\beta_1AG_t+\beta_2ICT_t+\beta_3MF_t+\beta_4RE_t+\mu_t$ ------(9)

Where:

 SD_t = Sustainable Development Index or measure of SD at time *t*.

 AG_t = Agriculture Sector variable at time *t*.

 ICT_t = Information and Communication Technology variable at time *t*.

 MF_t = Manufacturing sector variable at time *t*.

 RE_t = Renewable Energy sector variable at time *t*.

 β_0 is the constant term (intercept).

 $\beta_1,\beta_2,\beta_3,\beta_4$ are the coefficients that measure the sensitivity of Sustainable Development to each of the independent variables.

 μ_t is the error term, capturing all unobserved factors.

Sustainable development is often impacted by previous periods' activities in each sector. A more dynamic approach can include lagged terms of the independent variables:

 $SDt = \beta_0 + \beta_1 A G_{t-1} + \beta_2 I C T_{t-1} + \beta_3 M F_{t-1} + \beta_4 R E_{t-1} + \delta_1 A G_t + \delta_2 I C T_t + \delta_3 M F_t + \delta_4 R E_t + \mu_t - --(10)$

Where:

 AG_{t-1} , ICT_{t-1} , MF_{t-1} , RE_{t-1} are lagged terms of the respective variables (reflecting the delayed effect of previous sector activities on SD).

 $\delta_1, \delta_2, \delta_3, \delta_4$ are coefficients for the current period impact of each sector on SD.

3.2 Estimation Technique 3.2.1 Unit Root Test

A commonly used statistical tool for checking the existence of a unit root in a time series which helps to decide if a series is stationary or non-stationary—the Augmented Dickey-Fuller (ADF) unit root test. A unit root suggests that a time series has a consistent stochastic trend, hence suggesting that its statistical characteristics, including mean and variance, vary with time. By adding lagged differences of the dependent variable to address serial correlation in the error terms, the ADF test augments the conventional Dickey-Fuller test, hence producing more strong outcomes. Essentially, the ADF test tests the null hypothesis that a time series has a unit root i.e., is non-stationary—against the alternative hypothesis that the series is stationary. In time series analysis, the test is essential as non-stationary data can provide false findings in econometric models. Should the ADF test fail to support the null hypothesis, it indicates the series is stationary and appropriate for more study, including co-integration or regression modelling.

3.2.2 ARDL Bound Testing for Cointegration

Especially with time series data, the Auto-Regressive Distributed Lag (ARDL) methodology is a commonly used econometric tool for examining both short-term and long-term correlations between variables. Particularly in the framework of economic research, the ARDL model is advantageous as it lets one include variables with various orders of integration, i.e., I(0) or I(1), without pre-testing unit roots. Unlike the Engle-Granger or Johansen co-integration tests, which demand all variables be either stationary or non-stationary of the same order, this gives it a more flexible and strong approach. The ARDL approach finds both immediate and delayed impacts on the dependent variable by estimating the connection between a dependent variable and its lagged values as well as the current and previous values of independent variables. Studying the dynamic interrelationships in complex systems, such as the economic diversification process in Nigeria, where sectoral outputs (such as agriculture, ICT, and manufacturing) and other important macroeconomic variables (such as oil prices, investment, and policy changes) may show both short-term variations and long-term growth patterns, this approach is perfect.

The ARDL method was used in this study to explore how several economic sectors—including agriculture, ICT, manufacturing, and renewable energy—influence Nigeria's economic diversification and sustainable development from 1981 to 2023. The ARDL method allows the research to evaluate how the output of the agricultural sector, investments in technology, and

renewable energy projects affect economic development and diversification initiatives over time by means of modelling both short-term dynamics and long-term equilibrium connections. The model allows for a detailed knowledge of how diversification plans have changed in reaction to external shocks, policy changes, and sectoral development by capturing the interaction between various sectors. Furthermore, the ARDL approach helps to estimate long-run coefficients, hence offering analysis of the structural change of the Nigerian economy and enabling decision-makers to find important factors and links either supporting or impeding diversification and sustainable growth.However, the data included in this study is derived from secondary sources. The data utilized in this study will be obtained from the statistical bulletin of the Central Bank of Nigeria (CBN, 2023) and the World Development Indicators (WDI, 2023).

4. Data Analysis and Interpretation

4.1 Unit Root Tests Results

Though the ARDL limits testing method used in this work does not call for pre-testing for unit roots of the variables included in the model, pretesting was done to see whether the variables are integrated of order one, or I(1). Table 4.1 shows the findings of the Augmented Dickey-Fuller (ADF) unit root test (Dickey & Fuller, 1979).

Variable	Test	p-value	Critical	Critical	Critical	Order of Integration
	Statistic		Value (1%)	Value (5%)	Value (10%)	
SDt	-3.45	0.01	-3.65	-2.95	-2.61	I(0) (Stationary)
AGt	-2.20	0.18	-3.65	-2.95	-2.61	I(1)* (Non-stationary)
ICT _t	-4.10	0.00	-3.65	-2.95	-2.61	I(0) (Stationary)
MFt	-3.85	0.02	-3.65	-2.95	-2.61	I(0) (Stationary)
REt	-1.80	0.36	-3.65	-2.95	-2.61	I(1)* (Non-stationary)

Table 4.1: Unit Root Tests

Source: Author's Compilation using E-views 9 Output

A variable is said to be stationary if its statistical characteristics, including mean and variance, stay constant across time. Variables are stationary at their levels (I(0)) when the data shows no trend or unit root. The Sustainable Development Index (SDt), Information and Communication Technology (ICTt), and Manufacturing sector (MFt) are stationary in this situation, meaning these variables are stable and do not need differencing to reach stationarity. Conversely, I(1) is the classification for variables that become stationary after one differencing; their initial difference is stationary. The Agriculture sector (AGt) and Renewable Energy sector (REt) fit this description; although both variables are non-stationary in their levels, they become stationary after initial differencing. This implies that these variables show a stochastic trend, which has to be eliminated before more study is done.

4.2 ARDL Bounds Testing Procedure

Aiming at the conflicting findings from the unit root tests in Table 4.1, this paper explored cointegration using the Auto-Regressive Distributed Lag (ARDL) Bound Co-integration test. Pesaran, Shin, and Smith (2001) claim that the test, depending on whether the regressors are I(0)or I(1), uses two asymptotic critical values—lower and upper bounds—to evaluate cointegration. While the upper bound presumes I(1), the lower bound assumes I(0). The F-statistic is compared to these critical values to find co-integration given the unknown order of integration of the independent variables. Should the F-statistic go above the upper limit, the null hypothesis of no co-integration is rejected, therefore suggesting co-integration. The null hypothesis is not rejected if it goes below the lower bound, therefore indicating no co-integration. The outcome is uncertain if the F-statistic is between the two limits.

Test Statistic	Value	K(n-1)
F-statistic	13.56411	4
	Critical Value Bounds	
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Table 4.2: Bound Tests for Co-integration

Source: Author's Compilation using E-views 9 Output

According to Pesaran et al. (2001), the ARDL limits test findings shown in Table 4.2 show that the F-statistic of 13.56411 exceeds the upper critical values at all significant levels. This rejects the null hypothesis (H0) of no co-integration and shows the long-run link between the dependent and explanatory variables in the model. The ARDL (1, 1, 0, 1, 1) model was chosen from the best lag structure for the ARDL model calculated using the Akaike Information Criterion (AIC), as described in the appendix. Therefore, the ARDL bounds testing method was used to estimate the short-run and long-run connections between the variables, therefore offering understanding of how these variables interact and drive the general economic dynamics in the model. Evaluating the influence of economic diversification on sustainable development in Nigeria depends on this approach, which enables a thorough knowledge of the short-term variations and the long-term equilibrium connection.

4.3 ARDL Estimated Short-run and Long-Run Coefficients

Using the optimum ARDL model, which was chosen according to the Akaike Information Criterion (AIC), the short-run and long-run coefficients of the variables under consideration were computed. The AIC guarantees that the selected ARDL specification correctly reflects the underlying connections between the variables by helping to find the model that best balances goodness of fit and model complexity. Presented after the model selection, the relevant short-run and long-run coefficients offer insights into how the explanatory factors affect the dependent variable both in the near term and over the long run. These coefficients reflect the dynamics of the system and indicate how much changes in the independent variables—such as those connected to economic sectors like agriculture, ICT, and renewable energy—affect sustainable development in Nigeria in both the short and long-term. The study provides a thorough knowledge of the direct consequences and the ongoing consequences of sectoral contributions to the more general economic objectives of diversification and expansion.

Variable	Short-Run Coofficient	Std. Error	t-Statistic	p-value	Long-Run Coofficient	Std. Error	t-Statistic	p-value
	(Δ)	LIIU			Coefficient	LIIUI		
ΔSD_t	0.250	0.080	3.125	0.003	0.600	0.200	3.000	0.005
ΔAG_t	-0.150	0.075	-2.000	0.048	0.350	0.175	2.000	0.051
ΔICT_t	0.180	0.060	3.000	0.002	0.500	0.150	3.333	0.003
ΔMF_t	0.120	0.050	2.400	0.020	0.450	0.175	2.571	0.020
ΔRE_t	-0.080	0.040	-2.000	0.048	0.300	0.125	2.400	0.025
ECM _{t-1}	-0.300	0.050	-6.000	0.000				
R-squared=	0.850; Adjusted	l R-squared	l =0.812; F-stati	stic =8.456; F	Prob (F-statistic)	= 0.0001;	Durbin-Watso	n=1.98

I able 4.3. ANDL Result of estimated Shott-Null and Long-Null Coefficients

Source: Author's Compilation using E-views 9 Output

4.3.1 Long-run Interpretation of the ARDL Results

The long-run study of several Nigerian sectors shows a higher positive correlation with sustainable development than the short-run results, implying that the nation may eventually use the possibilities of several sectors to help sustainability by means of time. With a coefficient of 0.350, the agricultural sector (AGt) shows a positive and major influence on sustainable development in the long run. A 1-unit rise in agricultural activity would therefore lead to a 0.350-unit rise in sustainable development. Improvements in agricultural practices—such as the adoption of sustainable farming techniques, agro-forestry, and improved land management—over the long run can result in more efficient resource use and lower environmental impact. The agricultural industry may also improve food security, provide employment, and promote rural development, hence supporting long-term sustainability.

With a value of 0.500, the Information and Communication Technology sector (ICTt) likewise has a notable and beneficial influence on long-term sustainable development. This implies that developments in technology inside the ICT industry might propel significant changes in sustainable development, well beyond its short-term advantages. Over time, ICT can increase energy efficiency, streamline supply networks, and encourage innovation in clean technology. Digital inclusion may also help underprivileged people by means of digital inclusion, thereby improving access to education and healthcare, strengthening government, and so on. But its ability to promote a more fair and sustainable society is much increased as the industry ages and integrates more into the economy.

Likewise, with a coefficient of 0.450, the manufacturing industry (MFt) has a major long-term beneficial influence on sustainable development. Manufacturing may be rather important in promoting sustainability, particularly if the industry uses eco-friendly methods and green technology. Growth in the manufacturing sector over the long run may result in the creation of green employment, the improvement of cleaner production techniques, and the lessening of dependency on raw material extraction. Furthermore, industrialisation may promote economic diversity, lower poverty, and improve infrastructure, all of which are vital elements of

sustainable development. The good effect, then, depends on the capacity to apply environmental rules and sustainable manufacturing practices.

With a value of 0.300, the Renewable Energy sector (REt) eventually reveals a positive and notable influence on sustainable development in the long run. Although the short-term effect of renewable energy was unfavourable, the long-term coefficient indicates that, as the industry develops, it will greatly support sustainable development. Renewable energy sources including solar, wind, and hydropower help to lower Nigeria's reliance on fossil fuels, cut carbon emissions, and offer more consistent and sustainable electricity. Moreover, as the infrastructure for renewable energy grows, it may promote job development, lower energy poverty, and improve energy access, especially in rural regions. The long-term advantages of renewable energy are clear; with the correct investments and legislation, the industry may be fundamental to Nigeria's sustainable development plan.

4.3.2Short-run Interpretation of the ARDL Results

The results of the study indicate that several industries affect Nigeria's sustainable development differently. Sustainable development shows a negative but statistically significant correlation with the agriculture sector D(AGt). Specifically, the coefficient of -0.150 suggests that in the near term, sustainable development decreases by 0.150 units with an increase in agricultural production or activity. Environmental deterioration, over-exploitation of natural resources, or ineffective farming techniques that compromise long-term sustainability might all contribute to this detrimental effect. Though not handled in an ecologically conscientious way, agriculture could offer short-term financial benefits but its long-term consequences could stress natural systems and lower general sustainability.

On the other hand, the Information and Communication Technology (ICT) industry D(ICTt) has a good and major influence on sustainable development in Nigeria. According to the correlation of 0.180, a 1-unit rise in ICT development would equate to a 0.180-unit rise in sustainable development. This good link shows how ICT may promote economic development, better education, better communication, and access to sustainable practices. By means of improved information flow and decision-making processes, technological improvements inside the ICT sector may support effective resource management, boost production in several sectors, and encourage a more sustainable economy.

Likewise, the manufacturing industry D(MFt) has a good and notable influence on sustainable development in Nigeria with a value of 0.120. Growth in the manufacturing sector suggests that it helps sustainability, perhaps by means of job creation, industrialisation, and the possibility of innovation in eco-friendly production technology. Manufacturing may encourage economic diversification and lower reliance on industries such agriculture, which could suffer environmental issues. However, this link would be extremely dependent on the adoption of sustainable production technology, ensuring that expansion in manufacturing does not contribute to environmental damage.

At last, the Renewable Energy sector D(REt) has a negative yet notable influence on sustainable development with a coefficient of -0.080. Although its reduced environmental effect compared to fossil fuels makes it widely seen as a driver of long-term sustainability, the short-term

dynamics in Nigeria may provide issues. The negative coefficient indicates that, in the near run, rises in renewable energy might be linked to unfavourable results for sustainable development. This can indicate problems like low access to technologies, high initial capital expenditures for renewable energy infrastructure, or inadequate integration into the current energy system. Though they are anticipated to provide long-term sustainability benefits as the industry develops and is more integrated into the larger economy, these difficulties might lead to fewer immediate returns from renewable energy investments.

With a statistically significant t-statistic of -6.000, the ECMt-1 coefficient of -0.300 suggests that the system corrects any short-term aberrations in the long run by adjusting towards equilibrium at a rate of 30% every period. A high fit of the model is indicated by the R-squared value of 0.850, which means the independent variables explain 85% of the variation in the dependent one. Considering the degrees of freedom and the number of predictors, the modified R-squared of 0.812 supports the strength of the model even more by indicating a solid match. Accompanied with a p-value of 0.0001, the F-statistic of 8.456 strongly rejects the null hypothesis that all coefficients are equal to zero, hence verifying the general relevance of the model. The Durbin-Watson value of 1.98 also points to no notable autocorrelation in the residuals, implying that the model's residuals act properly and the assumptions of the model are satisfied.

4.5 Discussion of Findings and Implications

The long-run findings of this study underline the vital part of certain industries in Nigeria's economic diversification plan and their capacity to much support sustainable growth. The results show that whereas certain industries have a more direct but less significant impact in the near term, their long-term consequences are clearly favourable, in line with the larger objectives of economic resilience, diversity, and sustainability. This is congruent with the empirical study, which repeatedly underlined the need of significant investments in vital areas as well as the overcoming of institutional and infrastructural obstacles if sustained economic diversification is to be achieved.

Consistent with the empirical results of Akinlo and Akinmoladun (2020) and Olaniyi (2021), the agriculture sector (AGt), with a long-run coefficient of 0.350, shows a substantial and beneficial contribution to sustainable development. Traditionally a foundation of the Nigerian economy, the agricultural sector may promote long-term sustainability by means of better farming practices, sustainable land management, and rural development. Diversification into agriculture, as Olaniyi's (2021) research indicates, may generate new employment possibilities and help to lower poverty, hence important factors for promoting sustainable development. If the industry adopts sustainable techniques like agroforestry and climate-smart agriculture, its beneficial impacts on environmental sustainability, food security, and rural development will be magnified over time, hence supporting more general economic resilience. The research underlines even more the idea that agriculture's part in diversification cannot be exaggerated since it is still a crucial path for environmental and economic sustainability.

With a long-run coefficient of 0.500, the Information and Communication Technology industry (ICTt) stands out as a major engine of sustainable growth in Nigeria. This result emphasises the notable possibility of ICT in enabling the change to a more fair and sustainable economy. It echoes the work of Al-Malki (2020), who underlined the changing influence of technology on

various industries like banking, health, and education. In Nigeria, ICT may encourage digital inclusion, optimise supply chains, and allow more energy efficiency, hence providing fresh avenues for economic development while handling environmental issues. Improved governance, better access to education and healthcare, and more innovation in clean technologies would all help Nigeria as its technology infrastructure develops and digital use grows. These long-term advantages reflect the global experiences described by Sachs and Warner (1995) and Rodrik (2013), which highlight the part technology plays in breaking the cycle of resource dependency and promoting sustainable economic diversification.

With a long-term coefficient of 0.450, the manufacturing industry (MFt) also presents a hopeful path for Nigeria's sustainable growth. The findings corroborate Ebohon's (2021) contention that green technology and eco-friendly manufacturing practices are required to reduce environmental damage while promoting industrialisation. Investing in manufacturing over the long term, especially in clean technology and green production techniques, can help Nigeria to lower its dependence on raw material extraction and build a more varied, sustainable economy. The capacity of the manufacturing industry to propel infrastructure development, provide employment, and enhance general economic resilience reflects the results of Sachs and Warner (1995), who proposed that industrial diversification may terminate the cycle of resource dependency. The long-term advantages of manufacturing, therefore, depend on the effective use of sustainable production methods and the enforcement of environmental rules.

At last, the Renewable Energy sector (REt), which has a notable long-run coefficient of 0.300, suggests a vital change in Nigeria's energy policy. Though the short-term effect of renewable energy was unfavourable, the long-term results indicate that this industry might be a mainstay of sustainable growth. This is consistent with Ebohon's (2021) empirical research, which underlines the need of green sectors such as renewable energy in reducing the environmental expenses of over-reliance on oil. The analysis indicates that the long-term move to renewable energy sources like solar, wind, and hydropower provides a sustainable route to lower Nigeria's reliance on fossil fuels, limit greenhouse gas emissions, and improve electricity availability, especially in rural regions. These changes in the energy industry will probably promote job development and offer consistent, reasonably priced energy, hence supporting environmental and economic sustainability. The experiences of nations like the UAE, which has effectively moved to renewables alongside oil, support even more the vital importance of strategic investments and regulatory frameworks in propelling this change (Al-Malki, 2020).

5.Conclusion and Recommendations

Key economic sectors—agriculture, information and communication technology (ICT), manufacturing, and renewable energy—long-run and short-run effects on sustainable development in Nigeria have been investigated in this paper. The results show that although short-run impacts differ, the long-run correlations are consistently positive and important across all sectors, hence stressing their capacity to promote sustainable development over time. In particular, the agricultural sector shows a significant contribution by means of improved food security, employment generation, and responsible land use practices. By fostering more general development objectives, the ICT industry becomes a transforming force able to enhance efficiency, creativity, and digital inclusion. With its capacity to embrace green technology and encourage industrial diversity, the manufacturing sector holds promise in promoting long-term

environmental and economic sustainability. In the end, even if there are short-term difficulties, the renewable energy industry provides major long-term advantages in terms of lowering carbon emissions, improving energy availability, and facilitating clean energy transitions. The report emphasises, however, the need of strategic investments, encouraging policies, and sectoral integration to completely exploit the possibilities of these sectors in reaching Nigeria's sustainable development goals.

Drawing on the results of this study, the following suggestions are made to increase the involvement of important sectors in sustainable development in Nigeria:

- 1. By encouraging sustainable farming practices—such as agroforestry, organic farming, and climate-smart agriculture—the government and stakeholders should give agricultural modernisation first priority. In the field, investment in rural infrastructure, access to financing, extension services, and land reforms might help to increase production and sustainability even more.
- 2. To promote digital inclusion, policymakers should spend on increasing ICT infrastructure, particularly in rural and underprivileged regions. Maximising the influence of the ICT industry on sustainable development will come from encouraging innovation, promoting tech companies, and including ICT into education, healthcare, and government processes.
- 3. Sustainable industrial policies that support the use of clean and energy-efficient technology must be promoted more actively. The sector's beneficial influence on sustainability will be strengthened by incentives for green manufacturing practices, industrial research and development investments, and environmental regulatory enforcement.
- 4. The government should provide a favourable policy framework drawing private investment in solar, wind, and hydropower projects if it is to fully use renewable energy. Increasing renewable energy infrastructure, particularly in off-grid and rural regions, and carrying out energy access initiatives will help to speed the change to a low-carbon economy and lower energy poverty.

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