Industrialization and Economic Growth in Nigeria

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A R T I C L E I N F O	A B S T R A C T
  	This research investigated how industrialization and economic growth in Nigeria from 1980 to 2024 are related. This study utilized data sourced from the Central Bank of Nigeria Statistical Bulletin (2024) and the World Development Indicators (2024). These include yearly data for the subsequent variables: Gross Domestic Product acts as the dependent variable, with Industrial Sector Output, Mining Production, Electricity Supply to the Industrial Sector, and Government Capital Expenditure on Industry functioning as independent variables. The analysis employed the Auto-Regressive Distributed Lag (ARDL) model as the test statistic. The findings indicated that while the output of the industrial sector has a positive correlation with Nigeria's economic growth, this relationship is not significant. In contrast, mining production and government capital expenditure have negative correlations that are statistically significant. There is a positive and statistically significant correlation between electricity supply to the industrial sector and economic growth. The study concluded that while industrialization continues to be a key driver of economic transformation, the findings highlight structural weaknesses and ongoing inefficiencies in Nigeria's industrial sector, mining industry, and public investment framework. It was suggested that the government should bolster its efforts to improve electricity supply for better industrial productivity; guarantee transparency and efficiency in capital spending to yield growth-promoting results; foster industrial capacity utilization and technological advancement; and reform the mining sector to enhance value addition and encourage sustained economic growth

INTRODUCTION

It is well acknowledged that industrialization plays a crucial role in economic development, particularly in developing nations. This entails broadening and diversifying a nation's productive capacity beyond just agriculture and raw material exports to encompass manufacturing and processing sectors. Through boosting productivity, generating jobs, and encouraging tech innovation, industrialization plays a role in economic transformation.

In Nigeria, industrialization has been seen as crucial for economic diversification, reducing reliance on oil revenues, and tackling development issues like unemployment, poverty, and income inequality. Since Nigeria's independence in 1960, different governments have launched industrial policies to foster local production, substitute imports, and develop infrastructure. In the period following 1980, there was an escalation of initiatives aimed at economic liberalization and fostering industrial growth driven by the private sector, among which was the mid-'80s Structural Adjustment Program (SAP). In spite of these endeavors, Nigeria's industrial sector has not performed up to its potential.

The years between 1980 and 2024 illustrate a complex path characterized by changes in policy, economic crises, structural bottlenecks, and global economic dynamics. The contribution of the manufacturing sector to GDP has been modest, with industrial output frequently limited by insufficient infrastructure, unreliable electricity supply, restricted credit access, and a difficult business climate. Nigeria's industrial landscape continues to develop as of 2024. The emergence of digital technology, the African Continental Free Trade Area (AfCFTA), and a burgeoning youth demographic offer new prospects for industrial growth. Nonetheless, the nation still struggles with systemic issues that impede its industrial competitiveness. Mining production, a fundamental element of industrialization, has been recognized for a long time as a driver of economic growth in countries rich in resources.

Before the 1970s oil boom, mining played an important role in Nigeria's economic and industrial growth. Solid minerals such as coal from Enugu and tin from the Jos Plateau were instrumental in supporting local industrial activities and served as important exports. With the discovery and commercialization of crude oil, however, the mining sector experienced a swift decline as government policies and public investment overwhelmingly shifted toward the oil and gas industry. Following Nigeria's 1960 independence, the government has actively driven industrialization via various capital expenditures. Since 1980, public investment has focused on developing infrastructure, creating industrial zones, and establishing institutions to support local manufacturing and technological progress.

The aim of these endeavours was to spur industrial production, draw in private investment, and lessen the nation's reliance on crude oil exports. In addition, the connection between government expenditure and industrial performance has frequently been undermined by irregularities in public investment patterns, inadequate budget execution, and policy reversals. Nigeria's economic performance from 1980 to 2024 has been marked by phases

of growth as well as periods of stagnation. Although some years saw higher capital investments in industry and infrastructure, the overall effect on economic growth has been inconsistent. Given the current constraints on fiscal policy and increasing public debt, the discussion about how effective government capital expenditure is as a means of promoting industrial and economic development continues to be pertinent.

Empirical evidence indicates that a lasting disparity exists between electricity demand and supply in Nigeria's industrial sector, leading to capacity utilization rates that fall short of global benchmarks. It is essential to comprehend how electricity supply impacts the industrial sector as Nigeria progresses toward its development objectives via greater industrialization. This research aims to investigate the link between industrialization and economic growth in Nigeria, with the goal of determining how much industrial development contributes to the country's economic performance.

Statement of the Problem

Nigeria possesses a wealth of natural and human resources that should, in principle, promote swift industrial growth. The country is still mainly reliant on exporting crude oil and importing manufactured products. The economy is susceptible to external shocks, like changes in global oil prices, due to the fragile industrial foundation. Nigerian governments over the years have placed a high priority on fostering industrial activities, as there is a common belief that industrialization is a crucial factor in driving economic growth. There have been ongoing worries regarding how effective these measures have proven to be, given that Nigeria's industrial sector has consistently failed to meet expectations. Moreover, previous industrial policies have frequently fallen short of their goals because of corruption, inadequate infrastructure, insecurity, and lack of consistent policy execution.

These issues have obstructed the industrial sector's ability to act as a catalyst for widespread economic growth. Both economic indicators and empirical evidence show that Nigeria's level of industrialization has not changed significantly over time. Researchers like Marcus et al. (2017) have underscored this paradox, stressing that Nigeria's industrial sector is still not developed in comparison to its potential. In the same vein, Obioma and Ozughalu (2005) note that the sector is marked by low value addition, slow output growth, insufficient job creation, heavy reliance on imported industrial inputs, decreasing capacity utilization, elevated production costs, and poor integration with other economic sectors.

Nigeria has carried out a range of initiatives and inducements designed to promote industrial growth over the years. These encompass the following initiatives: - Structural Adjustment Program (SAP) from 1986 to 1990; - Nigeria Industrial Revolution Plan (NIRP, 2014): Targets key sectors like agro-processing, solid minerals, and light manufacturing; - Economic Recovery and Growth Plan (ERGP, 2017–2020): Stresses the importance of diversification and industrial growth; - National Development Plan (2021–2025): This research aims to scrutinize critically the extent to which industrialization has contributed positively and significantly to Nigeria's economic growth. Thus, the key question

is: Why has there not been a substantial economic growth resulting from Nigeria's industrialization process? The aim of this study is to examine the relationship between industrialization and economic growth in Nigeria, emphasizing the key limitations and proposing feasible solutions. Understanding these dynamics is essential for informing future policy directions and ensuring that investments in industrialization effectively translate into broad-based economic development.

Objectives of the Study

The broad objective of this study is to examine the relationship between industrialization and economic growth in Nigeria. Specifically, the study aims to achieve the following specific objectives:

1. To assess the impact of industrial sector output on the economic growth of Nigeria.
2. To evaluate the contribution of mining production to economic growth in Nigeria.
3. To investigate the relationship between government capital expenditure on industry and economic growth in Nigeria.
4. To analyze the influence of electricity supply to the industrial sector on Nigeria's economic growth.

Research Questions

The following research questions are formulated to guide the study:

1. What is the impact of industrial sector output on economic growth in Nigeria?
2. To what extent has mining production affected Nigeria's economic growth?
3. What is the relationship between government capital expenditure on industry and economic growth in Nigeria?
4. How does electricity supply to the industrial sector affect economic growth in Nigeria?

Statement of the Hypotheses

The following hypotheses have been formulated to address the research questions and objectives above:

- H_{01}: Industrial sector output has no significant impact on Nigeria's economic growth.
- H_{02}: There is no significant relationship between mining production and economic growth in
- Nigeria.
- H_{03}: There is no significant relationship between government capital expenditure on industry and
- economic growth in Nigeria.
- H_{04}: Electricity supply to the industrial sector has no significant effect on economic growth in Nigeria.

LITERATURE REVIEW

Industrialization

Conceptually, industrialization is not confined to the mere growth of manufacturing; it involves the whole process of converting raw materials into finished products through the use of labor, technology, and capital. By characterizing industrialization as the transformation of raw materials into consumer goods, new capital goods, and social infrastructure through the use of human capital and physical assets, Ekpo (2005) underscores this wider perspective. In turn, these outputs improve the provision of services to individuals and businesses, thus contributing to overall economic development.

As stated by Alokan (2021), industrialization involves the expansion of large-scale machine production and the emergence of the factory system as the primary mode of production. It encompasses not just technological progress but also the establishment of industrial enterprises, particularly in economies where agriculture has historically been the foundation. In the end, the theory of industrialization stresses its capacity to convert economies characterized by low productivity and sluggish growth into dynamic, high-growth, and technologically sophisticated societies.

Economic Growth in Nigeria

The notion of economic growth is pivotal in the fields of economics and development studies. It typically denotes a long-term rise in an economy's productive capacity. The most common way to gauge it is by looking at the growth rate of real Gross Domestic Product (GDP), which indicates the total value of a country's produced goods and services, with inflation accounted for. Conceptually, economic growth represents the increase in a country's production and income levels, resulting in enhanced living standards, investment, and job opportunities.

Theories of economic growth offer a conceptual framework for comprehending the factors and dynamics of growth. Capital accumulation, labor productivity, and free markets were emphasized by classical economists like Adam Smith and David Ricardo as essential for growth. In developing economies such as Nigeria, economic growth is frequently sought after to alleviate poverty, create jobs, and improve national competitiveness. Nigeria's growth experience, as highlighted by Ajakaiye and Fakiyesi (2009), has often been marked by volatility largely driven by external factors like oil price fluctuations, with a limited structural transformation.

Mining Production and Economic Growth in Nigeria

As stated by Auty (1993), mineral production can propel economic growth through the generation of revenue, foreign exchange, and jobs. Additionally, it can act as a basis for backward linkages and downstream industries that promote wider industrial growth. This potential is contingent upon the effectiveness of resource management and reinvestment strategies. The demand for construction, infrastructure, and processing facilities generated by mining production can act as a catalyst for industrialization. Thus, conceptually, mining production embodies a dual-edged aspect of industrialization and economic growth.

Electricity Supply to the Industrial Sector and the Nigeria Economy

In numerous developing nations, Nigeria included, insufficient electricity supply has constituted a significant obstacle to industrial development. According to Eboh (2011), industries face heightened operational costs and diminished output efficiency due to power outages, voltage variations, and restricted grid coverage. As a result, companies frequently turn to alternative energy sources that are more costly, which further erodes profitability and hampers expansion efforts. Electricity supply impacts economic growth indirectly by affecting small and medium enterprises (SMEs), education, healthcare, and digital connectivity.

Government Capital Expenditure to Industry and Nigeria Economy

Expenditure by the government on capital items is defined as public outlay for physical assets like infrastructure, industrial facilities, energy systems, transport networks, and other long-term investments that seek to improve productive capacity. According to Musgrave and Musgrave (1989), capital expenditure refers to government investments that help create long-lasting assets anticipated to provide economic benefits in the long term. In principle, government capital expenditure on industry comprises investments in industrial parks, power generation facilities, road and rail infrastructure, research institutions, and vocational training centers. These investments foster an environment conducive to private sector involvement, lower production costs, and enhance the efficiency of industrial activities.

The Rationale for Increased Industrial Output

In most developing nations, enhancing industrial production is regarded as a key aim of economic policy and an essential component of development and structural transformation. It has always been given an important role in the government's various development plans to ensure that self-reliance in the supply of industrial products is enhanced.

- The following are the reasons for increased industrial output.
- To Alleviate Poverty/Standard of Living:
- To Reduce Unemployment Rate:
- To Increase Export/Import Substitution:
- To Reduce Dualistic Economy
- To Achieve Vision 2020:

Theoretical Review.

Several economic theories explain the relationship between industrialization and economic growth:

The Classical Growth Theory, proposed by economists like Adam Smith, David Ricardo, and Thomas Malthus, highlights the importance of capital accumulation, labor division, and specialization for economic growth. In his groundbreaking book The Wealth of Nations, Adam Smith contended that the division of labor and enhancements in productivity within manufacturing sectors are crucial factors for economic growth.

Within Nigeria, classical theorists would promote the idea of moving from an economy mainly based on agriculture to one characterized by more developed industrial production. Außerdem die Theorie des Strukturwandels (Lewis-Modell):The theory suggests that economic growth happens as labor shifts from

the traditional agriculture sector to the modern industrial sector, resulting in increased productivity and income.

The Endogenous Growth Theory: Proposes that the main determinants of long-term economic growth are internal factors, including technological innovation, the development of human capital, and industrial expansion.

The Dependency Theory: Claims that developing countries, such as Nigeria, continue to rely economically on developed nations because of their dependence on primary exports, which constrains industrialization and economic independence.

The Rostow's Stages of Growth Model: Rostow identifies industrialization as a critical stage in economic development—the "take-off" stage—where an economy transitions toward sustained growth.

Industrialization is highlighted as a crucial means of transforming traditional economies in the Lewis dual-sector model and Rostow's stages of growth. While the Harrod-Domar model emphasizes the productivity of investment, the endogenous growth theory concentrates on innovation and human capital. The roles of government and global economic structures are highlighted by Keynesian and dependency theories, respectively.

Empirical Literature Review

Using the Autoregressive Distributed Lag (ARDL) model to examine short- and long-term dynamics, Evbuomwan and Owuru (2021) studied the factors influencing manufacturing output in Nigeria from 1981 to 2019. The dependent variable was the output of manufacturing, while key explanatory variables comprised bank credit to the manufacturing sector, capacity utilization, electricity consumption, exchange rate, and inflation. According to the study, bank credit and capacity utilization had a significant positive effect on manufacturing output, whereas inflation and fluctuations in the exchange rate had negative effects.

Over the period from 1981 to 2020, Ibitoye and Ajayi (2022) investigated the relationship between Nigeria's industrial output and economic growth. They modeled GDP based on industrial output, foreign direct investment (FDI), exchange rate, and trade openness using the ARDL approach and the Johansen cointegration test. Their findings validated that both industrial output and FDI were important catalysts for long-term economic growth, whereas fluctuations in exchange rates were found to weaken the impact of industrial performance.

METHODOLOGY
Research Design

The study employs an ex-post facto time series research design that fundamentally relies on secondary data. The research aims to evaluate the stationarity of the variables prior to determining whether a long-run or short-run relationship exists among them. This comes before the order of integrations of the variables that leads us to the method of analysis. The hypotheses are evaluated and suitable choices are made depending on the results of the findings. This research design is suitable because it investigates the link between

industrialization and economic growth in Nigeria using existing data rather than manipulating variables

Model Specification

It is necessary to establish a functional model that would assist in achieving the study's aim in order to ascertain the connection between industrialization and economic growth in Nigeria. The model's theoretical construct is based on the adapted IS-LM framework, which was also used by Egbulonu (2018) and Dogara (2018).

The study modified the model accordingly based on the peculiarity of this study, and employed a simple econometric model of the form:

GDP = (INDO, ELEC, MINP, GCEX,)   (3.1)

where,

GDP: is the Gross Domestic Product (proxy for economic growth).

INDO is the Industrial Sector Output.

ELEC, is the electricity generation (to the industrial sector)

MINP, is the mining production.

GCEX, is the government capital expenditure.

Putting the above functional form of the model in econometric form and assuming a linear relationship amongst the variables for simplicity we have:

$GDP_t = \beta_0 + \beta_1 INDO_t + \beta_2 ELEC_t + \beta_3 MINP_t + \beta_4 GCEX_t + \mu_t)$

(3.2)

Where: β_0, is the intercept of the model

INDO, ELEC, MINP, GCEX, are unknown parameters of the model to be estimated

μ, is the stochastic error term of the model which accounts for other indices that are not specified in the model

t, is the time period (1980 – 2024)

The a priori expectation: The signs are expected to be positive for all the parameters,

Method of Data Analysis

The method of Analysis utilized is Autoregressive Distributed Lag (ARDL) model to ascertain the relationship between industrialization and economic growth in Nigeria. The ARDL (p, q) model is stated as:

$$GDP_t = \sum_{i=1}^{p} \alpha_i \Delta GDP_{t-i} + \sum_{i=0}^{q} \alpha_i \Delta INDO_{t-i} + \sum_{i=0}^{q} \alpha_i \Delta ELEC_{t-i} + \sum_{i=0}^{q} \alpha_i \Delta MINP_{t-i}$$

$$+ \sum_{i=0}^{q} \alpha_i \Delta GCEX_{t-i} +$$

$$\sum_{i=1}^{p} \beta_i GDP_{t-i} + \sum_{i=0}^{q} \beta_i INDO_{t-i} + \sum_{i=0}^{q} \beta_i ELEC_{t-i} + \sum_{i=0}^{q} \beta_i MINP_{t-i}$$

$$+ \sum_{i=0}^{q} \beta_i GCEX_{t-i} + \varphi ECT + \varepsilon_t \ldots\ldots\ldots\ldots (3.3)$$

$$ECT_t = Y_t - \alpha_0 - \sum_{i=1}^{p} \gamma_1 \Delta Y_{t-i} - \sum_{i=0}^{p} \beta_i \Delta X_{t-i} \text{ and}$$

Where

$$\phi = 1 - \sum_{i=1}^{p} \gamma_1 \Delta Y_{-i} \dots\dots\dots\dots\dots(3.6)$$

The Bound test procedure used equations 3.3 and 3.4 into 3.5 as:

$$\Delta Y_t = -\sum_{i=1}^{p-1} \gamma_1 Y * \Delta Y_{t-i} + \sum_{i=0}^{p} \beta_i \Delta X_{t-i} - \rho Y_{t-1} - \alpha - \sum_{i=0}^{p} \delta X_{t-i} + \mu_{it} \dots\dots\dots\dots(3.7)$$

Then we test the existence of level relationship as $\rho = 0$ and $\delta_1 = \delta_2 = \dots = \delta_k = 0$

where Δ = difference operator, α = the short term coefficient, β = the long run coefficients μ = white noise error term.

Pre-estimation
Unit Root Test

To fully explore the data generating process, we first examined the time series properties of model variables using the Augmented Dickey- Fuller test.

The ADF test regression equations with constant are:

$$\Delta Y_T = \alpha_0 + \alpha_1 Y_{T-1} + \sum_{j=1}^{k} a_j \, \Delta Y_{T-1} + \varepsilon_T \dots \tag{3.8}$$

where Δ is the first difference operator ε_T is random error term that is iid k = no of lagged differences Y = the variable. The unit root test is then carried out under the null hypothesis $\alpha = 0$ against the alternative hypothesis of $\alpha < 0$. Once

$$ADF_\tau = \frac{\hat{\alpha}}{SE(\alpha)} \dots\dots\dots\dots(3.9)$$

a value for the test statistics is computed we shall compare it with the relevant critical value for the Dickey-Fuller Test. If the test statistic is greater (in absolute value) than the critical value at 5% or 1% level of significance, then the null hypothesis of $\alpha = 0$ is rejected and no unit root is present. If the variables are non-stationary at level form and integrated of the same order, this implies evidence of co-integration in the model.

Justification of the Model

The use of ARDL test approach is predicated on its several advantages over other cointegration tests such as Engle-Granger and Johansen's cointegration method. Firstly, the ARDL efficiently determines the cointegrating relation in small sample cases (Ghatak & Siddiki, 2001; Tang, 2003), whereas Johansen's method requires large sample for validity. Secondly, other methods requires that the variables must be integrated of the same order before the cointegration test is carried out, while the ARDL approach can be applied irrespective of whether the regressors are *I(1) and I(0) or mutually* cointegrated, in which the dependent variable must be *I(1).*

RESULTS AND DISCUSSION

Table 4.1: Industrialization and Economic Growth in Nigeria from 1980 to 2024
(N′ billions)

Years	Mining N billion	Industrial output N billion	Electricity S. N billion	GDP N billion	GCE to Industry N billion
1980	13.12	28.23	0.8	10.24	88,349,900
1981	9.13	30.31	0.86	9.18	75,392,000
1982	8	33.49	0.82	8.33	100,728,300
1983	9.89	29.42	0.8	7.04	102,165,100
1984	14	39.55	0.89	5.66	103,489,800
1985	12.43	41.63	0.67	7.09	113,630,500
1986	22.29	45.96	0.7	8.03	160,209,100
1987	22.56	66.34	0.71	9.11	144,297,640
1988	49.83	76.14	2.02	14.23	201,648,296
1989	63.69	87.96	2.2	16.06	178,747,441
1990	76.78	115.03	2.42	18.09	193,259,090
1991	149.81	159.95	2.53	22.55	210,483,991
1992	144.69	231.02	2.64	29.6	222,882,340
1993	132.9	370.16	3.05	38.11	235,280,690
1994	448.11	619.85	3.17	50.88	247,679,039
1995	675.58	780.48	3.3	59.22	260,077,389
1996	624.63	848.33	3.29	69.31	272,475,739
1997	433.2	838.53	3.16	91.83	284,874,088
1998	600.46	891.29	3.27	101.62	297,272,438
1999	1,274.48	984.08	3.38	112.97	309,670,787
2000	975.78	1,146.68	41.07	150.4	300,069,137
2001	1,051.29	1,358.53	47.29	177.13	303,467,486
2002	1,598.74	1,635.05	56.52	217.44	306,865,836
2003	2,476.23	1,968.56	67.91	613.07	310,764,186
2004	3,301.43	2,326.31	74.27	796.56	319,184,345
2005	4,075.35	2,689.08	109.05	924.08	1,239,169,63
2006	4,398.96	2,913.26	116.63	983.63	2,159,154,922
2007	5,310.95	3,263.82	134.19	1,131.72	3,079,140,210
2008	4,343.06	3,406.69	158.66	1,283.47	3,999,125,498
2009	8,454.55	3,578.64	179.47	1,570.97	4,919,110,786
2010	11,098.9	4,527.45	275.85	1,905.57	5,839,096,075
2011	11,386.5	5,588.82	375.84	2,188.72	6,759,081,363
2012	10,380.9	7,233.32	492.68	2,676.28	7,679,066,651
2013	9,716.76	8,685.43	531.95	3,188.82	3,856,000,324
2014	6,100.01	8,973.77	536.67	3,472.26	19,005,140,458

2015	5,469.55	8,903.24	524.68	3,606.56	5,695,970,901
2016	10,481.9	10,044.48	667.92	4,281.78	48,637,746,138
2017	13,648.6	12,455.53	871.55	6,031.06	88,604,848,108
2018	12,769.4	16,781.06	1,037.77	8,996.90	150,362,521,28
2019	10,851.7	19,539.55	1,145.64	11,639.4	107,921,658,32
2020	10,737.5	25,725.87	1,739.45	16,586.8	146,516,291,63
2021	13,648.2	27,508.52	1,789.50	18,696.8	158,345,125,51
2022	12,541.0	31,664.81	2040.58533	21,677.3	171,040,386,52
2023	12,689.02	35,375.94	2278.2844	24,716.8	184,603,819,04
2024	12,837.03	39,087.08	2,515.98	27,756.46	198,167,251,558

Source: Central Bank of Nigeria Statistical Bulletin 2024 Edition

The Unit Root Test

The stationarity of the variables was determined in order to ascertain the statistical properties of the data and avoid a spurious regression. The test is carried using the Augmented Dickey Fuller (ADF) Unit root test and the results are summarized below

Table 2. Summary of Unit Root Test Result

	ADF Test statistics			
Variable	At Level	1st Difference	Decision Rule	Order of Integration
GDP	6.362140	-	Stationary at level	I(0)
INDO	7.229108	-	Stationary at level	I(0)
ELEC	5.935607	-	Stationary at level	I(0)
MIN	-0.023701	-6.366859	Stationary at 1st difference	I(1)
GCEX	2.778780	4.315980	Stationary at 1st difference	I(1)
Critical value at 5% level = -2.945842				

Source: Computed from E-views 10 edition

As shown in table 4.1 above, the Gross Domestic Product (GDP), Industrial Output (INDO), and Electricity Generation (ELEC) were all integrated of order zero ($I \sim (0)$), indicating that they were stationary at their level form. Although Mining Production (MINP) and Government Capital Expenditure (GCEX) were not stationary in their level form, they became stationary after first differencing. This indicates that the variables (MINP and GCEX) were integrated of order one ($I \sim (1)$). The conclusion that the variables are stationary is based on the fact that the ADF statistics exceed the ADF critical values at 5%, leading us to reject H0. As the variables are integrated of order one and zero, and none of them is

integrated of order two. As a result, we utilize the ARDL bound co-integration test.

ARDL Bound Co-integration Test

According to Pesaran, Shin and Smith (2001), a prerequisite for conducting the ARDL bound co-integrating test is that all variables involved must be integrated of order one, order zero, or a combination of the two. As all variables are integrated of order zero or one, we moved forward with estimating the ARDL bound test. The null hypothesis of ARDL bound co-integration posits that the variables are not cointegrated, in contrast to the alternative hypothesis that they are. The rule for making a decision is to dismiss the null hypothesis when the F-statistics exceeds the upper bound critical values at the selected significance level.

Table 3. ARDL Bound Co-integration (5% critical value) Test Result for the Models

Model	F-Statistics	K	Significance level	Critical Bound Value	
				10 (Lower Bound)	11 (Upper Bound)
	23.87221	4	5%	2.56	3.49

Source: Author's Computation 2025

From table 4.2 the F-statistics for the model is 23.87221 and is greater than the upper (I1) bound of 3.49 at 5% level of significance. Thus, we reject the null hypothesis and conclude that there is a long run relationship between industrialization and economic growth in Nigeria. Since there is a long run relationship, we therefore estimate the short run and long run ARDL analysis.

Test for Short Run Relationship

Having ascertained that there exist a co-integrating relationship between industrialization and economic growth in Nigeria, the short run relationship needs to be ascertained.

Table 4. Summary of Parsimonious Short Run Relationship Result Between Industrialization and Economic Growth in Nigeria

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)*	0.204735	0.014932	13.71108	0.0000

From table 4.3 above; the coefficient of the error correction term (cointEQ) is statistically insignificant and does not carry the expected negative sign at 5% level of significant; revealing that a short run relationship does not exist between industrialization and economic growth in Nigeria.

Test for Long Run Relationship

It's imperative to ascertain the long run relationship that exists between industrialization and economic growth in Nigeria.

Table 4.4: Summary of Long Run Relationship between industrialization and economic growth in Nigeria Result

Long Run Coefficients

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INDO	0.089591	0.141203	0.634488	0.5347
ELEC	42.37013	8.220396	5.154269	0.0001
MINP	-0.164131	0.075523	-2.173248	0.0451
GCEX	-5.30E-07	1.31E-07	-4.048068	0.0009
C	110.0754	61.49770	1.789910	0.0924

Source: Author's Computation 2025

Interpretation of Long Run ARDL Result

GDP = 110.0754 +0.089591INDO +42.37013ELEC – 0.164131MINP – 0.0000000530GCEX

The long run coefficient from table 4.4 above shows that the joint impact of all exogenous variables (INDO, ELEC, MINP and GCEX) on the endogenous variable will amount to 110.07 percent; this is on the basis that they are all held at constant. In other word if all the exogenous variables are held at constant it will amount to a 110.07% positive contribution to economic growth in Nigeria.

The Industrial Sector Output (INDO) showed a positive correlation with Nigeria's economic growth, indicated by a coefficient value of 0.089591 percent. This means that in the long term, a one percent increase in INDO results in a 0.089 percent rise in Nigeria's economic growth. Electricity Supply to the Industrial Sector (ELEC) demonstrated a positive correlation with Nigeria's economic growth, indicated by a coefficient value of 42.37013 percent. This means that over the long term, a one percent increase in Electricity Generation (ELEC) results in a 42.37 percent rise in Nigeria's economic growth.

Mining Production (MINP) exhibited a negative correlation with Nigeria's economic growth, indicated by a coefficient of –0.164131 percent. This means that over the long term, a one percent increase in Mining Production (MINP) results in a decrease of 0.16 percent in Nigeria's economic growth. In Nigeria, the relationship between Government Capital Expenditure on Industry (GCEX) and economic growth is negative, with a coefficient of – 0.0000000530 percent. This indicates that over the long term, a one percent increase in GCEX results in a decrease of – 0.0000000530 percent in Nigeria's economic growth.

Test of Hypotheses

The individual test was carried out to test for joint significance of the independent variables on the dependent variable at 5% level using t-probability and t-statistic shown in table 4.5 and 4.6. The rule applied was: If t-probability is greater than the prescribed level of 5% or 0.05, accept the null hypothesis, otherwise reject the null hypothesis when f-probability is less than 0.05.

As shown in table 4.4, the t-stat probability of INDO was 0.5347, which exceeds the critical value of 0.05. Accordingly, we accept the null hypothesis and conclude that there is no statistically significant effect of Industrial Sector Output on Nigeria's economic growth. Furthermore, the probability of the t-stat for MINP, as shown in table 4.4 above, was 0.0451, which is lower than the critical value of 0.05. We therefore dismiss the null hypothesis, concluding that Mining Production is statistically significantly related to Economic Growth in Nigeria. In addition, the t-stat probability of GCEX was 0.0009, which is lower than the

critical values of 0.05. We therefore reject the null hypothesis and conclude that there is a statistically significant relationship between Government Capital Expenditure and Economic Growth in Nigeria. The probability of t-stat of ELEC was 0.0001, and less than 0.05 critical values. Thus, we reject the null hypothesis and conclude that Electricity Supply to the Industrial Sector has a statistically significant effect on Economic Growth in Nigeria.

Discussion of Findings

This research examined how industrialization affected Nigeria's economic growth from 1980 to 2024, both in the long term and short term. The ARDL model produced results that were inconsistent. Although the output of the industrial sector and electricity supply had positive long-term effects on economic growth, only the latter was statistically significant. The growth was negatively and significantly affected by mining output and government capital spending on industry. The error correction term was not significant and had the wrong sign, suggesting that there is no short-run adjustment between indicators of industrialization and economic growth. The minor positive effect of industrial sector output stands in contradiction to theoretical expectations and earlier empirical findings. This limited influence is indicative of structural challenges like low capacity utilization, dependence on imported inputs, elevated production costs, and infrastructural shortcomings that restrict industrial productivity.

The effect of electricity supply was positive and significant, affirming the crucial role of dependable energy for industrial performance and corroborating earlier findings that better electricity boosts output efficiency and economic growth. The mining production exhibited a negative and significant impact, corroborating the "resource curse" argument. The developmental benefits of the mining sector are diminished by weak policy implementation, limited value addition, environmental issues, and an overreliance on crude oil. Capital expenditure by the government in the industrial sector negatively impacted it significantly, indicating possible inefficiencies like corruption, mismanagement, and funds being allocated improperly. These weaken the potential for public investment to enhance growth. In general, the lack of short-term effects points to significant structural and institutional obstacles that postpone the effects of industrial development. The findings highlight the need for improved industrial capacity, reliable electricity, mining sector reform, and better public expenditure management to ensure industrialization supports sustainable growth.

Summary of Findings, Conclusion and Recommendations

Summary of Findings

The following summarizes the result of the research work;

i. Industrial Sector Output has a positive but insignificant impact on economic growth in Nigeria.

ii. Mining Production has a negative but significant relationship with economic growth in Nigeria.

iii. Government Capital Expenditure to the Industrial Sector has a negative but significant relationship with economic growth in Nigeria

iv. Electricity Supply to the Industrial Sector has a positive and significant effect on economic growth in Nigeria.

CONCLUSIONS AND RECOMMENDATIONS

The study examined the impact of key industrialization indicators—industrial output, mining production, electricity supply, and government capital expenditure—on Nigeria's economic growth from 1980–2024 using ARDL analysis. Industrial output and electricity supply were positive, but only electricity supply was significant. Mining production and government capital expenditure had negative and significant effects. A long-run relationship exists between industrialization and growth, but no significant short-run adjustment mechanism was found. The findings point to structural weaknesses in industry, the mining sector, and public expenditure processes. Inefficiencies, misallocation of funds, weak value-added activities, and inadequate infrastructure undermine industrialization's role in economic transformation. Reliable electricity remains crucial for enhancing productivity and growth. Without addressing these structural and governance problems, industrialization will continue to fall short of its potential.

FURTHER STUDY

Strengthen Industrial Sector Productivity and Value Addition

Improve capacity utilization, technological upgrading, and domestic value addition through incentives, industrial credit access, and creation of industrial clusters. Enhancing linkages will increase the sector's contribution to GDP.

Reform and Diversify the Mining Sector for Developmental Linkages

Formalize mining activities, improve regulation, encourage local mineral processing, curb illegal mining, and promote downstream value addition to transform the sector into a growth driver.

Improve the Efficiency and Accountability of Government Capital Expenditure

Implement transparent project selection and monitoring processes. Redirect spending toward infrastructure supporting industrial development and strengthen fiscal discipline to curb corruption and waste.

Enhance Electricity Supply Reliability for Industrial Growth

Invest in power generation, transmission, and distribution, especially for industrial zones. Encourage renewable energy, PPPs, and competitive tariff reforms. Reliable electricity will lower production costs and raise productivity.

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