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Trade Liberalisation, Manufacturing Sector Performance and Economic Growth in Nigeria

¹Oluwo Peter Olugbenga & ²Oresajo Safiriyu Adegbenga

^{1,2}Department of Economics Education, College of Social Sciences Education, Lagos State University of Education, Oto, Ijanikin, with a Campus @ Odo-Noforija, Epe.

Email: Oluwopo@lasued.edu.ng

ABSTRACT

This paper investigated how trade liberalisation and manufacturing sector performance interact to influence economic growth in Nigeria over the period 2000–2023. Annual time-series data were analysed using the Autoregressive Distributed Lag (ARDL) modelling framework alongside cointegration tests to capture both short-run adjustments and long-run relationships among the variables. The empirical results confirmed the presence of a long-run equilibrium relationship linking economic growth with trade liberalization and manufacturing output. Evidence showed that Nigeria's growth performance during the period was predominantly driven by the services and non-oil sectors, while the manufacturing sector remained weakened by persistent structural and infrastructural constraints. Trade liberalisation is found to exert limited and inconsistent effects on economic growth, largely due to weak domestic productive capacity and heavy reliance on imports. The findings further indicate that achieving sustained growth rates in excess of 6 percent is critical for meaningful structural transformation and employment creation. The study therefore recommended policies aimed at strengthening manufacturing capacity, expanding infrastructure investment, improving access to finance, deepening economic diversification, and pursuing balanced trade strategies that promote exports while protecting domestic industries to support long-term economic sustainability.

Keywords: Trade liberalisation; Manufacturing sector performance; Economic growth; ARDL

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1. Introduction

Nigeria's economy has experienced a moderate recovery in recent years, although its growth rate remains below the level required for substantial structural transformation. Data from the National Bureau of Statistics (NBS) indicate that the country's real Gross Domestic Product (GDP) increased by 3.4% in 2024, up from 2.74% in 2023 (Obiukwu, Nwosu & Chukwu,2024). In the fourth quarter of 2024, economic activity expanded by 3.84% year-on-year, marking the strongest quarterly growth in roughly three years. This performance was largely fueled by the services sector, which recorded 5.37% growth and accounted for about 57.38% of total GDP. The non-oil sector, which contributes approximately 95% of national output, also maintained positive momentum with a 3.96% increase during the same period (Onogbosele,2025).

However, underlying challenges continue to limit Nigeria's growth potential. The agriculture and industrial sectors remain sluggish, growing by only 1.76% and 2.00%, respectively, in the last quarter of 2024, both lower than their previous-year rates. Although the oil sector showed signs of recovery after earlier contractions, it still represents a relatively small portion of GDP at around 4.6% and continues to fluctuate due to production instability and global price volatility. The 3.4% annual growth rate remains insufficient to address widespread poverty and unemployment, as economists estimate that Nigeria requires sustained growth above 6% annually to achieve meaningful economic transformation and job creation (Utouh,2024).

Nigeria's manufacturing sector has recorded a fluctuating yet largely downward trajectory since 2023. National Bureau of Statistics (NBS,2024) revealed that the sector's contribution to nominal GDP fell from about 16.0% in late 2023 to approximately 12.7% in the second quarter of 2024. Both nominal and real growth rates weakened during this period, with nominal growth estimated at 1.9% and real growth at 1.3%. This downward trend reflects intermittent contractions in output, largely driven by persistent structural bottlenecks such as inadequate infrastructure, escalating production costs, foreign exchange instability, and subdued consumer demand. These challenges have collectively constrained industrial productivity, eroded competitiveness, and limited the sector's capacity to drive broader economic growth (Busse, Dary, &Wüstenfeld,2024).

Trade liberalisation has become an important component of Nigeria's economic reform agenda, aimed at reducing trade barriers, expanding external market access, and enhancing competitiveness. Policy initiatives that promote openness, such as tariff reductions and simplified trade procedures, have contributed to increased participation in global markets (Abinabo & Abubakar,2023). The gains from these reforms remain constrained by persistent structural challenges, including weak infrastructure, limited export diversification, and the dominance of crude oil in external trade. Therefore, the impact of trade liberalisation on Nigeria's economic performance depends on the extent to which the domestic economy can strengthen its productive capacity and improve its integration into value-added global value chains (Wani,2019).

The manufacturing sector plays a critical role in translating trade liberalisation into long-term economic growth, given its potential to boost productivity, generate employment, and foster structural transformation. In Nigeria, the sector's performance has been hindered by high production costs, inadequate power supply, limited access to credit, and intense competition from imported goods (Adekunle & Akinwale, 2020). These constraints have weakened the sector's ability to fully leverage the opportunities created by trade openness. Enhancing manufacturing productivity through targeted industrial policies, improved infrastructure, and stronger support for domestic production is essential for maximizing the growth-enhancing effects of trade liberalisation. When these conditions are met, the interaction between trade openness, a robust manufacturing sector, and a stable macroeconomic environment can significantly accelerate Nigeria's economic growth trajectory (Ponnusamy, 2022).

Nevertheless, the sector has shown faint signs of resilience, supported by recent government and monetary policy interventions. Indicators from industrial production and purchasing managers' surveys between 2024 and mid-2025 suggest mild recoveries in output and business confidence. Targeted measures such as improved credit access for manufacturers, export restrictions on unprocessed raw materials to encourage domestic value addition, and temporary tariff adjustments aim to revitalize production and promote industrial expansion. Yet, persistent financing gaps, infrastructural deficiencies, and logistical inefficiencies continue to inhibit sustainable recovery. The sector's share of GDP and growth performance weakened between 2023 and 2024, emerging policy efforts and gradual macroeconomic stabilization provide cautious optimism for a medium-term rebound in Nigeria's manufacturing landscape (Nnadozie, Raifu & Afolabi, 2025).

In light of the above, this paper considers the need to stimulate economic growth through the integration of trade liberalisation and manufacturing sector performance in Nigeria. By doing so, it aims to provide vital insights to policymakers, industrialists, and government agencies to boost national output. Despite the relevance of these issues, a notable gap exists in the empirical literature: few studies have simultaneously examined trade liberalisation, manufacturing sector performance, and economic growth within a unified analytical framework. This gap underscores the importance of the current study, which seeks to jointly analyze these variables to provide a clearer assessment of the effects of trade reforms.

Accordingly, this study seeks to answer the following research questions:

Research Questions

- a) What is the nature of the short-run and long-run relationship between trade liberalisation, manufacturing sector performance, and economic growth in Nigeria during the period 2000–2023?
- b) How does the interaction between trade liberalisation and manufacturing sector performance influence Nigeria's economic growth within the ARDL framework?

Research Objectives

- a) To examine the short-run and long-run effects of trade liberalisation and manufacturing sector performance on economic growth in Nigeria from 2000 to 2023.
- b) To analyse the interactive and dynamic relationship among trade liberalisation, manufacturing sector performance, and economic growth using the ARDL modelling approach.

2. Literature Review

2.1 Conceptual Literature

This paper reviewed the literature of the study conceptually, empirically, and theoretically. The conceptual clarifications of the study were duly simplified and delineated. Trade liberalisation refers to the deliberate reduction or elimination of government-imposed barriers to international trade, such as tariffs, quotas, export restrictions, and non-tariff barriers, to allow goods and services to flow more freely across national borders. The policy is aimed at enhancing efficiency, competitiveness, and integration into the global economy (Sanusi, 2023)

Manufacturing sector performance refers to the effectiveness and outcomes of the manufacturing industry in converting raw materials into finished goods and contributing to economic growth. It is assessed in terms of indicators such as output growth, capacity utilisation, value added to the economy, and productivity levels. This performance reflects how well the sector contributes to total output and economic development, often evaluated through measures like manufacturing production indices, contribution to GDP, and employment creation within the sector.

Manufacturing sector performance refers to how well the manufacturing industry of an economy is doing, typically measured by output growth, employment, productivity, capacity utilisation, value-added, and sector contribution to GDP (Oluwo, 2023).

Economic growth, as used in this paper, means a sustained increase in a country's productive capacity and output over time, commonly measured by the growth rate of real gross domestic product (GDP) or real GDP per capita. It reflects improvements in the quantity and quality of goods and services produced in an economy and is driven by factors such as capital accumulation, technological progress, labour force expansion, and institutional efficiency (World Bank, 2023).

2.2 Theoretical Literature

Structural Change Theory

This is associated with scholars such as Lewis (1954) and Chenery (1979), emphasises economic growth as a process of transforming resources from low-productivity sectors, especially agriculture, into higher-productivity sectors such as manufacturing and modern services. Its key strength lies in

highlighting the central role of industrialisation, structural transformation, and sectoral linkages in driving development. This perspective is particularly relevant for developing economies seeking to diversify away from primary commodity dependence. However, the theory often underestimates institutional quality, technological innovation, and global trade dynamics. It also assumes smooth labour mobility across sectors, which is unrealistic in economies characterised by skill mismatches, infrastructural deficits, and high unemployment, as observed in Nigeria.

Dependency Theory

This view is under development as a consequence of unequal trade relations between developed and developing economies, arguing that trade liberalisation can reinforce dependency and suppress domestic industrialisation. The theory's strength lies in its critique of unbalanced global trade structures and its explanation of why openness may harm local manufacturing in weak economies. This insight aligns with Nigeria's experience of import dependence and limited industrial competitiveness. However, dependency theory is largely deterministic and pessimistic, offering limited policy prescriptions for growth beyond protectionism. It also overlooks the potential benefits of trade when supported by strong domestic productive capacity, innovation, and institutional development.

2.2 Empirical Literature

Onogbosele (2025) examined the effect of trade openness on Nigeria's agricultural and manufacturing sectors using the ARDL Error Correction Model. The study found that trade openness has weak short-run effects on manufacturing output but positively drives growth in the long run, alongside significant influences from interest rates and energy consumption. In the agricultural sector, trade openness produces a negative short-run impact, while long-run growth is supported by precipitation and capital goods imports. The study recommended sector-specific trade policies, improved credit access, stronger infrastructure, and a reliable energy supply to enhance the benefits of trade openness in Nigeria's real sector.

Nnadozie, Raifu, and Afolabi (2025) examined the impact of infrastructure development on manufacturing performance in 38 sub-Saharan African countries using panel data from 2003 to 2020. Employing FGLS, PCSE, and two-step Difference GMM to address heteroscedasticity, cross-sectional dependence, and endogeneity, the study found that infrastructure development significantly enhances manufacturing value added. Although some sensitivity appears when alternative performance measures are applied, the core evidence confirms that infrastructure is vital for strengthening manufacturing output. The paper

recommended that governments in the region prioritise expanding and improving infrastructure to support sustainable industrial growth.

Utouh (2024) examined how trade liberalization influences export performance and economic growth in Tanzania, aiming to determine whether increased openness strengthens the country's export capacity and long-term development. Using annual data from 1980 to 2020 and applying the ARDL technique, the study identified a positive long-run relationship in which liberalization boosts exports and export expansion, in turn, drives economic growth. The analysis also highlighted the role of institutional and structural conditions such as governance quality, private sector activity, and business start-up procedures in shaping both export outcomes and growth performance. The study concluded by recommending further liberalization efforts, stronger export promotion, improved governance, broader private sector support, and simplified business processes to foster sustained economic progress.

Obiukwu et al. (2024) investigated the impact of trade liberalization and the manufacturing sector on Nigeria's economic growth from 1981 to 2018. Using secondary data from the CBN and NBS, the study applied OLS regression, co-integration, and error correction models to examine short- and long-run relationships among real GDP, manufacturing output, exchange rate, trade openness, and trade balance. Findings revealed a significant long-run relationship, with 59% of short-run disequilibrium corrected annually. The study concluded that trade liberalization enhances growth only when supported by a strong manufacturing base and recommended policies to boost manufacturing productivity and ensure exchange rate stability.

Busse, Dary, and Wüstenfeld (2024) assessed how trade liberalisation influences manufacturing employment in developing economies by analysing data from 131 countries between 1991 and 2020 using panel fixed-effects and instrumental variable techniques. Their findings showed that increased trade openness has, on average, reduced manufacturing employment, suggesting that liberalisation has intensified competitive pressures that many domestic industries could not withstand. The study highlights significant regional disparities, with sub-Saharan Africa and Latin America experiencing the sharpest employment declines, consistent with ongoing patterns of premature deindustrialisation. Therefore, improving labour productivity and enhancing the competitiveness of domestic manufacturing firms are crucial policy measures for mitigating the adverse employment effects of global trade integration.

Abinabo and Abubakar (2023) analyzed the relationship between trade openness and economic growth in Nigeria using annual time series data from 1990 to 2021. The study applied descriptive statistics, the Augmented Dickey-Fuller (ADF) test, the Johansen cointegration test, and the Error Correction Mechanism (ECM) for estimation. Findings revealed a long-run relationship between trade openness, proxied by exports, imports, and trade volume, and economic growth, measured by real GDP. Specifically, trade openness had a positive and statistically significant impact on growth, while imports negatively influenced economic performance. The study concluded that Nigeria has benefited from external trade but cautioned against excessive importation that could lead to product dumping. It is recommended that the government continue

to promote foreign trade and border openness, while enforcing policies that safeguard domestic industries and ensure a balanced trade structure.

Ponnusamy (2022) assessed the growth effects of trade liberalization in small, open economies by applying the synthetic control method to compare outcomes across different export-specialization groups. The analysis showed that countries with a strong manufacturing export base experience the most substantial growth gains after liberalizing trade, largely due to marked expansions in manufacturing exports. In contrast, resource-dependent economies exhibit limited benefits from openness. These findings are reinforced by several robustness checks, underscoring the pivotal role of export composition in determining how effectively economies respond to liberalization.

Ogundipe (2022) analysed the impact of Nigeria's manufacturing sector on economic growth using annual data from 1981 to 2018 and an OLS estimation technique to evaluate how manufacturing output, capital, labour, foreign direct investment, and the exchange rate influence GDP. The findings showed that manufacturing output has a positive and significant effect on economic growth, confirming its role as a key driver of the Nigerian economy. Capital formation, labour, and foreign direct investment also exhibit positive and significant relationships with GDP, indicating that domestic factor accumulation and external investment jointly support output growth. In contrast, the exchange rate shows a positive but insignificant effect, suggesting that exchange rate volatility limits its contribution to economic expansion. The study demonstrated that strengthening manufacturing performance and improving macroeconomic stability are essential for sustaining long-term economic growth in Nigeria.

Adekunle and Akinwale (2020) analysed the relationship between trade liberalization and Nigeria's manufacturing sector from 1986 to 2018 using the Autoregressive Distributed Lag (ARDL) and Pairwise Granger Causality techniques. The study established a dynamic relationship between manufacturing output and trade liberalization, revealing that trade liberalization had an indirect yet significant effect on manufacturing productivity. The causality results showed an independent causal link from trade liberalization to manufacturing output, indicating that trade policies have hindered the sector's growth due to Nigeria's over-reliance on imported goods. The authors concluded that trade policies exert an undesirable impact on manufacturing performance and recommended removing restrictive trade barriers, stabilizing the exchange rate, and strengthening local manufacturing capacity to improve competitiveness and productivity.

Wani (2019) examined the relationship between trade openness and economic growth in Afghanistan over the period 1995–2016, focusing on the comparative effects of three measures of trade openness: exports, imports, and total trade volume. Using a combination of Autoregressive Distributed Lag (ARDL), Johansen-Juselius (JJ) co-integration, and Ordinary Least Squares (OLS) techniques, the study found that exports have a significant positive long-run effect on economic growth, whereas imports and total trade volume exert a significant negative impact. Robustness checks using Fully Modified OLS confirm these results. Furthermore, Granger causality and variance decomposition analyses reveal a unidirectional causality: from exports to economic growth in the export model, and from economic growth to imports and total trade in the other

models. The study recommended that Afghan policymakers prioritise export promotion strategies and ensure efficient utilization of capital goods to boost domestic production and economic growth.

Malefane and Odhiambo (2018) investigated the impact of trade openness on economic growth in South Africa over the period 1975–2014 using the Autoregressive Distributed Lag (ARDL) bounds testing approach. The study uniquely employed four proxies of trade openness: total trade-to-GDP ratio, exports-to-GDP ratio, imports-to-GDP ratio, and a residual trade openness index accounting for country size and geography. The long-run results revealed that only the total trade-to-GDP ratio significantly and positively affects economic growth, while the other proxies do not show a significant long-term effect. In the short run, the first three proxies exhibited a positive impact, but the trade openness index did not. These findings suggest that trade liberalization policies can enhance economic growth in South Africa, particularly when overall trade activity is expanded, emphasizing the need for targeted policies that promote international trade and integration.

Silajdzic and Mehic (2018) examined the link between trade openness and economic growth in ten Central and Eastern European transition economies using panel data covering 1995 to 2013. Applying Prais–Winsten PCSE and dynamic LSDVC estimators to address issues of heteroscedasticity, autocorrelation, and endogeneity, the study separated trade volumes from trade policy by analysing trade intensity measures alongside effective tariff rates. The evidence indicates that increased trade volumes tend to promote economic growth, whereas trade liberalisation policies reflected in lower tariff rates do not generate positive growth effects during the period reviewed. The study concluded that passive trade liberalisation may not benefit economies with weaker technological capabilities, underscoring the role of structural characteristics and initial development conditions in shaping the trade growth relationship.

Nteegah, Nelson, and Owede (2017) examined the effect of trade liberalization on Nigeria's economic growth using time series data analysed through the Autoregressive Distributed Lag (ARDL) model. The study found that oil and non-oil exports positively and significantly influenced real GDP in both the short and long run, while imports, especially refined petroleum products, harmed growth. The authors concluded that excessive import dependence undermines economic performance and recommended policies to boost non-oil exports, diversify the economy, and enhance domestic refining capacity. The study acknowledged that trade openness supports growth when export expansion outweighs the adverse effects of import dependency.

Ogu, Aniebo, and Elekwa (2016) investigated whether trade liberalization benefits or harms Nigeria's manufacturing sector using time series data from 1980 to 2013. Employing the Error Correction Mechanism (ECM), the study found that trade liberalization negatively affected manufacturing output in the short to medium term but showed potential to promote growth in the long run. Key factors such as exchange rate, interest rate, and inflation were found to influence manufacturing performance, though not all were significant. The paper concluded that liberalization initially hurts domestic manufacturers due to structural weaknesses, import dependence, and poor competitiveness. The study recommended a comprehensive reform

of Nigeria's competition policy to achieve a "neutral status" that enables local manufacturers to compete fairly in international markets and benefit fully from trade openness.

3. Methodology

Endogenous Growth Theory

This was developed by Romer (1986) and Lucas (1988), providing a more comprehensive framework by endogenising technological progress, human capital accumulation, innovation, and knowledge spillovers as drivers of long-term growth. Unlike neoclassical models, it allows for increasing returns to scale and recognises that policy choices, trade openness, and sectoral performance can directly influence productivity and growth. Its major strength lies in explaining how investment in manufacturing, infrastructure, human capital, and innovation can generate sustained growth through learning-by-doing and spillover effects. This makes it particularly suitable for analysing the interaction between trade liberalisation and manufacturing sector performance in Nigeria, where growth outcomes depend heavily on internal structural conditions and productive capacity.

Despite its strengths, endogenous growth theory is not without limitations. It often relies on strong assumptions regarding the efficiency of institutions, innovation capacity, and the absorptive ability of economies, which may not fully hold in developing countries with weak governance and infrastructural constraints. It measures key endogenous variables such as knowledge spillovers and technological progress, which remain empirically challenging. Nonetheless, the theory remains the most appropriate for this study because it explicitly links trade policy, manufacturing performance, and long-run economic growth through internally driven mechanisms rather than external forces alone.

Based on the foregoing review, this study is anchored on endogenous growth theory because it best explains how trade liberalisation can influence economic growth through its impact on manufacturing performance, capital accumulation, and productivity. Unlike classical and neoclassical frameworks, which either predict stagnation or treat technology as exogenous, endogenous growth theory recognises the critical role of domestic policies, sectoral development, and innovation in sustaining long-term growth. By focusing on internal structural dynamics, the theory provides a robust foundation for examining Nigeria's growth experience and the conditions under which trade liberalisation can effectively support industrialisation and economic transformation.

$$GDPPC = AK^{\alpha}L^{\beta} \quad (1)$$

For analytical clarity, the study assumes symmetry across industries, implying that all industries employ identical levels of capital and labour. This assumption allows for a more coherent interpretation of sectoral behaviour and its contribution to economic performance. Based on this symmetry, the aggregate production function can be expressed as follows:

$$GDPPC = AKI^a Li^{1-a} K^b \quad (2)$$

Where: RGDPPC = Real GDP per capita at time t

A = Total factor productivity

K = Capital stock

L = Labour

$$RGDPPC = f(CAP, LAB, TO, MAN, IFS) \quad (3)$$

$$RGDPPC = \alpha_0 + \alpha_1 CAP + \alpha_2 LAB + \alpha_3 TO + \alpha_4 MAN + \alpha_5 IFS \quad (4)$$

Where:

CAP= Capital

LAB= Labour

TO= Trade Openness

MAN= Manufacturing sector

IFS= Infrastructural spending

Where Economic Growth(RGDP) was measured by real GDP, Capital (CAP), measured by Gross capital formation, Labour (LAB) measured by Labour participation rate, Trade openness (TO) measured by the addition of import and export to real GDP, Manufacturing sector performance (MAN) by % of GDP and infrastructure measured by infrastructural frequency all sourced from World Development Indicators, 2023.

Model Specification

The endogenous growth theory assumes that investments in infrastructure, human capital, innovation, and the manufacturing sector create lasting productivity gains through spillovers and learning. It further holds that trade liberalisation, supported by effective use of capital and labour, strengthens these internal growth forces by widening markets and promoting technological advancement.

This study's econometric model is hereby specified in Linear Functional form as contained in eqn 4 and transformed as long-run results in eqn 5 below;

$$RGDP = \alpha_0 + \alpha_1 CAP_t + \alpha_2 LAB_t + \alpha_3 TO_t + \alpha_4 LMAN_t + LIFS_t + P_t \quad (5)$$

The increase in Infrastructural spending, Capital and Labour participation rate is expected to stimulate economic growth in Nigeria. Hence, the short-run econometrics estimate is expressed below:

$$\begin{aligned}\Delta \text{RGDP}_t = & \alpha_0 + \sum_{l=1}^p Y_{1l} \Delta \text{LRGDP}_{t-1} + \sum_{j=1}^{q_1} Y_{2j} \Delta \text{LCAP}_{t-1} + \sum_{j=1}^{q_2} Y_{3j} \Delta \text{LAB}_{t-1} + \sum_{j=1}^{q_3} Y_{4j} \text{TO}_{t-1} \\ & + \sum_{j=1}^{q_4} Y_{5j} \text{MAN}_{t-1} + \sum_{j=1}^{q_5} Y_{6j} \Delta \text{IFS}_{t-1} + \Phi ECT_t + P_t\end{aligned}\quad (6)$$

Where y_1 - y_6 are the Vector parameters of the long run estimates, Δ are the operators of the First difference, δ_1 - δ_6 are the vector parameters of the short run estimates, P , and q_1 – q_5 are the optimal lag length, α_0 is the parameter of the drift component, while P_t is the stochastic white noise.

4. Result and Discussion

4.1 Result

Table 1: Descriptive Statistics

	GDP	CAP	LAB	TO	MAN	IFS
Mean	2179.284	19274.77	17.84001	4.169243	10.42439	15.21040
Median	2354.276	10089.57	17.84550	3.302826	9.642380	12.12547
Maximum	2585.734	82889.22	18.11129	20.79404	15.36380	63.18255
Minimum	1421.680	2404.816	17.55051	-3.698743	6.552817	8.560376
Std. Dev.	353.0642	21730.01	0.175205	6.019647	2.547141	10.72045
Skewness	-0.844817	1.717476	-0.030298	1.113667	0.438294	3.959364
Kurtosis	2.452069	4.868519	1.808733	3.820251	1.994025	18.22540
Jarque-Bera	3.155095	15.29026	1.422789	5.633826	1.780391	294.5191
Probability	0.206481	0.000478	0.490959	0.059790	0.410575	0.000000
Sum	52302.81	462594.4	428.1601	100.0618	250.1853	365.0496
Sum Sq. Dev.	2867050.	1.09E+10	0.706023	833.4314	149.2224	2643.347
Observations	24	24	24	24	24	24

Source: Authors' Compilation, 2025

Table 1 presents the descriptive statistics of the variables employed in the study. The mean and median values for GDP and labour (LAB) are relatively close, indicating stable economic activity and a fairly uniform labour input over the sample period. In contrast, capital (CAP), trade openness (TO), and infrastructure (IFS) show wider gaps between their means and medians, suggesting the presence of volatility and possible extreme values. Manufacturing output (MAN) exhibits moderate dispersion, reflecting modest but uneven industrial performance.

The Jarque–Bera statistics indicate mixed distributional properties among the variables. GDP, LAB, MAN, and TO do not significantly depart from normality, as their probability values exceed the 5% significance

level. However, CAP and IFS reject the null hypothesis of normality, largely due to skewness and excess kurtosis, implying the presence of outliers or structural fluctuations.

Overall, the descriptive results suggest that while some variables display relative stability, others are characterized by volatility and non-normality, supporting the application of econometric techniques that are robust to such distributional differences.

Table 2: Correlation matrix

	GDP	CAP	LAP	TO	MAN	IFS
GDP	1.0000					
CAP	0.4335	1.0000				
LAB	0.2220	0.2536	1.0000			
TO	-0.5455	-0.4960	0.3031	1.0000		
MAN	-0.3255	0.5713	-0.2111	0.0495	1.0000	
IFS	0.0720	0.3736	0.3230	-0.0720	-0.2091	1.0000

Source: Authors' Compilation, 2025

The result shows that capital (CAP) is positively correlated with economic growth (GDP), suggesting that increases in investment and capital formation tend to support Nigeria's growth. Labour (LAB) also shows a weak positive correlation with GDP, indicating that labour contributes to growth but not strongly. Trade openness (TO) has a negative correlation with GDP, implying that Nigeria's level of trade liberalisation may not have translated into higher growth during the period, possibly due to import-dependence or weak export capacity. Manufacturing output (MAN) is negatively correlated with GDP but positively correlated with capital, suggesting that capital increases do not necessarily boost manufacturing's contribution to growth. Finally, Infrastructural spending (IFS) shows only a weak positive correlation with GDP, indicating limited direct growth influence.

Table 3: Unit Root Test

Variables	ADFL	Levels	1st diff	PP	Levels	1st diff	Order of integration
GDP	-3.1974**			-3.1520**			I(0)
CAP	-0.2211		-3.7673***	-0.3425		-3.8921***	I(1)
LAB	-2.1562		-4.3014***	-2.4292		-4.5793***	I(1)
TO	-1.2670		-9.1556***	-1.9186		-8.8617***	I(1)
MAN	-2.7240		-5.0855***	-1.8254		-5.8651***	I(1)
IFS	-2.1924		-6.6386***	-2.1662		-6.7683***	I(1)

Source: Authors' Compilation, 2025

The unit root tests show that GDP is stationary at level (I(0)), indicating that economic growth in Nigeria does not exhibit persistent trends and quickly reverts to its long-run path after shocks. In contrast, capital

(CAP), labour (LAB), trade openness (TO), manufacturing output (MAN), and Infrastructural spending (IFS) are all non-stationary at the level but become stationary after first differencing (I(1)), meaning these variables follow long-run trends and shocks to them have lasting effects. The mix of I(0) and I(1) variables suggests that the model is suitable for ARDL estimation, as it can handle variables integrated at different orders but not above I(1)

Table 4: VAR optimal lag length

VAR optimal lag length criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-928.3952	NA	3.14e+29	84.94502	85.24258	85.01512
1	-746.6526	247.8308*	6.34e+23	71.69569	73.77859	72.18636
2	-688.2223	47.80663	2.07e+23*	69.65657*	73.52481*	70.56781*

Source: Authors' Compilation, 2025

Table 4 shows the results of the VAR lag length selection using various information criteria. Although the LR test suggests lag 1 as the preferred option, the FPE, AIC, SC, and HQ criteria all identify lag 2 as the optimal lag, indicated by the lowest values in their respective columns. Since the majority of the criteria favour lag 2, it is considered the most appropriate lag length for the VAR model.

Table 5: Bound cointegration test

Test statistics	Value	K
F-statistics	9.383170	5
Critical value bound		
Significant level	I(0)	I(1)
10%	2.407	3.517
5%	2.910	4.193
1%	4.134	5.761

Source: Authors' Compilation, 2025

The bounds test result shows an F-statistic of 9.38, which is well above the upper critical value (I(1)) at the 1%, 5%, and 10% significance levels. This indicates strong evidence of cointegration among the variables, meaning there is a stable long-run relationship between economic growth and its determinants (capital, labour, trade openness, manufacturing output, and financial sector development). Economically, this implies that despite short-run fluctuations, these variables move together over time and adjust toward a common long-run equilibrium in Nigeria.

$$\begin{aligned}
\Delta \text{RGDP} = & \alpha_0 + \lambda_1 \text{RGDP}_{t-1} + \lambda_2 \text{LCAP}_{t-1} + \lambda_3 \text{LAB}_{t-1} + \lambda_4 \text{TO}_{t-1} + \lambda_5 \text{MAN}_{t-1} + \lambda_6 \text{IFS}_{t-1} \\
& + \sum_{i=1}^P Y_{1i} \Delta \text{RGDP}_{t-1} + \sum_{j=1}^{q_1} Y_{2j} \Delta \text{CAP}_{t-1} + \sum_{j=1}^{q_2} Y_{3j} \Delta \text{LLAB}_{t-1} + \sum_{j=1}^{q_3} Y_{4j} \Delta \text{TO}_{t-1} \\
& + \sum_{j=1}^{q_4} Y_{5j} \Delta \text{LMAN}_{t-1} + \sum_{j=1}^{q_5} Y_{6j} \Delta \text{IFS}_{t-1} + P_t
\end{aligned}
\tag{7}$$

Where, Δ are the operators of the first difference, y_1 - y_6 are the Vector parameters of the long run estimates, λ_1 - λ_6 are the vector promoter of the short run estimates, P and q_1 – q_6 are the optional lag length, α_0 is the constant parameter, and P_t is the stochastic white noise. This was developed by Pesaran et al (2001).

To determine the direction of the “co-integration”, the rejection of the null hypothesis indicates that there is a long-run relationship among the variables in equation 7 above.

The cointegration null hypothesis is estimated below

$$H_0: \lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \tag{8}$$

To this end, when employing the ARDL bound test with the F-statistic, it shows two values depicting the lower bound 1 (0) and the upper bound 1 (1) to examine a short-run or long-run cointegration among the variables.

However, if the values of the F-statistic are less than 1(0) of the lower bound value, it shows that the variables do not cointegrate with each other. Conversely, if the F-statistic is greater than 1(0) of the lower bound values, the variables are said to be cointegrated.

Table 6: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Trace Statistics	Critical Value (0.05)	Prob
None*	0.919784	95.75366	0.0000
At most 1*			
At most 2*			
At most 3*			
At most 4			
At most 5			

***, ** and * represents level of significance at 1%, 5% and 10% respectively.

Table 6 presents the results of the Johansen cointegration test using the trace statistic. The null hypothesis tested is the number of cointegrating equations (CEs) in the system. For the first row, the trace statistic of 0.919784 is compared to the 5% critical value of 95.75366, with a p-value of 0.0000, indicating rejection of the null hypothesis of no cointegration at conventional significance levels. The asterisks (*) denote significance at 10%, 5%, and 1%, highlighting that at least one cointegrating relationship exists among the variables. The remaining rows (at most 1, 2, 3, etc.) provide thresholds for additional cointegrating equations, though they are not significant in this case.

Table 7: Unrestricted Cointegration Rank Test (Max Eigen)

Hypothesized No. of CE(s)	Max Eigen Statistics	Critical Value (0.05)	Prob
None*	0.919784	40.07757	0.0005
At most 1*			
At most 2*			
At most 3*			
At most 4			
At most 5			

***, ** and * represents level of significance at 1%, 5% and 10% respectively.

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.** Critical Value
None *	0.919784	173.7550	95.75366	0.0000
At most 1 *	0.884069	118.2483	69.81889	0.0000
At most 2 *	0.803846	70.84347	47.85613	0.0001
At most 3 *	0.600013	35.00868	29.79707	0.0115
At most 4	0.481103	14.84957	15.49471	0.0624
At most 5	0.018752	0.416462	3.841465	0.5187
Trace test indicates 4 cointegrating equation(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Unrestricted Cointegration Rank Test (Max-eigen value)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.** Critical Value
None *	0.919784	55.50679	40.07757	0.0005
At most 1 *	0.884069	47.40479	33.87687	0.0007
At most 2 *	0.803846	35.83478	27.58434	0.0035
At most 3	0.600013	20.15912	21.13162	0.0679
At most 4 *	0.481103	14.43310	14.26460	0.0470
At most 5	0.018752	0.416462	3.841465	0.5187

Max-eigenvalue test indicates 3 cointegrating equation(s) at the 0.05 level	
* denotes rejection of the hypothesis at the 0.05 level	
**MacKinnon-Haug-Michelis (1999) p-values	

Table 7 presents the results of Johansen's cointegration tests using both the Maximum Eigenvalue and Trace statistics. The Max-Eigen test indicates that the null hypothesis of no cointegration (None) is rejected at the 1% level ($p = 0.0005$), suggesting at least one cointegrating relationship among the variables. The Trace test further confirms multiple cointegrating relationships, with the null of no cointegration and the nulls of at most 1, 2, and 3 cointegrating equations all rejected at conventional significance levels, while the nulls for at most 4 and 5 are not rejected. Overall, these results imply the presence of up to four cointegrating relationships in the system, indicating a long-run equilibrium among the variables.

Table 8: ARDL Result

Dependent Variable: GDP				
Selected model: ARDL(1,2,0,0,2,0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	0.964072	0.133296	7.232557	0.0000
CAP	0.010784	0.005579	1.932888	0.0794
CAP(-1)	-0.018302	0.006219	-2.943125	0.0134
CAP(-2)	0.011892	0.005723	2.077918	0.0619
LAB	-1.50E-05	6.75E-06	-2.215985	0.0487
TO	-3.390620	1.920758	-1.765251	0.1052
MAN	-8.788759	13.85664	-0.634263	0.5389
MAN(-1)	29.02518	15.15506	1.915213	0.0818
MAN(-2)	-38.48901	12.12556	-3.174204	0.0089
IFS	3.259219	1.224867	2.660875	0.0222
C	1057.436	210.2282	5.029942	0.0004
R-squared	0.991632	Mean dependent var		2246.167
Adjusted R-squared	0.984025	S.D. dependent var		283.2738
S.E. of regression	35.80338	Akaike info criterion		10.30081
Sum squared resid	14100.70	Schwarz criterion		10.84634
Log likelihood	-102.3090	Hannan-Quinn criterion.		10.42932
F-statistic	130.3571	Durbin-Watson stat		2.595438
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent test results do not account for the model selection.				

Report below shows the estimated ARDL (1,2,0,0,2,0) results, highlighting the short-run dynamics and underlying long-run tendencies of GDP and its determinants. The lagged GDP coefficient is positive and highly significant, indicating strong output persistence and gradual adjustment to shocks. This confirms that

past economic performance plays a dominant role in shaping current growth, consistent with a stable long-run relationship once cointegration is established.

In the short run, capital exhibits adjustment dynamics: its contemporaneous and second-lag effects are positive, while the first-lag effect is negative, suggesting temporary adjustment costs before productivity gains materialise. Labour exerts a negative and significant effect on GDP, reflecting weak labour productivity. Trade openness shows a negative but insignificant impact, implying limited immediate growth effects. Manufacturing displays mixed short-run behaviour, with a significant negative effect emerging after two periods, possibly due to structural constraints. In contrast, Infrastructural spending has a positive and significant effect, underscoring its immediate role in supporting economic growth.

Table 9: Error Correction

Dependent Variable: D(GDP)				
Selected model: ARDL(1,2,0,0,2,0)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)*	-0.035928	0.133296	-0.269539	0.7925
CAP(-1)	0.004373	0.001851	2.362080	0.0377
LAB**	-1.50E-05	6.75E-06	-2.215985	0.0487
TO**	-3.390620	1.920758	-1.765251	0.1052
MAN(-1)	-18.25258	8.698377	-2.098389	0.0598
IFS**	3.259219	1.224867	2.660875	0.0222
C	1057.436	210.2282	5.029942	0.0004
D(CAP)	0.010784	0.005579	1.932888	0.0794
D(CAP(-1))	-0.011892	0.005723	-2.077918	0.0619
D(MAN)	-8.788759	13.85664	-0.634263	0.5389
D(MAN(-1))	38.48901	12.12556	3.174204	0.0089
R-squared	0.850279	Mean dependent var		43.22294
Adjusted R-squared	0.714170	S.D. dependent var		66.96837
S.E. of regression	35.80338	Akaike info criterion		10.30081
Sum squared resid	14100.70	Schwarz criterion		10.84634
Log likelihood	-102.3090	Hannan-Quinn criterion.		10.42932
F-statistic	6.247012	Durbin-Watson stat		2.595438
Prob(F-statistic)	0.002786			
* p-values are incompatible with the t-bounds distribution.				
** Zero-lag variable.				

The error-correction representation in Table 9 provides insight into the long-run relationship between GDP and its determinants through the coefficient on the lagged level of GDP. Although the coefficient of GDP(-1) is negative, as theoretically expected, it is statistically insignificant, indicating a weak and slow adjustment of GDP toward its long-run equilibrium following short-run shocks. This suggests that deviations from long-

run growth paths persist for some time, and the economy does not quickly return to equilibrium after disturbances.

Nevertheless, the presence of significant level terms for capital, labour, manufacturing, and infrastructure implies that these variables are relevant in shaping long-run growth outcomes. In particular, capital accumulation and Infrastructural spending are associated with positive long-run growth effects, while labour and manufacturing exhibit negative long-run influences, reflecting structural inefficiencies and productivity constraints. Overall, the results indicate that while a long-run relationship exists, the speed of adjustment is weak, underscoring the need for sustained structural and institutional reforms to enhance long-run economic growth.

Table 10: Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-0.035928	0.003566	-10.07516	0.0000
D(CAP)	0.010784	0.001805	5.975045	0.0000
D(CAP(-1))	-0.011892	0.002258	-5.266868	0.0001
D(MAN)	-8.788759	8.102877	-1.084647	0.2932
D(MAN(-1))	38.48901	8.647074	4.451102	0.0004
R-squared	0.850279	Mean dependent var		43.22294
Adjusted R-squared	0.815051	S.D. dependent var		66.96837
S.E. of regression	28.80023	Akaike info criterion		9.755360
Sum squared resid	14100.70	Schwarz criterion		10.00332
Log likelihood	-102.3090	Hannan-Quinn criterion.		9.813773
F-statistic	24.13618	Durbin-Watson stat		2.595438
Prob(F-statistic)	0.000001			
* p-values are incompatible with the t-Bounds distribution.				

The table 10 presents the results of the error correction model (ECM). The error correction term (COINTEQ*) is negative and highly significant (-0.0359, $p = 0.000$), indicating that any short-term deviations from the long-run equilibrium are rapidly corrected. In the short run, changes in capital (D(CAP)) positively and significantly influence GDP, whereas its one-period lag (D(CAP(-1))) exerts a negative effect, reflecting dynamic adjustment. Current-period changes in manufacturing (D(MAN)) are not significant, but its lagged value (D(MAN(-1)) positively and significantly affects output. The model explains a large portion of the variation in short-run GDP ($R^2 = 0.85$; Adjusted $R^2 = 0.815$) and passes diagnostic tests, with a Durbin–Watson statistic of 2.595 indicating no serious autocorrelation. These findings highlight the short-run

importance of capital and lagged manufacturing in GDP growth, alongside a robust mechanism for restoring long-run equilibrium.

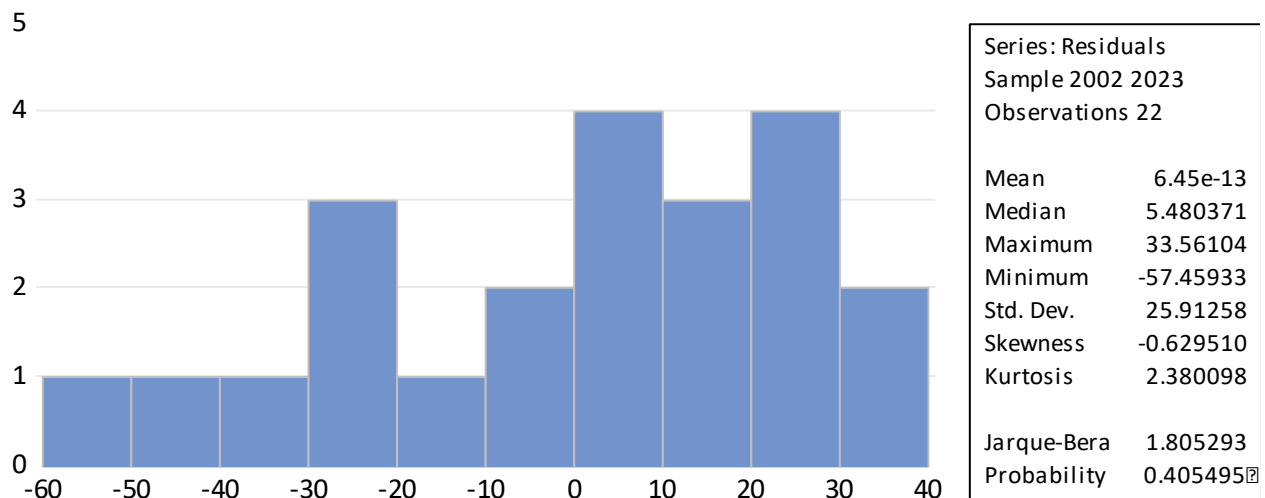


Table 11: Breusch-Godfrey serial correlation LM Test

F-statistics	1.708732	Prob. F(1,10)	0.2204
Obs*R-squared	3.210604	Prob. Chi_square(1)	0.0732

The F-statistic has a probability value of 0.2204, while the Obs*R-squared has a probability value of 0.0732. Since both values are greater than the 0.05 level of significance, the null hypothesis of no serial correlation cannot be rejected. This indicates that there is no evidence of serial correlation in the model's error terms, meaning the residuals are independent and the regression results are reliable with respect to autocorrelation.

Table 12: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity			
F-statistics	0.708641	Prob. F(10,11)	0.7025
Obs*R-squared	8.619790	Prob. Chi_square(10)	0.5685
Scaled explained SS	1.487020	Prob. Chi_square(10)	0.9990

Table 12 presents the results of the Breusch–Pagan–Godfrey test for heteroskedasticity, which examines whether the variance of the error terms in a regression model is constant (homoskedastic) or not. The null hypothesis states that the model is homoskedastic. The reported F-statistic of 0.708641 with a probability

value of 0.7025 is greater than the 0.05 significance level, indicating that the null hypothesis cannot be rejected. Similarly, the ObsR-squared value of 8.619790 with a probability of 0.5685 and the Scaled explained sum of squares value of 1.487020 with a probability of 0.9990 are all statistically insignificant since their p-values exceed 0.05. This suggests that there is no evidence of heteroskedasticity in the model, meaning the error terms have constant variance and the regression estimates are reliable and unbiased for inference.

4.2 Discussion of Findings

The findings reveal that Nigeria's economic growth has remained positive but modest, consistent with recent National Bureau of Statistics reports. Real GDP expanded by 3.4 percent in 2024, driven largely by the services and non-oil sectors. This pattern aligns with Obiukwu et al. (2024), who also reported a long-run equilibrium relationship between GDP and structural variables such as manufacturing output, trade openness, and capital formation. The present study further confirms the existence of cointegration among GDP, capital, labour, manufacturing, trade openness, and infrastructure spending, as shown by the ARDL bounds and Johansen tests. This supports earlier evidence by Abinabo and Abubakar (2023), who found a significant long-run link between trade openness and Nigeria's economic growth. Therefore, the results reinforce the view that internal sectoral dynamics play a central role in sustaining macroeconomic expansion.

Despite the positive trajectory of aggregate GDP, the study identifies persistent weaknesses in the manufacturing sector. Descriptive results show fluctuations and a decline in the sector's share of GDP between 2023 and 2024, which is consistent with Adekunle and Akinwale (2020), who observed that trade liberalisation has not translated into sustained industrial growth due to structural rigidities and import dependence. The negative short-run effect of manufacturing output on GDP in the ARDL model mirrors the findings of Ogu et al. (2016), who reported that liberalisation initially suppresses manufacturing performance because domestic firms struggle to compete with imported goods. However, in contrast to the contractionary short-run effects, the positive lagged relationship in the model suggests potential for medium-term improvement if structural constraints are addressed.

The study also finds that trade openness exerts a negative short-run influence on economic growth, although not statistically significant at conventional levels. This result diverges from studies such as Abinabo and Abubakar (2023), who reported a positive long-run effect of openness on growth in Nigeria. It is, however, consistent with evidence from Wani (2019), who found that imports and total trade volume depress economic growth in Afghanistan, and with Nteegah et al. (2017), who showed that high import dependence undermines Nigeria's output performance. These divergences highlight that the growth effect of trade openness largely depends on domestic productive capacity and the balance between exports and imports. In economies with a weak industrial structure, liberalisation can widen exposure to external shocks and intensify import pressures. Capital formation demonstrates mixed but generally positive effects on economic growth, as indicated by the significant short-run coefficients. This is broadly consistent with endogenous growth theory, which

emphasises the role of capital accumulation in generating increasing returns and productivity spillovers. The results also support Udah (2010), who argues that investment complements labour and technology in driving growth. Conversely, labour exhibits a negative and significant effect on GDP in the short run, which may reflect Nigeria's low labour productivity and structural unemployment. This finding diverges from classical assumptions but aligns with empirical observations in economies where labour supply grows faster than productive job opportunities.

The combined findings confirm a long-run equilibrium relationship among GDP, trade openness, manufacturing, capital, and infrastructure spending, reinforcing the premise of endogenous growth theory that internal structural factors and spillovers shape long-term economic performance. The results show both convergence and divergence with existing studies, highlighting that Nigeria's ability to benefit from trade liberalisation depends on strengthening its manufacturing base, improving infrastructure, and reducing import dependence. While policy reforms have shown early signs of stabilization, sustained growth will require coordinated efforts to enhance competitiveness, stimulate value addition, and promote technological upgrading.

5. Conclusion and Recommendation

5.1 Conclusion

The study confirms that Nigeria's economic growth is driven by a long-run equilibrium relationship among capital formation, labour dynamics, trade openness, manufacturing output, and infrastructure spending. The ARDL results underscore the centrality of domestic structural factors in shaping growth trajectories, consistent with the predictions of endogenous growth theory. While capital investment and Infrastructural spending enhance growth, the mixed effects of trade openness and labour reveal persistent structural inefficiencies that limit productivity gains. In other words, evidence suggests that Nigeria's long-term growth prospects depend on strengthening its manufacturing base, improving productivity, and adopting trade and macroeconomic policies that support sustained structural transformation.

5.2 Recommendation

Based on the findings of the study, it is recommended that policymakers give priority to investment in the manufacturing sector through improved infrastructure, better access to finance, targeted incentives, and support for innovation. There is a strong need to promote economic diversification by strengthening non-oil sectors, reducing dependence on imports, and encouraging local production. Trade policies should be balanced to promote exports while providing reasonable protection for domestic industries. Enhancing infrastructure and expanding credit access remain essential for raising productivity and sustaining industrial growth. Since improvements in total factor productivity are critical for translating trade liberalisation into

sustained economic growth, complementary investment in technology, human capital, and institutional quality is necessary. Future research should further examine the channels through which trade openness affects productivity, including firm efficiency, technology adoption, and cross-sector and cross-country analysis.

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