

Manufacturing Sector Outputs and Economic Growth in Nigeria

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ABSTRACT

Manufacturing sector in Nigeria has been experiencing a stunted growth and its contribution to gross domestic product has remained low. It is on this note that this study examined the impact of manufacturing sector outputs and economic growth in Nigeria within the period of 1986 to 2024. Data for the analysis were sourced from CBN statistical bulletin. Gross domestic product (GDP) was used as a dependent variable while food, beverages and tobacco (FBT), textile, apparel and footwear (TAF) and motor vehicles and assembly (MVA), are the exogenous variables. Consequently, this research adopted Ex-Post Factor research design in which multiple regressions was used. Augmented Dickey Fuller (ADF) and autoregressive distributed lag model were employed as the research techniques. The results showed that: the production of food, beverages and tobacco and that of motor vehicles and assembly had positive and significant impact on economic growth in Nigeria, whereas the production of textile, apparel and footwear had a negative and significant impact on economic growth in Nigeria within the time of the study. Based on the results, this research recommends that Nigerian government should focus on mitigating the structural inefficiencies to transition the sector from a growth-retarding burden to an economic engine. Again, government of Nigeria should transition from simple "Completely Knocked Down" (CKD) vehicle coupling to deep local manufacturing.

Keywords: *Manufacturing Sector Outputs, Economic Growth, ARDL, Nigeria*

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1. Introduction

Manufacturing sector plays a vigorous role in the economic transformation of any nation, whether developed or developing. This means that manufacturing sector serves as an avenue for increasing productivity in relation to import replacement and export expansion, creating foreign exchange earning capacity, raising employment and per capita income, which causes unrepeatable consumption pattern (Loto, 2012). This suggest that the primary goal of manufacturing sector development is to increase the economy's productive capacity towards generating more goods and services (Rubmann, 2015). Increasing the economy's productive capacity is beneficial in multiple ways, such as increased employment, increased income for individuals and businesses, improved living standards, and economic stability (Porter, 2000; Bhide, 2009). In addition, Nigeria's foreign exchange woes may also be solved by developing the manufacturing sector, reducing the country's dependence on imports, thus reducing the outflow of foreign exchange (David et al., 2010). The manufacturing sector development process helps in creating new employment opportunities, bring in additional capital and resources, stimulate economic growth, and diversify the economy. Since Nigeria's independence in 1960, the government has implemented several policies and strategies to grow the manufacturing sector. The import substitution industrialization (ISI) plan was the first of these initiatives. The goal was to lessen reliance on imported consumer goods while providing job opportunities for the Nigerian workforce. Since then, succeeding

administrations have developed significant industrial plans to suit the existing economic realities of the time at various periods (Igwemma & Nwoko, 2007). These strategies include incentivizing and creating an environment conducive to foreign investment, lowering taxes for businesses and manufacturers, improving infrastructure, and investing in research and development.

Conceptually, manufacturing sector could be conceived as any economic unit that processes or creates new commodities through the transformation of raw materials or semi-finished goods (Eze & Ogiji, 2013). Adebayo (2010) conceived manufacturing sector as those industries which are involved in the manufacturing and processing of items and which indulge or give free rein in either the creation of new commodities or in value addition.

The performance of the manufacturing sector vis-a-vis manufacturing employment shown that from 1981 to 1985, manufacturing accounted for 9.46 percent of GDP on a five-year average, while manufacturing employment accounted for 13.37 percent. The average fell to 9.29 percent between 1986 and 1990, while manufacturing employment reached 13.37 percent, an increase of 0.2 percentage points. From 1991 to 1995, the manufacturing sector's share of GDP continued to fall, from 9.35 percent to 8.65 percent, while manufacturing employment rose from 13.37 percent to 13.38 percent. From 1996 to 2000, manufacturing's share of GDP fell to an average of 6.82 percent, while manufacturing employment fell to 12.704 percent, a significant drop of more than 100 points; from 2001 to 2000, manufacturing's share of GDP fell to an average of about 6.26 percent, a decline from the previous five-period average, while manufacturing employment fell to 11.908 percent (National Bureau of Statistics, NBS, 2021; Central Bank of Nigeria, CBN, 2021).

Manufacturing sector in Nigeria has been experiencing a stunted growth and its contribution to gross domestic product has remained low. For instance, the manufacturing sector as a whole remains small, accounting for only 6.6% of GDP in 2016 and 12% of employment (World Bank, 2018). Manufacturing output growth fell drastically to an annual average of about 2.6% during the period 1986-78 even with the introduction of SAP in 1986 up till 1993 when the growth rate in the sector was negative. In 2020, the manufacturing sector growth is 9.06% (CBN, 2021). From statistical report, it has been observed that the contribution of manufacturing to GDP has not been encouraging in spite of the several policies put in place to encourage production for export. For instance, in 2021, its contribution to GDP was 8.98% (CBN, 2021). It is evident that manufacturing sub-sector of the Nigerian economy has not reached a desired stable level to perform its function as an engine of growth. This shows that there is gross under-utilization of resources (Edeh & Okia, 2024).

From 2016 to 2020, GDP recorded a positive change of 8.57 per cent; manufacturing output recorded an increase of 12.82 per cent; cement manufacturing recorded a positive change of 43.24 per cent, food, beverage and tobacco recorded a positive change of 0.47 per cent; output of textile, apparel and footwears recorded a change increase of 32.23 per cent, output of wood and wood products recorded a positive change of 16.00 per cent while manufacturing employment recorded an increase of 5.94 per cent from the previous period (CBN, 2021). The analysis of the change in these outputs and employment shows a seemingly positive correlation between manufacturing sector development and employment in Nigeria. This study, therefore, sought to empirically establish the nexus between manufacturing sector outputs and economic growth in Nigeria.

2. Literature Review

2.1 Empirical review

Aniefiok et al (2024) examined the relationship between manufacturing sector output and economic growth in Nigeria from 1981 to 2022. The study adopted a quantitative econometric technique using ordinary least square method (OLS), after testing for level of integration of the macroeconomic variables in the specified model. The OLS result revealed that manufacturing sector output has a positive but insignificant relationship with economic growth in Nigeria within the period reviewed.

Edith et al (2024) assessed the effect of manufacturing sector on Nigerian economy. Data obtained from CBN bulletin was analyzed using OLS technique. The research found out that Cement had a positive (34.79977) effect on GDP; Food had a positive (19.04310) effect on GDP; Textile had positive (16.70344) effect on GDP; Non-metallic products had a negative (-100.0591) effect on GDP; (5) Motor vehicle & assembly had a negative (-106.5468) effect on GDP. The research recommended that government should improve on the ease of doing business, interventions in interest rate and exchange rate in Nigeria. The government need to gear up in development of infrastructures that will boost the manufacturing sub-sector so as to boost the gross domestic product.

Ogar et al (2024) investigated the impact of manufacturing output on employment in Nigeria. The Autoregressive Distributive Lag (ARDL) estimation technique was used to establish the long run relationship among the variables. It was revealed that long run relationship exists among the variables in the estimated model. The results of the Error Correction Mechanism (ECM) within the framework of the ARDL showed that the development of the manufacturing sector is one of the key strategies for the creation of employment opportunities in Nigeria.

Edeh and Okia (2024) examined the impact of fiscal policy on manufacturing sector output in Nigeria for the period (1981-2021). For this study, annual time series data on manufacturing sector output, government expenditure, taxation, trade openness, inflation rate, exchange rate and government borrowing were collected from the Central Bank of Nigeria (CBN) 2021 Annual Statistical Bulletin. To analyse the data, the Ordinary Least Square (OLS) regression technique was used. The results showed that government expenditure has positive and significant impact on manufacturing sector output in Nigeria. There is a uni-directional causality flowing from manufacturing sector output to government expenditure between government expenditure and manufacturing sector output in Nigeria.

Evbuomwan et al (2021) investigated the determinants of manufacturing sub-sector output growth in Nigeria between 1981 and 2020 with time series data extracted from Central Bank of Nigeria data base. The analysis was carried out using the ARDL technique in view of the fact that all the variables were not stationary at the same order. Anchoring on AK-type neoclassical growth frameworks, the short run Cointegration results revealed that manufacturing industries capacity utilization rates and commercial banks credit to the manufacturing sub-sector positively influenced manufacturing output, while inflation rate and exchange rate had negative coefficients. The study also revealed that increase in capital expenditure, credit to manufacturers and electricity consumption positively spurred manufacturing output in the long run. The authors therefore recommend that increased capital expenditure by the government to revamp the power sector and enhanced access to affordable

credit from banks by manufacturers would guarantee Nigerian manufacturing sub-sector long term development.

Alifa et al. (2021) evaluated the impact of small and medium enterprise units and output value on Indonesian provinces' economies and employment in 2017–2019. The dependent variable is regional economy and employment, while the independent variable is small and medium enterprise units and production value. This study analyses secondary data using panel data regression. Thirty-four samples yielded 102 observations. The Fixed Effect Model was utilized for panel data regression. The regional economy's dependent variable was unaffected by industrial unit number and production value. However, manufacturing units and production value positively affect employment.

Ajeigbe et al (2021) examined the effect of manufacturing sector development on youth unemployment in Africa using a panel data of thirty-three African countries covering 2002 to 2018. The estimation technique used was the Panel Autoregressive Distributed lag method (PARDL). The study found a positive long run relationship between manufacturing value added and youth unemployment and recommended that to curb the menace of youth unemployment ravaging major African Countries, policy focal point should be directed towards the development of manufacturing sector, conducive economic environment to attract foreign direct investment, policies should be put in place to enhance capital formation with domestic credit being made available for new and existing entrepreneurs and industrialist.

Adeniyi (2021) examined whether the Nigerian manufacturing sector creates more jobs during economic expansions, which did not occur between 1981 and 2014. The study examined industry employment intensity of gross value-added rise during expansion using the Vector Error Correction Model. (VECM). Over the past year, manufacturing employment was inversely associated with agriculture employment. The data also show that manufacturing employment is connected with administration and social services employment throughout the past year. Manufacturing's employment elasticity of growth compared to administration and social services is 5.26 per cent a year later.

Atan and Effiong (2020) investigated the role of manufacturing sector in curbing youth unemployment in Nigeria using annual time series data from 1991 to 2019. The method of data estimation was the autoregressive distributed lag estimation technique. The study found manufacturing output to have negative effect on youth unemployment both in the short-run and in the long-run. This implies that increasing the volume of manufacturing activities will reduce youth unemployment. The Granger causality test also showed that there exists causal relationship between youth unemployment and industrialization in Nigeria.

2.2 Theoretical framework

The study is rooted in the Cobb-Douglas production function. This theory is all about the function of household in the production processes. That is, Cobb-Douglas production function maintains that output in the economy changes proportionally to input changes through the factors of production such as labour and capital combined in production processes (Okezie et al, 2013). In fact, according to Becker (1965), the theory upholds that household only consumes goods it produces, and the production of each goods requires the input of household members' time and other purchased inputs like capital and labour. Hence, the production function is specified as:

$$Q = AL^{\beta} K^{\alpha} \quad 1$$

Where; Q is the quantity of output produced, L is the quantity of labour force employed in production, K is the capital input utilized in production, A is the innovation employed in the production process in terms of technology, which also referred to as multi-factor productivity, and it captures variables that account for effects in total farm output not caused by traditionally measured inputs of labour and capital; β is the output elasticities of labour while α output elasticities of capital. The above values are fixed and are determined by available technology.

3. Methodology

3.1 Research design

For the purpose of this study, ex-post facto research was adopted; as the researcher made use of what had already existed since it involves time series research. Unit root test and Autoregressive Distributed Lag (ARDL) model were employed as the method of analysis. The test of unit root was used in the research to determine the order of integration of the variables of the study; while the ARDL technique was adopted for the examination of the magnitude or elasticity of the coefficients of the independent variables in relation to the dependent variable.

3.2 Model Specification

The model of this study is anchored on Cobb-Douglas production function $Q = AL^{\beta} K^{\alpha}$, which maintains that output in the economy changes proportionally to input changes through the factors of production such as labour and capital combined in production processes; where; Q is the quantity of output produced, L is the quantity of labour force employed in production, K is the capital input utilized in production, A is the innovation employed in the production process in terms of technology, which also referred to as multi-factor productivity, and it captures variables that account for effects in total farm output not caused by traditionally measured inputs of labour and capital; β is the output elasticities of labour while α output elasticities of capital. In capturing the objective of this study, our model is thereby specified as thus:

$$GDP = F(\text{FBT}, \text{TAF}, \text{MVA}) \quad 2$$

Where:

GDP = Gross Domestic Product

FBT = Production of Food, Beverages and Tobacco

TAF = Production of Textile, Apparel and Footwear

MVA = Motor Vehicles and Assembly

In a linear function, it is represented as thus:

$$GDP = b_0 + b_1\text{FBT} + b_2\text{TAF} + b_3\text{MVA} + b_4\text{TOP} + U_t \quad 3$$

Where; b_0 = Constant Term, b_1 = Regression coefficient of manufacturing sector output, b_2 = Regression coefficient of exchange rate, b_3 = Regression coefficient of interest rate, b_4 = Regression coefficient of trade openness, and U_t = Error Term.

4. Results

Table 1: Augmented Dickey-Fuller (ADF) Unit Root Test Results

Variables	Level			First Difference			Remarks
	t-Statistics	5% critical value	p-value	t-statistics	5%-critical value	p-value	
LGDP	-4.094800	-2.941145	0.0028	-----	-----	-----	I(0)
LFBT	-1.549721	-2.941145	0.4980	-6.669326	-2.943427	0.0000	I(1)
LTAF	-1.058582	-2.943427	0.7216	-4.982885	-2.943427	0.0002	I(1)
MVA	-3.921384	-2.943427	0.0046	-----	-----	-----	I(0)

Sources: Researcher's computation from E-View 10

The Augmented Dickey Fuller (ADF) unit root test as presented in table 1, revealed that the gross domestic product (GDP) and vehicles and assembly (MVA) were stationary at level whereas food, beverages and tobacco (FBT) and textile, apparel and footwear (TAF) were stationary at first difference. This ADF unit root test results therefore revealed the existence of a mixed order of integration among the variables of the study. This mixed order of integration from the unit root test results implies the possibility of long-run relationship among the variables of the study, though further investigations using ARDL bound test result will reveal if actually long run relationship exist among the variables of the study.

Table 2: Bound Test Result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	55.59782	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Sources: Researcher's computation from E-View 10

The results of the bound test presented in Table 2 shows that a long-run relationship exists between manufacturing sector outputs and economic growth in Nigeria within the periods of the study. The result disclosed that the computed F value of (55.59782) is greater than 3.67 upper critical value at 5% level of significance, the null hypothesis is therefore rejected. That is, the null hypothesis of no long-run relationship existing between manufacturing sector outputs and economic growth is rejected at a 5% level of significance.

Table 3: ARDL Short-run Coefficients Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.263460	1.252555	-3.403810	0.0022
LGDP(-1)*	-0.020834	0.008160	-2.553143	0.0172
LFBT(-1)	0.777145	0.204914	3.792538	0.0008
LTAF**	-0.221072	0.079366	-2.785482	0.0100
MVA(-1)	0.000523	0.003608	0.144870	0.8860
D(LFBT)	0.176602	0.197599	0.893741	0.3800
D(LFBT(-1))	-0.686725	0.171473	-4.004850	0.0005
D(LFBT(-2))	-0.418193	0.177271	-2.359068	0.0264
D(MVA)	0.005106	0.003728	1.369577	0.1830
D(MVA(-1))	-0.004221	0.002130	-1.982044	0.0586
D(MVA(-2))	0.004100	0.001976	2.075146	0.0484

$R^2 = 0.998967$; $\text{Adj } R^2 = 0.998554$; $\text{DW} = 2.251485$

Sources: Researcher's computation from E-View 10

Table 3 illustrates the short-run coefficients test results of the ARDL model. The results indicated that the production of food, beverages and tobacco (FBT) at lag 1, with the coefficient of 0.777145 and p-value of 0.0008, has positive and significant impact on gross domestic product in Nigeria in the short-run. On the contrary, the coefficient of production of textile, apparel and footwear (TAF) being -0.221072 with associate p-value of 0.0100, implies negative association between production of textile, apparel and footwear and gross domestic product; but, statistically significant in the short-run in Nigeria. Lastly, considering the production of motor vehicles and assembly with the coefficient of 0.004100 and associate p-value of 0.0484, we deduce that production of motor vehicles and assembly (MVA) at lag 2, has positive and significant impact on gross domestic product in Nigeria in the short-run.

The above result shows that the R^2 is 0.998967, which implies that about 99.8967% of the total variations in gross domestic product (GDP) are explained by the independent variables (food, beverages and tobacco, production of textile, apparel and footwear and motor vehicles

and assembly) during the period of the study. While the remaining 0.001033% variations are as a result of other explanatory variables that are not captured in the model.

Table 4: ARDL Long-run Coefficients Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFBT	37.30135	19.30198	1.932514	0.0647
LTAF	-10.61102	6.512455	-1.629342	0.1158
MVA	0.025091	0.173753	0.144408	0.8863
C	-204.6371	109.6304	-1.866610	0.0737

Sources: Researcher's computation from E-View 10

Table 4 reveals the long-run coefficients test results of the ARDL model for which the variables under consideration were estimated.

From the long run results, it is discovered that production of food, beverages and tobacco (FBT) with the coefficient of 37.30135 and p-value of 0.0647, has positive impact on gross domestic product in Nigeria but, statistically not significant in the long-run. However, the coefficient of production of textile, apparel and footwear (TAF) being -10.61102 with associate p-value of 0.1158, implies a negative association between the production of textile, apparel and footwear and gross domestic product; but statistically not significant in the long-run in Nigeria. Lastly, considering the production of motor vehicles and assembly, with the coefficient of 0.025091 and associate p-value of 0.8863, we deduce that the production of motor vehicles and assembly has positive relationship with gross domestic product in Nigeria; but statistically not significant in the long-run.

5. Conclusion

This study examined the impact of manufacturing sector outputs on economic growth in Nigeria. To this end, the role of components of manufacturing as paramount contributing factor to gross domestic product in the country cannot be overemphasized. Hence, it is on this ground that this study is motivated to find out the extent to which production of manufacturing sector outputs impacted on economic growth, proxied by gross domestic product. The study employed the ARDL model to estimate the impact of manufacturing sector outputs on economic growth in Nigeria. Thus, the empirical evidence from the ARDL – Bound test analysis disclosed that there was a long-run equilibrium relationship existing between manufacturing sector outputs and gross domestic product in Nigeria within the period of the study. Hence, the empirical results showed that the short-run impacts of manufacturing sector outputs on economic growth is more significant than the long-run impacts. Hence, the study recommends as follows:

1. Since the study discovered that production of food, beverages and tobacco has positive and significant impact on economic growth in Nigeria in the short-run, while in the long run, it had positive and insignificant impact on economic growth in Nigeria, government must address underlying structural and economic bottlenecks, so as to sustain the short-term gains of the food, beverages, and tobacco sector and prevent the long-term stagnation of its impact.
2. Since the analysis revealed that production of textile, apparel and footwear had a negative and significant impact on economic growth in Nigeria in the short run, while in the long run, it had negative and insignificant impact on economic growth in Nigeria, government should focus on mitigating the structural inefficiencies to transition the sector from a growth-retarding burden to an economic engine.

3. Since the study discovered that production of motor vehicles and assembly had a positive and significant impact on economic growth in Nigeria in the short-run, while in the long run, it had positive and insignificant impact on economic growth in Nigeria, government should transition from simple "Completely Knocked Down" (CKD) vehicle coupling to deep local manufacturing. This requires enforcing progressive local content quotas, securing long-term auto-financing, and standardizing local component integration.

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