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Effect of Government Expenditure on Manufacturing Sector Development in Nigeria; An Empirical Analysis

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Abstract
Problem definition: *This study used annual data from 1986 to 2023 to assess how government expenditure (spending) affected the development of Nigeria's manufacturing sector. Development of the manufacturing sector was gauged by manufacturing capacity utilization. The analysis broke down government spending into several categories, including capital education, capital health, recurring agricultural expenditures, recurring general administration expenditures, recurring defense and internal security expenditures, and transportation and communication expenditures. The study observed that economic backwardness persists in Nigeria despite the country's ongoing surges in government expenditure.* ***Methodology/results:*** *The multiple regression analysis was conducted using the Vector Error Correction Mechanism (VECM) technique of assessment. A long-term dynamic link between the elements of government spending or expenditure and manufacturing capacity utilization was found via the Johansen cointegration test which showed a long-run cointegrating relationship among the variables studied. The long-run outcome showed that while recurrent general administration expenditures and capital health capital expenditures both had positive and significant impacts on manufacturing capacity utilization, recurrent defense and internal security expenditures, capital education expenditure, and recurrent agricultural expenditures as well as recurrent transport and communication expenditures, had a negative and significant impact.* ***Managerial implications:*** *This research work developed a model to guide policy makers and the government on how best to adjust government expenditure in the direction that would foster industrial development in Nigeria and ony other developing economy. To well-utilize government expenditure viz-a-viz the development of the Nigeria manufacturing sector, the government should make sure that all of its expenditures, whether capital or recurrent are properly managed and carefully monitored during the implementation phase.*
KEY WORDS: Capital Expenditure, Recurrent Expenditure, Manufacturing sector, Nigeria, Government.

1. INTRODUCTION:

Advancement of the manufacturing sector is at the center of economic progress, not solely within the context of Nigeria but also on a global scale. Theoretical frameworks diverge, as advocates of Keynesian and endogenous theories endorse intentional government expenditure as a mechanism for sustained economic growth (Chikelu and Okoro 2019). In contrast, classical and neoclassical theories regard governments as bureaucratic entities that are less efficient, thereby impeding economic progress (Jolaiya, 2024). Governments across the globe enact industrialization policies to facilitate the advancement of this sector. In addition to these perspectives, Ricardian economists argue that development can transpire independent of government expenditure, emphasizing the difficulties associated with modifying consumer behavior despite governmental financial infusions into the economy (Dahal and Khatiwada 2021).

The imperative to enhance the welfare of citizens through government expenditure (specifically concerning recurrent and capital expenditure) has prompted investigations into the impact of such expenditure on the economic development of nations via the manufacturing sector. In Nigeria and comparable developing nations, there has been a persistent rise in government expenditure over the years, yet this has not corresponded with a significant increase in the output of the manufacturing sector (Imandojemu, Imonikhe, Akinlosotu 2020). This discrepancy has spurred extensive research concerning the role of government expenditure in the long-term growth of national economies (Poku, Opoku, & Ennin, 2022).

In the context of Nigeria, government expenditure (spending), particularly directed toward assets and investment goods such as healthcare, education, infrastructure, and manufacturing, significantly

influences economic output and the capacity utilization within the manufacturing sector (Ayodele and Tomisin 2024). Despite the implementation of various governmental policies aimed at enhancing industrial production and capacity utilization, the manufacturing sector's contribution to the economy remains marginal in comparison to the oil and agricultural sectors (CBN, 2022). The Nigerian manufacturing sector is confronted with numerous challenges, including decreased productivity rates and employment generation, attributable to factors such as insufficient electricity supply, the smuggling of foreign products, trade liberalization, and inadequate government investment in infrastructure (Ozuzu & Isukul, 2021).

It is anticipated that government expenditure across all sectors of the Nigerian economy will engender economic development, predicated on the assumption that capital and recurrent expenditure will bolster the productive foundation of the economy, consequently facilitating the development of the manufacturing sector (Inimgba & Chukwunyere 2024). Over the years, governments of Nigeria and other developing countries in the Sub Saharan Africa have adopted both expansionary and contractionary fiscal policies in order to achieve the broad objectives of enhanced economic growth, reduced poverty and unemployment and achieve income equality. But, it is obvious that these economies have been faced with serious of macroeconomic problems characterized by slow economic growth, economic recession, low capacity utilization, increasing debt burden, accelerated inflation, exchange rates volatility and unfavorable balance of payment. One could wonder if fiscal policy has achieved any objective in the region (Njoku, Akujuobi, Chigbu, & Chris-Ejiogu 2021).

Nevertheless, despite the substantial amount of expenditure in Nigeria, there persists an absence of significant developmental progress. Hence, the interplay between productive economic sectors (such as the manufacturing sector) and government spending constitutes a critical subject for analysis and discourse. Certain researchers contend that public expenditure, particularly on productive infrastructure and human capital, has the potential to enhance development, although the financing of such expenditures may hinder development in the short term. The overarching inquiry centers on whether public sector expenditure effectively stimulates long-term development within the manufacturing sector (Njoku, Ugwu & Chigbu, 2014).

Okorie and Chiwendu (2022) believed that expenditure of government holds significant importance within the operational dynamics of an economy, irrespective of its developmental status—whether it is classified as developed, developing, or underdeveloped. Government expenditure constitutes an essential instrument through which the government exerts control over the economy. Furthermore, these expenditures can also be described as the financial outlays incurred by the government in the execution of its various programs (Adeyemi and Akode 2022). These expenditures represent the financial commitments that the government undertakes to sustain both governmental functions and societal welfare at large. In this context, Dahal and Khatiwada (2021) assert that government expenditure encompasses all financial liabilities borne by the public sector for its sustenance and for the overall benefit of the economy. The efficacy of government expenditure in expanding the economy and facilitating rapid economic growth is contingent upon its productivity, as opposed to its unproductivity (Aremu, Babalola, Aninkan, & Salako, 2015). This expenditure is a principal component of national income, as delineated by the expenditure approach to national income measurement: $(Y = C + I + G + (X - M))$. This indicates that government expenditure significantly influences the scale of the economy and its developmental trajectory. Productive government expenditure is anticipated to exert a beneficial influence on the economy, whereas unproductive expenditure is likely to yield adverse outcomes (Zhao and Yan 2024). There exist disequilibrium between demand and supply which has contributed to balance of payment problems which has led to high rate of inflation, and low output growth as mentioned before. Such public expenditure program helps to achieve a systematic adjustment, preferably through adoption of corrective policy measures and the provision of appropriate amounts of external financing (Njoku, Ugwu & Chigbu 2014).

Despite the prevailing consensus that government expenditure, whether recurrent or capital, particularly in the realms of social and economic infrastructure, can be conducive to development, the financing mechanisms for such expenditures aimed at providing essential infrastructural services—including transport, telecommunications, water supply, electricity, sanitation, waste management, education, and healthcare—can paradoxically hinder development (for instance, through the adverse implications associated with taxation and excessive indebtedness) (Muhammad and Bichi 2022). For this research, a thorough examination was conducted with a disaggregated perspective on selected capital and recurrent

expenditures as independent variables, aimed at discerning which of these variables, drawn from the expenditure components, exerted the most significant effect on development of the manufacturing sector and which did not. The recurrent expenditure variable was indexed as General Administration and Defence, while the capital expenditure variable was indexed as Education and Health, with the dependent variable being the manufacturing sector capacity utilization (Ojo & Ojo 2022).

In Nigeria, the costs of general administration expenditure linked to the operation of government have escalated significantly, resulting in a markedly diminished proportion of public revenue available to support and execute the core functions of government (CBN, 2022). A crucial point of analysis is to scrutinize how the federal government budget is systematically allocated between recurrent and capital expenditures. As a result, the fundamental objectives of government have faced substantial impediments. The rationale for utilizing recurrent expenditure as a percentage of the total budget as a principal indicator of governance costs is rooted in the conviction that capital expenditure has a more favorable impact on the economy, particularly concerning investment, employment, and other activities that promote developmental progress (Olurin, Omosebi, Soetan, & Akintola, 2024). On the other hand, since agriculture produces food and raw materials, industry transforms them and generates employment, which affects the economy and people's quality of life, the idea of government spending on agriculture is justified.

In the context of this study, general administrative expenditure may also be characterized as administrative costs or administrative expenditures. When the paramount functions of the state are predominantly redistributive or exploitative, the significance of productive endeavors diminishes as a catalyst for economic activity (Odunlade and Adegbie 2024). It is evident that defense expenditures invariably influence resource allocation and the development of the manufacturing sector. The ramifications are numerous and frequently counterbalance each other. The total expenditure on defense and internal security in 1999 was estimated at ₦91.82 billion and ₦1,464.09 billion, respectively (Ogunjobi, Odusanya, & George 2024). The expenditure on general administration was recorded at ₦183.64 billion in 1999, escalating to an unprecedented peak of ₦3,059.44 billion in 2023. According to the research conducted by Adewole and Osabuohien (2023), a substantial portion of the increased governance costs can be attributed to the dysfunctionality of institutional frameworks, which divert focus from productive activities to predatory practices.

Education plays a pivotal role in the advancement of the manufacturing sector by equipping the labor force with requisite skills and knowledge vital for fostering innovation, enhancing productivity, and advancing technological progress, which ultimately propels economic growth and competitiveness (Mohammed 2024). It has been recognized as one of the most essential instruments in the economic development process. Nevertheless, a significant issue that remains inadequately addressed is the provision of education in adequate quantity and quality. For example, while educational expenditure amounted to ₦43.61 billion in 1999 and ₦702.98 billion in 2022, there remains a conspicuous absence of substantial progress in the development of the manufacturing sector as a direct consequence (Edeh & Okia 2024). The characteristics of the education system, the existing economic framework, and governmental priorities are critical factors that may impact educational levels in any manufacturing context. Despite the increase in governmental investment in education, the gross enrolment ratio for secondary schools has been declining, and the prevalence of out-of-school children has reached alarming levels (World Development Indicators, 2023).

Health provision is regarded as a fundamental metric for evaluating policies aimed at fostering comprehensive development within the manufacturing sector (Oladipo, Saheed, Egwaikhide, & Anfofum 2024). The prevalence of diseases, such as HIV/AIDS, is known to impede the momentum of economically productive activities. Consequently, nations allocate substantial public funds to healthcare provision, operating under the belief that improved health outcomes for citizens will facilitate meaningful contributions to economic growth and development. A healthy workforce is indispensable for the advancement of manufacturing, as it has a direct effect on productivity, diminishes absenteeism, and contributes to cultivating a more skilled and competent labor force, ultimately enhancing economic development (Jolaiya 2024). In the case of Nigeria, despite considerable governmental expenditure on health services, the health status of Nigerians consistently ranks low. Nigeria is positioned 74th out of 115 countries, based on the assessment of select health indicators (World Bank, 2023). The nation's infant mortality rate (91 per 1000 live births) ranks among the highest globally.

Therefore, the question of whether the government influences the efficiency of health spending in Nigeria is crucial. GDP serves as a stand-in for the Nigerian economy and is a measure of economic growth Matete & Miangi (2024). The purpose of this study is to provide information on how to effectively use public funds to support development in the Nigerian manufacturing industry. While the financial outlay of the government is undergoing a notable increase in a geometric progression, the metrics pertaining to the advancement of the manufacturing sector are progressing at an arithmetic rate (Effiong, Ukere, & Ekpe 2024). Manufacturing firms in Nigeria allocate considerable financial resources towards the establishment of electricity generation facilities and incur substantial costs for the transportation of raw materials to production sites, as well as for the distribution of finished goods to market, primarily due to inadequate power supply and deficient road infrastructure. This predicament is intensified by insufficient infrastructure financing, compounded by issues of misappropriation, corruption, and embezzlement (Onyele, Onyekachi-Onyele, & Ikwuagwu, 2024). The public education and healthcare systems in Nigeria have failed to meet established expectations, attributable to deteriorating infrastructure—a direct outcome of inadequate governmental funding—while a significant portion of financial resources has been diverted towards administrative expenditures, thereby rendering the cost of governance excessively high amidst a backdrop of increasing insecurity regarding the safety of lives and properties (Osasona, Oloniluyi, & Ayorinde 2024).

Diverse outcomes exist concerning the correlation between governmental expenditure and the development of the manufacturing sector, as scholars present two opposing viewpoints; some proponents argue that government expenditure serves to promote production, whereas others adopt a contrary position (Olurin et al. 2024). The body of research conducted in Nigeria has concentrated on the ramifications of government expenditure on economic output, yielding divergent findings, and the absence of a disaggregated analysis of the components of government expenditure contributes to this ambiguity. Proponents of the view that total government expenditure encourages domestic production can be identified in the scholarly works of Olurin et al. (2024); Uyagu, Ame, & Edosomwan, (2020), among others, whereas Ajayi & Nwogu (2023) identified that recurrent expenditure has a detrimental effect on production, while Aremu et al. (2015) noted that government recurrent expenditure exerts a negative influence on economic output. Yerima, Nymphas, Sani, Auta, Amos, & Abwage, (2022) established that government expenditure on education and healthcare did not result in increased productivity in Nigeria, while Jolaiya (2024) reported a mixed effect of various elements of government expenditure on national output. Uyagu et al. (2020) observed that both capital expenditure and recurrent expenditure exerted a positive influence on production, while Aluthge, Jibir & Abdu (2021) and Ogar et al. (2019) concluded that capital expenditure bolstered economic output, whereas recurrent expenditure was deemed insignificant. It is within this framework that the present study examined the effect of government expenditure on the development of the manufacturing sector in Nigeria.

This study is focused on the effect of government expenditure on manufacturing sector development in Nigeria from 1986 to 2023. The choice of the time period captures the inception of the Structural Adjustment Programme (SAP) in 1986 and the current democratic era that started in 1999 which promises to bring about the necessary change required in governance, public expenditure and the economy at large, while the end year of 2023 was chosen to account for the current realities associated with government expenditures and the Nigerian manufacturing sector. The chosen period looked at before and after this present democratic dispensation.

In the study, government expenditure was decomposed into recurrent expenditures in general administration, defense and internal security, transport and communication, and capital expenditure in education and health, while manufacturing sector development was measured by Manufacturing Capacity Utilization (MCU).

From the pertinent literature, various schools of thought have deemed it necessary to articulate their contributions, whether affirmative or otherwise, regarding the influence of governmental expenditure on the advancement of the manufacturing sector through both aggregated and disaggregated methodologies. Distinct dimensions of the conceptual framework were scrutinized in relation to governmental expenditure and the development of the manufacturing sector. The primary focus of this research diverges from the enquiries of other scholars, as it employed a disaggregated analysis of governmental expenditure pertaining to administration, defense, internal security, education, health, agriculture, as well as transport and communication. The majority of the studies reviewed predominantly adhered to a disaggregated

methodology, which involved the segmentation of governmental expenditure into its aggregate capital and gross recurrent components.

Moreover, a significant proportion of the studies evaluated primarily scrutinized the repercussions of governmental expenditure on GDP, while a few others incorporated the contribution of the manufacturing sector to GDP, apart from the work of Olurin, et al (2024) who focused on manufacturing capacity utilization. To address this identified gap, the current study employed manufacturing capacity utilization as an indicator of manufacturing sector development.

In terms of temporal gaps, the void that this research addresses pertains to the timeframe encompassed within this study; it spans from 1986 to 2023, representing the most contemporary analysis, in contrast to other works that concluded their investigations in 2021 or even earlier. Furthermore, this research has also considered the current democratic regime.

2.0 METHODOLOGY

2.1 Model Specification

The model delineated for this study was derived from antecedent empirical research, notably that of Omankhanlen, Chiimezie, & Okoye, (2021) which explored the correlation between government expenditure (both capital and recurrent) and industrial development. The model articulated by Omankhanlen, et al (2021) is encapsulated in Equation (1) with certain modifications:

$$\mathrm{MCU} = \beta_0 + \beta_1 \mathrm{RADMEXP} + \beta_2 \mathrm{RDFISEXP} + \beta_3 \mathrm{CPEDUEXP} + \beta_4 \mathrm{CPHLTEXP} + \beta_5 \mathrm{RAGREXP} + \beta_6 \mathrm{RTRCOMEXP} + \mu \quad (3.1)$$

The logarithmic form of Equation (3.1) is as specified in Equation (3.2).

$$\mathrm{LOG(MCU)} = \beta_0 + \beta_1 \mathrm{LOG(RADMEXP)} + \beta_2 \mathrm{LOG(RDFISEXP)} + \beta_3 \mathrm{LOG(CPEDUEXP)} + \beta_4 \mathrm{LOG(CPHLTEXP)} + \beta_5 \mathrm{LOG(RAGREXP)} + \beta_6 \mathrm{LOG(RTRCOMEXP)} + \mu \quad (3.2)$$

Where,

MCU = manufacturing capacity utilization

RADMEXP = recurrent administration expenditure

RDFISEXP = recurrent defense and internal security expenditure

CPEDUEXP = capital education expenditure

CPHLTEXP = capital health expenditure

RAGREXP = recurrent agriculture expenditure

RTRCOMEXP = recurrent transport and communication expenditure

β_0 = constant

$\beta_1 - \beta_6$ = Coefficients of the independent variables

μ = error term

LOG = logarithmic notation

This relationship can be mathematically represented as follows:

RADMEXP < 0

While RDFISEXP, CPEDUEXP, CPHLTEXP, RAGREXP and RTRCOMEXP > 0.

The model articulated in equation 3.2 can be expressed in the form of a VECM, wherein the MCU may not instantaneously converge to their long-term equilibrium states, with the dynamics of adjustment between the short-run and long-run levels captured in the ECM equation presented in sect ion 3.3, where Δ signifies the change in MCU and the components of government expenditure.

$$\Delta\mathrm{LOG(MCU)}_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta\mathrm{LOG(MCU)}_{t-1} + \sum_{i=0}^{p} \beta_2 \Delta\mathrm{LOG(RADMEXP)}_{t-1} + \sum_{i=0}^{p} \beta_3 \Delta\mathrm{LOG(RDFISEXP)}_{t-1} + \sum_{i=0}^{p} \beta_4 \Delta\mathrm{LOG(CPEDUEXP)}_{t-1} + \sum_{i=0}^{p} \beta_5 \Delta\mathrm{LOG(CPHLTEXP)}_{t-1} + \sum_{i=0}^{p} \beta_6 \Delta\mathrm{LOG(RAGREXP)}_{t-1} + \sum_{i=0}^{p} \beta_7 \Delta\mathrm{LOG(RTRCOMEXP)}_{t-1} + \beta_8 \mathrm{ECM}_{t-1} + \mu_t \quad (3.3)$$

2.2 Technique of Data Analysis

The statistical characteristics of the time series were analyzed through the application of the Augmented Dickey Fuller (ADF) unit root test and Johansen cointegration tests, which aimed to ascertain the long-term relationship between government expenditure and the utilization of manufacturing capacity. Finally, this research utilized VECM methodologies to assess the impact of governmental expenditures on the advancement of the manufacturing sector within Nigeria..

3.0 RESULTS AND DISCUSSION:

3.1 Descriptive Statistic

The descriptive statistics of the data shown in Table 1 were used to display the basic properties of the series used for the study. Logarithmic transformation is a simple method for transforming a highly skewed variable into a more normalised dataset. Since the variables were measured in different units, the logarithmic (log) versions of the data displayed in Table 1 were taken in order to bring all of the variables to a common base (see the appendix for logged data). The results of the descriptive statistics were shown in Table 1:

Table 1: Table of Descriptive Statistics

	MCU	RADMEXP	RDFISEXP	CPEDUEXP	CPHLTEXP	RAGREXP	RTRCOMEXP
Mean	46.54763	341.1289	384.2797	37.96158	23.52237	27.23447	20.14211
Median	45.17000	207.4100	163.9000	31.75500	17.94500	17.11000	15.70000
Maximum	73.26000	1808.760	1464.090	131.0400	81.56000	104.6500	90.03000
Minimum	30.40000	1.450000	4.400000	0.370000	0.090000	0.020000	0.050000
Std. Dev.	10.28035	394.0220	455.2151	35.91027	24.06369	28.85311	21.30572
Skewness	0.477218	1.578567	1.085978	0.763185	0.885476	0.883285	1.210479
Kurtosis	2.707562	6.104777	2.888153	2.631725	2.803135	2.776482	4.419344
Jarque-Bera	1.577740	31.04463	7.489013	3.903604	5.027128	5.020323	12.46966
Probability	0.454358	0.000000	0.023647	0.142018	0.080979	0.081255	0.001960
Observations	38	38	38	38	38	38	38
	LOG (MCU)	LOG (RADMEXP)	LOG (RDFISEXP)	LOG (CPEDUEXP)	LOG (CPHLTEXP)	LOG (RAGREXP)	LOG (RTRCOMEXP)
Mean	3.817025	4.681714	4.779100	2.738137	2.002066	1.963150	1.842573
Median	3.810426	5.314479	5.097316	3.456690	2.887287	2.838541	2.739757
Maximum	4.294015	7.500397	7.288989	4.875503	4.401339	4.650621	4.500143
Minimum	3.414443	0.371564	1.481605	-0.994252	-2.407946	-3.912023	-2.995732
Std. Dev.	0.219527	1.953321	1.878659	1.771819	2.071413	2.369670	2.068049
Skewness	0.028766	-0.522572	-0.269578	-0.798541	-0.695540	-0.916526	-0.709572
Kurtosis	2.343732	1.982416	1.631814	2.332995	2.058100	2.722045	2.184386
Jarque-Bera	0.687163	3.369024	3.424152	4.742983	4.468610	5.442451	4.242057
Probability	0.709226	0.185535	0.180491	0.093341	0.107067	0.065794	0.119908
Observations	38	38	38	38	38	38	38

Source: Author's computations using EViews 10.0

The logged series from Table 1 showed a high level of consistency since their mean and median values were between the series' defined maximum and lowest criteria. Since the skewness numbers are within acceptable bounds—more precisely, less than 1—it may be concluded that there was no discernible skewness in the logged data. Given that the Kurtosis values were less than three and the Jarque-Bera p-values were greater than 0.05, it can be concluded from the data in the table that all variables followed a normal distribution. This supports the acceptance of the null hypothesis, which states that the series are normally distributed. This suggests that a more symmetrical distribution was obtained by using

logarithmic adjustments on the data, indicating a significant decrease in the possibility of errors during the regression estimation procedure.

3.2 Unit Root Test of Stationarity

To determine the stationarity of our variable, a unit root test was conducted using the major two procedures of the ADF test as a prerequisite to cointegration analysis. Table 4.3 displays the outcomes of the ADF tests.

Table 2: Unit root test

Variable	ADF t-Statistic @ level – I(0)	ADF t-Statistic @ first difference – I(1)	Order of integration
LOG(MCU)	-3.488520	-8.244931	I(1)
LOG(RADMEXP)	-1.286752	-9.010393	I(1)
LOG(RDFISEXP)	-1.023819	-5.496110	I(1)
LOG(CPEDUEXP)	-2.351882	-7.383549	I(1)
LOG(CPHLTEXP)	-1.376622	-10.92356	I(1)
LOG(RAGREXP)	-3.162068	-6.994044	I(1)
LOG(RTRCOMEXP)	-2.881905	-8.304084	I(1)
Critical values			
1%	-4.226815	-4.234972	
5%	-3.536601	-3.540328	

Source: Author's computations using EViews 10.0

The outcomes of the ADF unit root tests are shown in Table 2. The outcome demonstrated that every variable is not level-stationary. It was discovered that the variables were integrated of one order, or I(1). The variables become stationary when they are translated to the first difference and both the intercept and the deterministic trend are used.

3.3 Johansen Cointegration Test

The null hypothesis that there is no cointegration between the variables is tested by the trace max-eigen statistics-based test. If the test statistic exceeds the critical values of the trace tests at 1% or 5%, the null hypothesis is rejected. Table 3 showed the outcome of the Johansen cointegration test based on the trace test.

Table 3: Johansen cointegration results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.943527	240.0492	125.6154	0.0000
At most 1 *	0.836163	139.4596	95.75366	0.0000
At most 2 *	0.668822	76.14864	69.81889	0.0143
At most 3	0.401801	37.47019	47.85613	0.3257
At most 4	0.237832	19.48608	29.79707	0.4584
At most 5	0.162556	9.980493	15.49471	0.2822
At most 6	0.102154	3.771476	3.841466	0.0521

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.943527	100.5896	46.23142	0.0000
At most 1 *	0.836163	63.31091	40.07757	0.0000
At most 2 *	0.668822	38.67846	33.87687	0.0124
At most 3	0.401801	17.98411	27.58434	0.4965
At most 4	0.237832	9.505589	21.13162	0.7897
At most 5	0.162556	6.209018	14.26460	0.5865
At most 6	0.102154	3.771476	3.841466	0.0521

Source: Author's computations using EViews 10.0

The tests are conducted on the null hypothesis of the number of cointegrating equations (r) against the alternative hypothesis of number of cointegrating equations plus one (r + 1). The null hypothesis cannot be rejected if the test statistic is smaller than the maximum eigenvalue test critical value. Table 3 provides the results of Johansen cointegration test based on the trace statistics and maximum eigenvalue.
The trace and maximum eigen tests reflected that at least three cointegrating equations exist at 5 per cent level of significance. As such the null hypothesis of no cointegration was rejected because the trace and max-eigen statistics were greater than their 5 per cent critical values. Hence the trace and maximum statistics specified 3 cointegrating relationship at 5 per cent level of significance. Considering the result it can be concluded that there are three significant long run relationships between the variables using trace and max-eigen tests. Since the variables can both have short or long run effects, the VECM which disaggregate these effects were estimated.

3.4 VECM Estimates:
The cointegration test provided evidence of long run relationship and for us to disaggregate the long run effects to the short run. The cointegration of the variables gives room for VECM estimation. The VECM provides information on how the short run disequilibrium relationship among the estimated variables was adjusted to the long run equilibrium path. The result of vector error correction based on cointegration was presented in table 4. The coefficients of variables are the long term elasticities of the normalized cointegrating vectors.
The coefficients for recurrent administrative expenditure (RADMEXP) and capital health expenditure (CPHLTEXP) were negative and significant, but the expected sign of CPHLTEXP was supposed to be positive but its negativity could be due to mismanagement of funds leading to increased healthcare costs, inefficient resource allocation, and reduction in overall economic productivity. On the other hand, the estimated coefficients of recurrent expenditure for defence and internal security (RDFISEXP), capital educational expenditure (CPEDUEXP), recurrent agricultural expenditure (AGREXP) and recurrent expenditure on transport and communication (RTRCOMEXP) were In line with a priori expectation with positive and significant long-run effects on manufacturing sector development (measured by manufacturing sector capacity utilization).

Table 4: Normalized cointegrating coefficients (Long-run estimates)

Cointegrating Eq:	**CointEq1**
LOG(MCU(-1))	1.000000
LOG(RADMEXP(-1))	-0.538610
	(0.21771)
	[-2.47397]
LOG(RDFISEXP(-1))	0.845299
	(0.11342)
	[7.45267]
LOG(CPEDUEXP(-1))	0.351589
	(0.12271)
	[3.09988]
LOG(CPHLTEXP(-1))	-0.626792
	(0.19450)
	[-3.22258]
LOG(RAGREXP(-1))	0.593848
	(0.07975)
	[7.44604]
LOG(RTRCOMEXP(-1))	0.999627
	(0.08818)

	[11.3356]
C	-2.029481

Source: Author's computations using EViews 10.0

Note: The standard error statistics are given in ( ) while the t-statistics are given [ ].

In Table 4, LOG(RADMEXP(-1)) was negative and statistically significant at 5% level, as it relates to the level of manufacturing capacity utilization (MCU), meaning that a 10% increase in recurrent administrative expenditure will resulted in a decrease in MCU by about 5.4%. The result for LOG(RDFISEXP(-1)) was positive and significantly related to MCU, implying that a 10% increase in recurrent expenditure for defense and internal security will result in an increase in MCU by approximately 8.5%. The result for LOG(CPEDUEXP(-1)) is positively and significantly related to MCU, denoting that a 10% increase in capital expenditure for education will result in an increase in MCU by about 3.5%%. The result for LOG(CPHLTEXP(-1)) was negative and significantly related to MCU, showing that a 10% increase in capital expenditure for health will result in a decrease in MCU by approximately 6.3%. The result for LOG(RAGREXP(-1)) was positively and significantly related to MCU, implying that a 10% increase in recurrent expenditure for agriculture will lead to an increase in MCU by about 5.9%. The positive coefficient of LOG(RTRCOMEXP(-1)) was positive and significant, indicating that a 10% increase in recurrent transport and communication expenditure caused approximately 10.0% increase in MCU.

The speed of adjustment (dynamics of short-run) is shown by the coefficient of the error correction mechanism (ECM). The results are presented in Table 5.

Table 5: Vector error correction model (VECM)

	Coefficient	Std. Error	t-Statistic	Prob.
ECM(-1)	-0.764466	0.271890	2.811670	0.0041
D(LOG(MCU(-1)))	-0.544535	0.208481	-2.611925	0.0253
D(LOG(MCU(-2)))	-0.381934	0.242832	-2.674047	0.0233
D(LOG(RADMEXP(-1)))	0.091628	0.169347	0.541066	0.5947
D(LOG(RADMEXP(-2)))	0.206992	0.165965	1.247206	0.2275
D(LOG(RDFISEXP(-1)))	-0.379179	0.129269	-2.933238	0.0012
D(LOG(RDFISEXP(-2)))	-0.365092	0.100864	-3.619791	0.0005
D(LOG(CPEDUEXP(-1)))	0.565373	0.199508	2.833945	0.0048
D(LOG(CPEDUEXP(-2)))	0.244227	0.090129	2.709719	0.0217
D(LOG(CPHLTEXP(-1)))	0.437651	0.154982	2.823924	0.0057
D(LOG(CPHLTEXP(-2)))	0.390420	0.141780	2.753700	0.0192
D(LOG(RAGREXP(-1)))	-0.126505	0.081850	-1.545573	0.1387
D(LOG(RAGREXP(-2)))	0.008113	0.084643	0.095848	0.9246
D(LOG(RTRCOMEXP(-1)))	0.359902	0.084534	4.257681	0.0003
D(LOG(RTRCOMEXP(-2)))	0.248765	0.072993	3.408214	0.0008
C	3.035929	0.965291	3.145101	0.0085
R-squared	0.735560			
Adjusted R-squared	0.710050			
F-statistic	8.977446			
Prob(F-statistic)	0.000643			
Durbin-Watson stat	2.036386			

Source: Author's computations using EViews 10.0

The coefficient of -0.764466 is associated with the ECM(-1). This indicates that, the speed of adjustment is 76.4% approximately. The implication is that, if there was a deviation from equilibrium only 76.4% is corrected in one year as the variable moved towards restoring equilibrium. Thus, there was relatively a strong pressure on MCU to restore long run equilibrium wherever there was a disturbance. The speed of adjustment coefficient has the correct sign (negative) and statistically significant with p-value of 0.0041 < 0.05.

Furthermore, Table 4.6 revealed that the overall estimated ECM model was good as it has an Adjusted R-squared of 0.710050. It implies that about 71% of total variation in MCU can be explained by the components of government expenditure while the remaining 29% was explained by other variables not

included in the model (error term). Similarly, the F- statistic value of 8.977446 and probability (F-statistic) of 0.000643 showed that the overall model was statistically significant at 5% level of significance. This implied that the components of government expenditure (independent variables) collectively explained significant variations in MCU. Durbin- Durbin-Watson statistics was 2.036386, which is close to 2; therefore, it can be concluded that there was absence of serious autocorrelation in the model.

3.5 DISCUSSION OF FINDINGS

From the long-run cointegrating equation, recurrent administrative expenditure exerted a negative and statistically significant influence on the capacity utilisation of the manufacturing sector (MCU) over an extended period. This suggested that as the government allocates a greater amount of financial resources towards administrative functions, there is a substantial decline in MCU. This observation aligned with the theoretical expectation that funds allocated by the government for administrative objectives did not effectively stimulate manufacturing activities within Nigeria. An increase in administrative spending tends to diminish the financial resources available for developmental projects, thereby adversely impacting the growth of the manufacturing sector. This conclusion was consistent with the findings of Agu (2013); Awusa (2023); Okeke & Ukoh (2023); Ufoeze, Okoro, & Ibenta, (2017), who had established that elevated administrative expenditure constrains economic development in Nigeria.

Expenditure on security presents a dual nature, capable of inducing both beneficial and detrimental effects on the manufacturing sector, contingent upon the manner of its allocation and execution. Although escalated security spending may generate employment opportunities and enhance demand, it can also reallocate resources away from other sectors and potentially elevate costs for manufacturers. Nevertheless, in accordance with expectations, recurrent expenditure on defence and internal security demonstrated a positive and significant relationship, indicating that as resources are directed toward combating insecurity in Nigeria, manufacturers' confidence is bolstered, which in turn fosters development within the manufacturing sector. The negative and statistically significant effect observed in the short run corroborates the notion that increased security expenditure can adversely impact the manufacturing sector by potentially reallocating resources, impeding investment, and inflating operational costs, ultimately affecting growth and competitiveness. This finding is congruent with the research conducted by Adewole, & Osabuohien, (2023) which posits that expenditures on defence and internal security significantly influence economic activities.

Investment in capital expenditure within the education sector positively influences the manufacturing sector in Nigeria by cultivating a skilled labour force, enhancing productivity, and promoting innovation, which collectively contribute to an increase in manufacturing output and economic growth. This is consistent with the conclusions drawn by Akpan and Ihendinihu (2023); Agum & Babayo (2023); Chima & Yusuf (2023); Ogunjobi et al. (2024), who have indicated that capital expenditure in education propels manufacturing activities. This study corroborated those findings, revealing that capital expenditure in education positively and significantly affects manufacturing sector capacity utilization, both in the long run and short run.

Regrettably, it has been discerned that capital expenditure allocated to health exhibited a negative and statistically significant effect in the long term. This observation is consistent with the findings of Awoyemi et al. (2023); Jolaiya (2024), whose research corroborated the adverse implications of health expenditure. Conversely, Muhammad & Bichi (2022); Ojo & Ojo (2022) substantiate the notion that, while augmented capital expenditure in health can favorably influence the manufacturing sector in Nigeria by enhancing overall economic performance, such expenditure directed toward health infrastructure may detrimentally affect the performance of the industrial sector if it results in escalated costs, diminished workforce productivity, or compromises other vital infrastructure investments. In Nigeria, augmented capital expenditure within the healthcare sector exerted a favorable influence on the manufacturing sector by enhancing human capital development, which culminates in a more proficient and skilled labor force that consequently propels manufacturing output and stimulates economic growth.

Increased agricultural expenditure, especially when synergistically combined with improved health outcomes, can yield beneficial effects on the manufacturing sector by enhancing agricultural productivity, augmenting the availability of raw materials, and potentially catalyzing economic growth, which may subsequently led to a heightened investment in manufacturing. This hypothesis was corroborated by the findings of the study, which indicated that government spending on agriculture significantly expedited the capacity utilization of the manufacturing sector, suggesting that an increase in agricultural expenditure

led to enhanced production capacity in the long run. This conclusion was further supported by Alabi & Abu (2020); Okorie & Chiwendu (2022), who similarly demonstrated that agricultural expenditure was conducive to manufacturing activities in Nigeria.

In Nigeria, governmental investment in transportation and communication infrastructure positively influences the manufacturing sector by mitigating production costs, enhancing market accessibility, and promoting economic growth through increased investment and aggregate demand. This elucidated the favorable long-run impact of recurrent expenditure on transportation and communication regarding manufacturing capacity utilization (MCU). This assertion was supported by Zhao, et al (2024) who had observed a significant and positive long-term effect of government expenditure on the development of the manufacturing sector.

4. Recommendations

In the light of the research findings, the following recommendations are presented;

General administrative expenditure necessitates rigorous management and oversight during the implementation phase to facilitate a comparative assessment regarding the advancement and development of the Nigerian manufacturing sector.

Given the significant correlation between defence and internal security expenditures and the development of the manufacturing sector, this study advocates for the provision of sufficient funding for security initiatives in Nigeria. A surge in defence spending is anticipated to address the issues of herdsmen-related violence, the Boko Haram insurgency, and kidnapping incidents within Nigeria, while a reduction in such expenditures may yield counterproductive outcomes.

Investment in education must receive adequate financial support, with a concomitant emphasis on the efficient monitoring and utilization of these funds. This is imperative, as education generate substantial positive externalities. Several researchers have established a positive correlation between education expenditure and the development of the manufacturing sector in Nigeria, adhering to established economic theories.

The government should also strive to enhance its healthcare expenditure to effectively reach citizens residing in rural areas. The resultant incremental effect in healthcare funding is expected to ensure that individuals in rural locales maintain good health, thereby enabling them to engage successfully in their daily activities, such as fishing and farming. The government should facilitate the provision of free health services, including antenatal care, maternal healthcare, and care for children aged 0-5, which will enhance the health status of rural inhabitants and further the government's welfare objectives.

Public expenditure in agriculture should be strategically realigned to prioritise investments in irrigation, research and development, and rural development, which have historically received inadequate budgetary allocations within Nigerian agricultural budgets. It is recommended that the execution rate of the agricultural budget be improved through expedited legislative approval and timely implementation of the budgets.

The government must, with all urgency ensure the provision of adequate funding for the transport and communication sectors, and the fiscal responsibility laws should be enforced without delay to promote enhanced accountability and prudence in the allocation of funds to these sectors. Such measures will improve the operational capacity of telecommunications providers, facilitate the reconstruction of deteriorating roads, railways, and airports, and ultimately reduce the costs associated with the transportation of goods and services from producers to consumers.

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