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Government Capital Expenditures And Capacity Utilisation Of Manufacturing Firms In Nigeria

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ABSTRACT
This study examined the effect of government capital expenditures on average manufacturing capacity utilization in Nigeria. The study was motivated by the persistent low and unstable level of manufacturing capacity utilization in Nigeria despite continuous public capital spending across different sectors. The study disaggregated government capital expenditure into capital expenditure on administration, capital expenditure on economic services, capital expenditure on social and community services, capital expenditure on transfers, and total government capital expenditure. Average manufacturing capacity utilization was used as the dependent variable, while exchange rate, inflation rate, and interest rate were introduced as control variables. The study adopted an ex-post facto research design and used annual time-series data covering 1982 to 2024. Data were obtained from the Central Bank of Nigeria Statistical Bulletin, the National Bureau of Statistics, the Federal Ministry of Finance, and other relevant institutional sources. The study employed descriptive statistics, Augmented Dickey-Fuller unit root test, correlation analysis, ordinary least squares regression, heteroskedasticity test, and Breusch-Godfrey serial correlation test. The findings showed that capital expenditure on administration had a positive but non-significant effect on average manufacturing capacity utilization. Capital expenditure on economic services had a negative and significant effect. Capital expenditure on social and community services had a positive and significant effect. Capital expenditure on transfers had a negative and significant effect. Total government capital expenditure also had a negative and significant effect. The study concluded that government capital expenditure does not have a uniform effect on manufacturing capacity utilization in Nigeria. The study recommended that public capital spending should be better targeted toward industrial infrastructure, technical education, healthcare, research, power, transport, and accountable project execution.

Keywords: Government Capital Expenditure; Manufacturing Capacity Utilization; Public Spending; Economic Services; Social Services; Nigeria**.**

1 INTRODUCTION

The manufacturing sector is widely regarded as a major driver of industrial development because it supports employment generation, value addition, technological progress, export diversification, and long-term economic transformation (Afolabi & Laseinde, 2019; Osakwe, 2020). In developing economies, manufacturing is important because it reduces dependence on primary commodities and creates stronger linkages across agriculture, services, trade, and infrastructure (Akinlo, 2001; Afolabi & Laseinde, 2019). Nigeria's economic development has remained constrained by weak manufacturing performance, especially because the country has relied heavily on crude oil revenue for foreign exchange and public finance (Akinlo, 2001; Osakwe, 2020). Manufacturing capacity utilisation is therefore an important

indicator because it shows the extent to which installed industrial capacity is actually used for production (Corrado & Mattey, 1997; Federal Reserve, 2020).

Capacity utilisation reflects the relationship between actual output and the maximum output that firms can produce under normal operating conditions (Corrado & Mattey, 1997). Bernanke and Parkinson (1991) argued that capacity utilization is useful in understanding industrial performance because it shows how firms respond to changes in demand, costs, and production conditions. A high level of manufacturing capacity utilization suggests that machines, labour, and capital are being used efficiently, while a low level suggests idle resources, weak production, and structural constraints in the industrial sector (Corrado & Mattey, 1997; Bank-Ola et al., 2020). In Nigeria, manufacturing capacity utilization has remained low and unstable over several decades, showing that many firms operate below their installed production potential (Ajakaiye, 1995; Central Bank of Nigeria, 2020).

The Central Bank of Nigeria (2020) reported that Nigeria's manufacturing sector recorded an average capacity utilisation of about 55.5 percent between 2010 and 2019, which suggests that the sector did not operate close to full capacity during the period. Ajakaiye (1995) linked Nigeria's weak capacity utilization to policy shocks and structural adjustment pressures, while Akinlo (2001) identified poor power supply and weak infrastructure as major constraints to manufacturing performance. Adenikinju (2020) also observed that electricity problems remain a major barrier to industrial output in Nigeria because firms are forced to rely on costly private power generation. Poor transport infrastructure has equally affected manufacturing because bad roads, weak rail systems, and congested ports raise logistics costs and delay movement of raw materials and finished goods (Aliyu, 2012; Calderón & Servén, 2004).

Government capital expenditure is expected to address some of these manufacturing constraints by providing long-term public assets and productive infrastructure (Aschauer, 1989; Barro, 1990). Capital expenditure refers to government spending on assets and development projects that produce benefits beyond one fiscal year, such as roads, power supply, hospitals, schools, public buildings, water systems, transport networks, and industrial support facilities (Adewara & Oloni, 2012; Iheanacho, 2016). Aschauer (1989) argued that public infrastructure can raise private sector productivity when it reduces production and transaction costs. Barro (1990) also maintained that government spending can support growth when it provides productive public goods that private firms cannot efficiently provide alone.

Government capital expenditure can support manufacturing capacity utilisation through several channels (Aschauer, 1989; Calderón & Servén, 2004). Capital expenditure on economic services can improve roads, electricity, water, communication, and transportation, which are central to industrial production (Olaleye & Sulaiman, 2016). Capital expenditure on social and community services can improve education, health, housing, and welfare, which strengthens labour productivity and human capital (Lucas, 1988; Romer, 1990; Obadan & Okojie, 2019). Capital expenditure on administration can support security, public institutions, and policy implementation, although its direct impact on manufacturing may be weaker than spending on productive infrastructure (Afonso & Fernandes, 2006; Awojobi, 2020). Capital expenditure on transfers may also influence manufacturing when subsidies, grants, and support payments reduce production costs or stimulate demand, but such transfers may become wasteful when they are poorly targeted or politically driven (Nwafor & Onwukwe, 2015; Udo & Esara, 2016).

Despite the theoretical expectation that capital expenditure should improve industrial activity, Nigeria's manufacturing sector has continued to struggle with low-capacity utilization, high production costs, weak access to finance, foreign exchange instability, and unreliable infrastructure (Akinlo, 2001; Bank-Ola et al., 2020; Osakwe, 2020). Iheanacho (2016) noted that government expenditure does not automatically translate into economic growth unless

the expenditure is properly structured and efficiently implemented. Aluthge et al. (2021) found that capital expenditure can support growth, but their findings also suggest that the quality and composition of spending matter. Public choice theory provides a useful explanation for weak spending outcomes because public expenditure decisions may be shaped by political interests, rent-seeking, corruption, and bureaucratic inefficiency rather than productive priorities (Awojobi, 2020).

The problem that motivates this study is that government capital expenditure has continued over the years, yet manufacturing capacity utilization remains low and unstable in Nigeria (Central Bank of Nigeria, 2020; National Bureau of Statistics, 2020). This raises the question of whether public capital spending is properly directed toward the needs of the manufacturing sector (Iheanacho, 2016; Aluthge et al., 2021). Prior studies have examined government expenditure and economic growth, public spending and manufacturing output, and infrastructure and industrial performance, but many of them used broad measures of government expenditure or focused on output rather than average manufacturing capacity utilisation (Falade & Olagbaju, 2015; Nwanne, 2015; Gwaison et al., 2019). This study therefore examines the effect of government capital expenditures on average manufacturing capacity utilization in Nigeria by disaggregating capital expenditure into administration, economic services, social and community services, transfers, and total capital expenditure.

The study covers the period 1982 to 2024 because this period captures major policy and economic changes in Nigeria, including the Structural Adjustment Programme, oil price shocks, fiscal reforms, democratic transitions, and recent industrial policy efforts (Ajakaiye, 1995; Osakwe, 2020). The study controls for exchange rate, inflation rate, and interest rate because these variables affect manufacturing through imported input costs, consumer purchasing power, production costs, and access to credit (Bank-Ola et al., 2020).

2 LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1.1 Government Capital Expenditure

Government capital expenditure refers to public spending on long-term development assets and projects that are expected to support economic and social progress over time (Adewara & Oloni, 2012; Iheanacho, 2016). Iheanacho (2016) explained that capital expenditure differs from recurrent expenditure because it is directed toward assets and projects that last beyond one fiscal year. Adegboyo et al. (2021) described public expenditure as an important policy tool through which the government influences economic activity and allocates resources to priority sectors. Capital expenditure includes spending on roads, schools, hospitals, bridges, public buildings, transport systems, power projects, water systems, and communication infrastructure (Bizled, 2012; Farlex, 2016).

Aschauer (1989) argued that public capital can be productive when it improves private sector efficiency and lowers production costs. Barro (1990) also argued that government spending can raise growth if it is directed toward productive public goods. In the same way, Calderón and Servén (2004) found that infrastructure development supports economic growth and income distribution by improving the movement of goods, people, and information. However, government capital expenditure may fail to produce positive results when projects are poorly selected, poorly implemented, delayed, abandoned, or affected by corruption (Okonjo-Iweala & Soludo, 2003; Awojobi, 2020). This shows that the effect of capital expenditure depends not only on how much the government spends but also on where, how, and why the money is spent (Iheanacho, 2016; Aluthge et al., 2021).

2.1.2 Capital Expenditure on Administration and Average Manufacturing Capacity Utilization

Capital expenditure on administration refers to government spending on administrative buildings, public offices, equipment, governance systems, legislative structures, internal security, and defence-related administrative facilities (Afonso & Fernandes, 2006; Central Bank of Nigeria, 2019). Afonso and Fernandes (2006) noted that efficient public administration can support service delivery and improve the environment for economic activity. Administrative spending may support manufacturing indirectly by improving security, policy coordination, institutional capacity, and regulatory efficiency (Adegboyo et al., 2021; Awojobi, 2020).However, administrative capital expenditure may not directly increase manufacturing capacity utilization because it does not necessarily provide electricity, roads, raw materials, industrial finance, or skilled labour (Akinlo, 2001; Adenikinju, 2020). Awojobi (2020) argued from a public choice perspective that government spending may become inefficient when public resources are influenced by political and bureaucratic interests. If administrative spending mainly

supports offices, official structures, and bureaucracy, its effect on manufacturing may be weak or delayed (Iheanacho, 2016). Therefore, this study expects that capital expenditure on administration may have a limited effect on average manufacturing capacity utilization unless it directly strengthens industrial policy implementation.

2.1.3 Capital Expenditure on Economic Services and Average Manufacturing Capacity Utilization

Capital expenditure on economic services refers to government investment in productive sectors such as agriculture, construction, transport, power, water, communication, and other business-supporting infrastructure (Central Bank of Nigeria, 2019; Huang & Ho, 2020). Economic services expenditure should support manufacturing because factories need roads, electricity, ports, water, communication systems, and transport networks to operate efficiently (Aschauer, 1989; Calderón & Servén, 2004). Aliyu (2012) argued that poor transportation infrastructure raises production costs and weakens the competitiveness of manufacturers. Olaleye and Sulaiman (2016) found that electricity supply is important for manufacturing output because firms depend on power to maintain production schedules.

Akinlo (2001) identified power sector weakness as one of the major constraints facing Nigerian manufacturers. Adenikinju (2020) also observed that unreliable electricity forces firms to rely on diesel generators, which increases production costs and reduces industrial competitiveness. Economic services expenditure is therefore expected to improve average manufacturing capacity utilization when the spending is directed toward completed, functional, and well-maintained infrastructure (Aschauer, 1989; Olaleye & Sulaiman, 2016). However, public spending on economic services may fail if projects are delayed, mismanaged, poorly maintained, or not connected to industrial clusters (Okonjo-Iweala & Soludo, 2003; Awojobi, 2020). This makes the effect of economic services expenditure on AMCU an empirical question.

2.1.4 Capital Expenditure on Social and Community Services and Average Manufacturing Capacity Utilisation

Capital expenditure on social and community services refers to government investment in education, healthcare, housing, water, sanitation, electricity access, welfare facilities, and other services that improve human welfare (Bello-Schünemann et al., 2017; Central Bank of Nigeria, 2019). Lucas (1988) argued that human capital is a key source of long-term growth because skilled people improve productivity and innovation. Romer (1990) also emphasized that knowledge and technology contribute to sustained growth from within the economy. Therefore, social and community services can influence manufacturing capacity utilisation by improving the health, skill, stability, and productivity of workers (Obadan & Okojie, 2019; Akujuobi & Tony-Okolo, 2023).

Obadan and Okojie (2019) argued that skill mismatch remains a major problem for manufacturing performance in Nigeria because many graduates do not have the technical skills needed by industry. Social expenditure can also reduce labour absenteeism, improve worker morale, and strengthen the quality of industrial labour (Lucas, 1988; Romer, 1990). However, the effect of this spending depends on whether the money reaches schools, hospitals, training centres, housing programmes, and community facilities in ways that improve labour quality (Obadan & Okojie, 2019; Okonjo-Iweala, 2021).

2.1.5 Capital Expenditure on Transfers and Average Manufacturing Capacity Utilization

Government transfers are payments made by the government to individuals, firms, public agencies, or groups without a direct exchange of goods and services (Samuelson & William, 1976; Balla, 2008). Capital expenditure on transfers may include subsidies, grants, support funds, pensions, welfare payments, and other fiscal transfers that are linked to development objectives (Ojo, 2015; Udo & Esara, 2016). Udo and Esara (2016) argued that capital transfers can support development when they are used for infrastructure, public-private partnerships, or productive investment. Osemeke (2017) also noted that capital transfers can support jobs and project delivery when they are well managed. However, transfers may reduce manufacturing capacity utilisation when they are poorly targeted, politically distributed, or not linked to production (Nwafor & Onwukwe, 2015; Okonjo-Iweala, 2021). Nwafor and Onwukwe

(2015) found that fuel subsidies may provide short-term relief but can become inefficient when corruption and poor management weaken their benefits. Public choice theory suggests that transfers may be captured by interest groups when institutions are weak (Buchanan & Tullock, 1962; Awojobi, 2020). If transfers take funds away from roads, power, industrial parks, education, or health, they may weaken the manufacturing sector rather than support it (Nwafor & Onwukwe, 2015; Okonjo-Iweala, 2021).

2.1.6 Total Capital Expenditure and Average Manufacturing Capacity Utilisation

Total government capital expenditure is the aggregate of all public capital spending across administration, economic services, social and community services, transfers, and other capital categories (International Monetary Fund, 2014; Central Bank of Nigeria, 2019). Keynes (1936) argued that government spending can stimulate demand, output, and employment, especially when private sector demand is weak. Barro (1990) also suggested that public spending can support growth when it provides productive public goods. From this view, total capital expenditure should improve average manufacturing capacity utilisation if it creates infrastructure, improves human capital, and raises demand for locally produced goods (Aschauer, 1989; Calderón & Servén, 2004).However, total capital expenditure may hide important differences between spending categories (Iheanacho, 2016; Aluthge et al., 2021). Some components of capital expenditure may support manufacturing, while others may be weak, wasteful, or indirectly related to production (Dikeogu et al., 2016; Ogar & Ezeudu, 2017). Therefore, a disaggregated approach is important because it helps show which parts of capital expenditure improve manufacturing capacity utilisation and which parts do not (Iheanacho, 2016; Aluthge et al., 2021). This study, therefore, examines total capital expenditure alongside its main components.

2.1.7 Manufacturing Capacity Utilization

Manufacturing capacity utilization measures the percentage of installed production capacity that is actually used by manufacturing firms within a given period (Corrado & Mattey, 1997; Federal Reserve, 2020). Bernanke and Parkinson (1991) explained that capacity utilization provides insight into industrial activity because it reflects how firms respond to demand and cost conditions. Low manufacturing capacity utilization indicates that firms have idle machines, unused labour, weak production, and poor output performance (Corrado & Mattey, 1997; Bank-Ola et al., 2020). In Nigeria, low AMCU has been linked to poor electricity supply, exchange rate instability, weak infrastructure, low consumer demand, and high cost of production (Akinlo, 2001; Adenikinju, 2020).Osakwe (2020) argued that dependence on imported raw materials exposes Nigerian manufacturers to foreign exchange shocks and weakens industrial stability. Therefore, AMCU is influenced by both government capital expenditure and the wider macroeconomic environment (Bank-Ola et al., 2020).

2.2 Theoretical framework

This study is anchored on Keynesian economic theory, supported by endogenous growth theory and public choice theory (Keynes, 1936; Lucas, 1988; Buchanan & Tullock, 1962). Keynesian theory argues that government spending can stimulate aggregate demand, output, employment, and investment when private sector activity is weak (Keynes, 1936). This theory supports the expectation that public capital expenditure can raise manufacturing capacity utilization by providing infrastructure and stimulating demand (Aschauer, 1989; Barro, 1990). Endogenous growth theory explains that investment in human capital, knowledge, research, and technology can generate long-term growth from within the economy (Lucas, 1988; Romer, 1990). This theory supports the role of social and community services in improving labour productivity and industrial capacity (Akujuobi & Tony-Okolo, 2023).

Public choice theory provides a cautionary explanation by arguing that public spending may not always serve the public interest because politicians and bureaucrats may pursue personal or group interests (Buchanan & Tullock, 1962; Awojobi, 2020). This theory explains why capital expenditure may fail to improve manufacturing capacity utilisation even when government spending increases (Okonjo-Iweala & Soludo, 2003; Okonjo-Iweala, 2021). The three theories are therefore useful because they show that government spending can support manufacturing, but only when funds are properly allocated, efficiently implemented, and protected from waste (Keynes, 1936; Buchanan & Tullock, 1962; Lucas, 1988).

2.3 Empirical Review

The empirical evidence on government expenditure and manufacturing performance shows mixed results across countries, periods, and methods. Bamikole (2014) found that capacity utilization had a negative long-run effect on manufacturing productivity in Nigeria, linking the result to poor electricity supply and unproductive government spending. Richard (2014), however, found that fiscal policy had a strong and long-run relationship with manufacturing output, suggesting that government spending can improve manufacturing performance when properly implemented. Falade and Olagbaju (2015) also reported that capital expenditure increased manufacturing output in Nigeria, while recurrent expenditure reduced it. Similarly, Nwanne (2015) found that capital spending on roads and telecommunications had a strong positive effect on manufacturing output, although spending on power infrastructure was not significant.

Other studies show that disaggregating government expenditure gives a clearer understanding of its effect on economic and industrial performance. Dikeogu et al. (2016) found that total government expenditure did not significantly affect economic growth, but the individual components of spending produced different results. Ogar and Ezeudu (2017) also examined administration, economic services, social and community services, and transfers, and found that administrative expenditure had a strong positive effect on growth, while economic and social services had positive but non-significant effects. In South Africa, Meyer et al. (2017) found that general government spending had little effect on growth, while manufacturing sector investment had a positive long-run effect. Gwaison et al. (2019) found that government capital expenditure had a positive and significant effect on manufacturing output in Nigeria, while recurrent expenditure had a positive but non-significant effect.

Several studies also show that infrastructure, macroeconomic conditions, and public spending quality affect manufacturing capacity utilization and output. Kenny (2019) found that labour force, fixed capital formation, and exchange rate had a positive long-run relationship with manufacturing value added, while average manufacturing capacity utilisation, interest rate, and government spending had negative long-run effects. Edeme et al. (2020) found that capacity utilization and capital expenditure had positive and significant effects on manufacturing value added, while electricity supply had a negative and insignificant effect. Taiwo and Abayomi (2020) reported a positive relationship between real GDP and both recurrent and capital expenditure, while Nwosa and Tijani (2020) found that government expenditure had a negative and significant effect on service sector growth. Bank-Ola et al. (2020) further showed that inflation had a significant negative effect on manufacturing capacity utilization in Nigeria.

More recent studies reinforce the argument that the composition and effectiveness of public spending are central to growth and manufacturing outcomes. Chandana et al. (2021) and Aluthge et al. (2021) found that capital expenditure had a positive and significant effect on economic growth, while recurrent expenditure had no significant effect. Adesunloro (2021) also showed that the effect of government expenditure depends on its composition and efficiency. Joshua-Gyang et al. (2023) found that capital spending had a positive but weak effect on industrial output, while Oladeji (2023) found that capital spending on production supported manufacturing but recurrent expenditure had a negative effect. Thomya et al. (2023) showed that capital spending can reduce firm returns when investment decisions are poorly made, while Mustapha (2023) found that only spending on economic services supported growth. Ogunjobi et al. (2024) found that education administration spending did not improve manufacturing outcomes, while Okunlola et al. (2024) showed that corruption and conflict can affect how government expenditure influences growth. Obhiosa et al. (2024) further found that manufacturing capacity utilization responds differently to policy changes across Nigeria and South Africa.

2.4 Gap in Empirical Literature

The reviewed literature shows that many studies have examined government expenditure and economic growth, but fewer studies have focused directly on average manufacturing capacity utilization (Dikeogu et al., 2016; Aluthge et al., 2021). Several studies used manufacturing output, manufacturing value added, industrial development, service sector growth, or GDP growth as dependent variables rather than average manufacturing capacity utilization (Falade & Olagbaju, 2015; Gwaison et al., 2019; Edeme et al., 2020).

Other studies focused on total government expenditure without clearly separating administration, economic services, social and community services, transfers, and total capital expenditure (Taiwo & Abayomi, 2020; Chandana et al., 2021). Some studies also ended before the recent period and did not capture newer fiscal and industrial policy developments up to 2024 (Kenny, 2019; Bank-Ola et al., 2020). This study filled these gaps by examining the effect of disaggregated government capital expenditures on average manufacturing capacity utilization in Nigeria from 1982 to 2024, while controlling for exchange rate, inflation rate, and interest rate.

2.5 Hypotheses Development

Based on Keynesian theory, capital expenditure is expected to improve production by stimulating demand and supporting infrastructure (Keynes, 1936; Aschauer, 1989). Based on endogenous growth theory, spending on social and community services is expected to improve manufacturing through human capital development (Lucas, 1988; Romer, 1990). Based on public choice theory, some public spending may fail to improve manufacturing where funds are misallocated, politically influenced, or poorly implemented (Buchanan & Tullock, 1962; Awojobi, 2020). Therefore, the study tests the following hypotheses:

H_{01}: Government capital expenditure on administration has no significant effect on average manufacturing capacity utilization in Nigeria.

H_{02}: Government capital expenditure on economic services has no significant effect on average manufacturing capacity utilization in Nigeria.

H_{03}: Government capital expenditure on social and community services has no significant effect on average manufacturing capacity utilization in Nigeria.

H_{04}: Government capital expenditure on transfers has no significant effect on average manufacturing capacity utilization in Nigeria.

H_{05}: Total government capital expenditure has no significant effect on average manufacturing capacity utilization in Nigeria.

3 METHODOLOGY

This study adopted an ex-post facto research design because it relied on historical data that had already been reported by recognized public institutions. The design was suitable because the researcher did not manipulate the variables but examined how different categories of government capital expenditure affected average manufacturing capacity utilisation in Nigeria over time. Gujarati and Porter (2009) explained that regression analysis is appropriate where a study seeks to determine the direction and strength of relationships among economic variables. The study covered the period 1982 to 2024, a period that captures major fiscal, industrial, and macroeconomic changes in Nigeria, including structural adjustment, democratic transition, oil price shocks, exchange rate reforms, and recent manufacturing policy interventions (Ajakaiye, 1995; Osakwe, 2020).

The study used secondary data obtained from the Central Bank of Nigeria Statistical Bulletin, the National Bureau of Statistics, the Federal Ministry of Finance, World Bank publications, and other relevant official sources.

The model for the study is stated in functional form as:

AMCU = f(CEA, CEES, CESCS, CET, TCEX, EXRATE, INFRATE, INTRATE)

The econometric form of the model is stated as:

$$AMCU_t = \beta_0 + \beta_1 CEA_t + \beta_2 CEES_t + \beta_3 CESCS_t + \beta_4 CET_t + \beta_5 TCEX_t + \beta_6 EXRATE_t + \beta_7 INFRATE_t + \beta_8 INTRATE_t + \varepsilon_t$$

Where:

AMCU = Average manufacturing capacity utilization
CEA = Capital expenditure on administration
CEES = Capital expenditure on economic services
CESCS = Capital expenditure on social and community services
CET = Capital expenditure on transfers

TCEX = Total government capital expenditure
EXRATE = Exchange rate
INFRATE = Inflation rate
INTRATE = Interest rate
β0 = Constant term
β1–β8 = Coefficients of the explanatory variables
ε = Error term
t = Time period

The data were analyzed using descriptive statistics, Augmented Dickey-Fuller unit root test, correlation analysis, ordinary least squares regression, heteroskedasticity test, serial correlation test, and model specification test. Descriptive statistics were used to show the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, and normality behaviour of the variables. The Augmented Dickey-Fuller test was used to check whether the variables were stationary because time-series variables may produce misleading regression results when they contain unit roots (Gujarati & Porter, 2009). Correlation analysis was used to examine the level of association among the variables. Ordinary least squares regression was used to test the hypotheses because it shows the direction, magnitude, and significance of the relationship between the explanatory variables and AMCU. The decision rule was based on the 5% level of significance. The null hypothesis was rejected where the p-value was less than 0.05 and not rejected where the p-value was greater than 0.05 (Gujarati & Porter, 2009).

4 EMPIRICAL RESULTS

Table 2: Descriptive Statistics

Statistic	AMCU	CEA	CEES	CESCS	CET	TCEX
Mean	45.33152	178.3250	319.7100	85.81571	119.4678	703.3185
Median	45.48276	73.57740	215.3334	32.46730	43.58760	351.2500
Maximum	73.25882	1130.643	1960.733	540.0636	854.7670	4486.206
Minimum	30.40000	0.262700	0.656300	0.237600	0.000000	4.100100
Std. Dev.	8.790211	242.0298	409.6302	115.5787	182.0690	938.7777
Skewness	0.798398	0.241234	0.455769	0.401394	0.787852	2.192102
Kurtosis	2.995574	2.537892	2.419549	1.928082	2.374952	8.227677
Jarque-Bera	7.575651	5.475573	5.224020	3.683748	4.207369	83.40182
Probability	0.322645	0.647673	0.683780	0.765675	0.578675	0.000000
Observations	43	43	43	43	43	43

Source: Researcher's computation using EViews 10 (2025).

The descriptive statistics show that average manufacturing capacity utilization recorded a mean value of 45.33152. This suggests that, on average, Nigeria's manufacturing sector operated below half of its installed production capacity during the period covered. This result supports the argument that capacity underutilization remains a major weakness in Nigeria's manufacturing sector (Ajakaiye, 1995; Central Bank of Nigeria, 2020). The minimum value of 30.40000 and maximum value of 73.25882 show that AMCU fluctuated considerably across the period. Corrado and Mattey (1997) explained that capacity utilisation usually reflects changes in demand, infrastructure, and production conditions.

Capital expenditure on administration recorded a mean value of 178.3250, while capital expenditure on economic services recorded a mean value of 319.7100. The mean value of capital expenditure on social and community services was 85.81571, while capital expenditure on transfers had a mean value of 119.4678. Total capital expenditure recorded a mean value of 703.3185. The standard deviation values show that public capital expenditure fluctuated widely across the study period, which is expected in Nigeria because capital spending is influenced by oil revenue, budget priorities, inflation, borrowing, and policy changes (Iheanacho, 2016; Aluthge et al., 2021). The Jarque-Bera probability values show that all

variables except TCEX were normally distributed at the 5% level. TCEX was not normally distributed, as shown by its probability value of 0.000000.

The Augmented Dickey-Fuller unit root test was conducted to examine the stationarity properties of the variables. Gujarati and Porter (2009) stated that time-series variables should be tested for stationarity because non-stationary variables can produce spurious regression results.

Table 3: ADF Unit Root Test Results

Variable	Level t-statistic	Level p-value	First difference t-statistic	First difference p-value	Second difference t-statistic	Second difference p-value	Order of integration
AMCU	-3.856781	0.0050	Not required	Not required	Not required	Not required	I(0)
CEA	3.363649	1.0000	-4.011598	0.0038	Not required	Not required	I(1)
CEES	3.608281	0.9998	2.875546	1.0000	-6.783679	0.0000	I(2)
CESCS	3.301680	0.9996	0.595391	0.8405	-5.981277	0.0000	I(2)
CET	3.157916	0.9993	-6.935140	0.0000	Not required	Not required	I(1)
TCEX	4.325260	1.0000	0.579732	0.9869	-4.406427	0.0015	I(2)

Source: Researcher's computation using EViews 10 (2025).

The ADF result shows that AMCU was stationary at the level because its p-value was 0.0050, which is less than 0.05. CEA and CET became stationary after first differencing because their first-difference p-values were 0.0038 and 0.0000, respectively. CEES, CESCS, and TCEX became stationary after second differencing because their second-difference p-values were below 0.05. This means that the variables had mixed orders of integration. The result shows the need to handle the time-series properties of the variables carefully before making statistical conclusions.

Correlation analysis was conducted to show the degree of association among the variables. The result is presented in Table 4.

Table 4: Correlation Analysis Result

Variable	AMCU	CEA	CEES	CESCS	CET	TCEX
AMCU	1.000000	0.282700	0.229481	0.310598	0.140132	0.238434
CEA	0.282700	1.000000	0.989722	0.993066	0.938713	0.993992
CEES	0.229481	0.989722	1.000000	0.985726	0.949800	0.997074
CESCS	0.310598	0.993066	0.985726	1.000000	0.923612	0.988386
CET	0.140132	0.938713	0.949800	0.923612	1.000000	0.964107
TCEX	0.238434	0.993992	0.997074	0.988386	0.964107	1.000000

Source: Researcher's computation using EViews 10 (2025).

The correlation result shows that capital expenditure on administration had a weak positive relationship with AMCU at 0.282700. Capital expenditure on economic services also had a weak positive relationship with AMCU at 0.229481. Capital expenditure on social and community services recorded the strongest positive correlation with AMCU among the expenditure categories, with a value of 0.310598. Capital expenditure on transfers had the weakest positive correlation with AMCU at 0.140132. Total capital expenditure also had a weak positive correlation with AMCU at 0.238434.

The result suggests that the simple association between government capital expenditure and AMCU was generally weak. This supports the argument that manufacturing capacity utilization is affected not only by public spending but also by infrastructure quality, power supply, demand, exchange rate conditions, finance, and policy implementation (Akinlo, 2001; Adenikinju, 2020; Bank-Ola et al., 2020). The high correlations among the expenditure variables are expected because total capital expenditure contains the individual expenditure components.

The regression analysis was conducted to test the effect of government capital expenditures on average manufacturing capacity utilisation in Nigeria. The result is presented in Table 5.

Table 5: Regression Analysis Result
Dependent variable: AMCU

Variable	Coefficient	Standard error	t-statistic	p-value
CEA	0.014911	0.028239	0.528029	0.6008
CEES	-0.045867	0.015444	-2.969858	0.0054
CESCS	0.182910	0.045437	4.025612	0.0003
CET	-0.022761	0.010479	-2.171991	0.0367
TCEX	-0.987865	0.078755	-3.726726	0.0054
EXRATE	0.003305	0.016313	0.202610	0.8406
INFRATE	-0.027052	0.083406	-0.324343	0.7476
INTRATE	-0.299216	0.623285	-0.480063	0.6342
C	49.55251	13.31110	3.722645	0.0007
R^2:0.369716; Adjusted R^2:0.2437; F-statistic: 2.9329; Prob(F-statistic): 0.0159; DB Stat.: 1.196				

Source: Researcher's computation using EViews 10 (2025).

The regression result shows that capital expenditure on administration had a positive but non-significant effect on AMCU. The coefficient of CEA was 0.014911, while the p-value was 0.6008. Since the p-value is greater than 0.05, the effect is not statistically significant. This
means that administrative capital expenditure did not significantly explain changes in manufacturing capacity utilization in Nigeria. This result agrees with the view that administrative spending may support governance but may not directly remove the production constraints faced by manufacturers.

Capital expenditure on economic services had a negative and significant effect on AMCU. The coefficient of CEES was -0.045867, while the p-value was 0.0054. Since the p-value is less than 0.05, the effect is statistically significant. The negative coefficient may reflect poor project execution, delays, corruption, weak maintenance, and the failure of spending to reach production centres (Okonjo-Iweala & Soludo, 2003).Capital expenditure on social and community services had a positive and significant effect on AMCU. The coefficient of CESCS was 0.182910, while the p-value was 0.0003. Since the p-value is below 0.05, the result is statistically significant. This means that spending on social and community services improved average manufacturing capacity utilization.

Capital expenditure on transfers had a negative and significant effect on AMCU. The coefficient of CET was -0.022761, while the p-value was 0.0367. Since the p-value is less than 0.05, transfer-related capital expenditure significantly reduced manufacturing capacity utilization. Total government capital expenditure had a negative and significant effect on AMCU. The coefficient of TCEX was -0.987865, while the p-value was 0.0054. This suggests that total capital expenditure reduced average manufacturing capacity utilization during the period. The finding implies that the overall structure and implementation of capital expenditure may not have been sufficiently productive.

The control variables were not statistically significant. Exchange rate had a positive but non-significant effect, while inflation rate and interest rate had negative but non-significant effects. The R-squared value of 0.369716 shows that the explanatory variables accounted for about 36.97% of the variation in AMCU. The adjusted R-squared value of 0.243659 shows that the model retained explanatory power after adjusting for the number of variables. The probability value of the F-statistic was 0.015900, which is below 0.05. This means that the model was statistically significant at the 5% level.

The Breusch-Pagan-Godfrey heteroskedasticity test was conducted to examine whether the variance of the residuals was constant. Gujarati and Porter (2009) explained that heteroskedasticity can affect the reliability of standard errors and statistical inference.

Table 6: Heteroskedasticity test: Breusch-Pagan-Godfrey

Test statistic	Value	Probability
F-statistic	0.645405	Prob. F(4, 38) = 0.6335
Obs*R-squared	2.735465	Prob. Chi-Square(4) = 0.6030
Scaled explained SS	7.913152	Prob. Chi-Square(4) = 0.0948

Source: Researcher's computation using EViews 10 (2025).

The heteroskedasticity test result shows that the probability values were greater than 0.05. This means that the null hypothesis of constant variance was not rejected. The result therefore suggests that the model did not suffer from serious heteroskedasticity. This strengthens confidence in the reliability of the regression estimates.

The Breusch-Godfrey serial correlation LM test was conducted to examine whether the residuals were serially correlated. Serial correlation can weaken regression inference because it shows that current errors are related to previous errors (Gujarati & Porter, 2009).

Table 7: Breusch-Godfrey serial correlation LM test

Test statistic	Value	Probability
F-statistic	2.188943	Prob. F(2, 36) = 0.1267
Obs*R-squared	4.662183	Prob. Chi-Square(2) = 0.0972

Source: Researcher's computation using EViews 10 (2025).

The Breusch-Godfrey serial correlation test shows that the probability values were greater than 0.05. This means that the null hypothesis of no serial correlation was not rejected. The result indicates that serial correlation was not a serious problem in the model.

The Ramsey RESET test was conducted to examine whether the model suffered from functional form misspecification. Gujarati and Porter (2009) explained that model specification tests help determine whether the chosen functional form is appropriate.

Table 8: Ramsey RESET test

Test	Value	df	Probability
t-statistic	0.064044	37	0.9493
F-statistic	0.004102	(1, 37)	0.9493
Likelihood ratio	0.004767	1	0.9450

Source: Researcher's computation using EViews 10 (2025).

The Ramsey RESET test result shows that the probability values were above 0.05. This means that the null hypothesis of correct model specification was not rejected. The result suggests that the model did not suffer from serious functional form misspecification.

Table 9: Summary of Test of Hypotheses and Decisions

Hypothesis	Variable	Coefficient	p-value	Decision
H_{01}: Government capital expenditure on administration has no significant effect on AMCU	CEA	0.014911	0.6008	Fail to reject H01
H_{02}: Government capital expenditure on economic services has no significant effect on AMCU	CEES	-0.045867	0.0054	Reject H02
H_{03}: Government capital expenditure on social and community services has no significant effect on AMCU	CESCS	0.182910	0.0003	Reject H03
H_{04}: Government capital expenditure on transfers has no significant effect on AMCU	CET	-0.022761	0.0367	Reject H04
H_{05}: Total government capital expenditure has no significant effect on AMCU	TCEX	-0.987865	0.0054	Reject H05

Source: Researcher's computation using EViews 10 (2025).

4.1 Discussion of Findings

The finding on capital expenditure on administration shows a positive but non-significant effect on average manufacturing capacity utilization. This means that administrative capital expenditure did not significantly improve manufacturing capacity utilization in Nigeria. The result may be explained by the fact that administrative spending supports governance structures, public offices, defense, security, and institutional coordination but may not directly address the operational needs of manufacturing firms. Manufacturing firms require power, roads, ports, credit, skilled labour, industrial land, and access to raw materials to operate near full capacity (Akinlo, 2001; Adenikinju, 2020). Afonso and Fernandes (2006) argued that administrative efficiency can improve public service delivery, but this effect may not be strong where administrative spending is not linked to productive activities. This finding also supports Awojobi's (2020) public choice argument that government expenditure may become inefficient when it is not directed toward real economic needs.

The finding on capital expenditure on economic services shows a negative and significant effect on average manufacturing capacity utilisation. This result is unexpected because economic services expenditure should normally support manufacturing through roads, electricity, transport, communication, water supply, agriculture, and other productive infrastructure (Aschauer, 1989; Calderón & Servén, 2004). Olaleye and Sulaiman (2016)

found that electricity supply can improve manufacturing output, while Aliyu (2012) argued that poor transport infrastructure reduces manufacturers' competitiveness. The negative result in this study suggests that spending on economic services in Nigeria may not have been effectively implemented or may not have reached the productive sectors in ways that improved factory operations. Okonjo-Iweala and Soludo (2003) argued that corruption and weak project delivery reduce the value of public spending. This finding is also consistent with public choice theory, which warns that public expenditure may fail when allocation and execution are influenced by political interests and inefficiency (Buchanan & Tullock, 1962; Awojobi, 2020).

The finding on capital expenditure on social and community services shows a positive and significant effect on average manufacturing capacity utilization. This implies that government spending on education, healthcare, housing, water, sanitation, and related social services improved manufacturing capacity utilization in Nigeria. This finding supports endogenous growth theory, which argues that human capital, knowledge, and innovation are key drivers of long-term growth (Lucas, 1988; Romer, 1990). Obadan and Okojie (2019) argued that the mismatch between education and industry needs is a major constraint to manufacturing performance in Nigeria. Akujuobi and Tony-Okolo (2023) also found that education and health spending have implications for economic growth because they improve human capital. The positive result suggests that social and community spending can strengthen manufacturing when it improves the health, skill, and productivity of labour.

The finding on capital expenditure on transfers shows a negative and significant effect on average manufacturing capacity utilization. This means that transfer-related spending reduced manufacturing capacity utilization during the period. Transfers may support manufacturing when subsidies, grants, and support payments are tied to productive investment, energy efficiency, input cost reduction, or technology upgrading (Udo & Esara, 2016; Osemeke, 2017). However, transfers may weaken manufacturing when they are poorly targeted, politically allocated, or consumed without building productive capacity. Nwafor and Onwukwe (2015) found that fuel subsidies may provide short-term relief but can become inefficient due to corruption and poor management.

Okonjo-Iweala (2021) also warned that uncontrolled public spending and weak fiscal discipline can reduce the funds available for productive investment. This finding suggests that Nigeria needs to redesign transfers so that they support production rather than consumption or political patronage.

The finding on total government capital expenditure shows a negative and significant effect on average manufacturing capacity utilization. This means that the overall capital spending pattern did not improve manufacturing capacity utilisation. The result does not imply that capital expenditure is harmful in itself.

Instead, it suggests that the way capital expenditure has been allocated and implemented may be weak. Aschauer (1989) argued that public expenditure becomes productive when it provides infrastructure that supports private sector output. Iheanacho (2016) also noted that the contribution of government expenditure depends on the composition and effectiveness of spending. The negative result therefore suggests that total capital expenditure may have been spread across projects that were poorly executed, poorly maintained, delayed, or not linked to manufacturing needs.

The non-significant effects of exchange rate, inflation rate, and interest rate do not mean that macroeconomic conditions are unimportant. Bank-Ola et al. (2020) found that inflation affects manufacturing capacity utilization in Nigeria. Osakwe (2020) also argued that exchange rate instability affects manufacturers because many firms depend on imported raw materials and machinery. Interest rate conditions influence access to finance, especially for small and medium manufacturing firms (Onuoha, 2012). Therefore, even where the control variables are not statistically significant in this model, they remain important in the wider manufacturing environment.

5. CONCLUSION AND RECOMMENDATIONS

This study examined the effect of government capital expenditures on average manufacturing capacity utilization in Nigeria from 1982 to 2024. The study disaggregated government capital expenditure into administration, economic services, social and community services, transfers, and total capital expenditure. Exchange rate, inflation rate, and interest rate were used as control variables. The study used descriptive statistics, Augmented Dickey-Fuller unit root test, correlation analysis, ordinary least squares regression, heteroskedasticity test, serial correlation test, and Ramsey RESET test. The findings showed that capital expenditure on administration had a positive but non-significant effect on average manufacturing capacity utilization. Capital expenditure on economic services had a negative and significant effect. Capital expenditure on social and community services had a positive and significant effect. Capital expenditure on transfers had a negative and significant effect. Total government capital expenditure also had a negative and significant effect.

The study concludes that government capital expenditure has different effects on average manufacturing capacity utilization in Nigeria depending on the category of spending. The result shows that the amount spent is not enough to improve manufacturing capacity utilization. What matters more is the quality of spending, the direction of spending, the level of project completion, the strength of implementation, and the degree to which capital projects address the real needs of manufacturers. The positive effect of social and community services suggests that investment in human capital and welfare can support manufacturing. The negative effects of economic services, transfers, and total capital expenditure suggest that weak implementation, poor targeting, and inefficient allocation may be limiting the industrial benefits of public capital spending. The study made the following recommendations:

i. The study recommends that government should reduce wasteful administrative capital spending and ensure that administrative expenditure supports industrial policy implementation, investment facilitation, regulatory efficiency, and security. Administrative capital projects should be evaluated based on their contribution to the business environment.
ii. Capital expenditure on economic services should be better planned, executed, and monitored. Spending on power, roads, rail, ports, water, and communication should be directed toward manufacturing clusters, industrial estates, export processing zones, and production corridors. Government should also strengthen project maintenance and reduce abandoned infrastructure projects.
iii. Capital expenditure on social and community services should be expanded and linked to industrial human capital development. More attention should be given to technical education, vocational training, healthcare, housing, water, and sanitation. These investments can improve labour productivity and help manufacturing firms use more of their installed capacity.

iv. Capital expenditure on transfers should be restructured. Subsidies, grants, and support payments should be tied to productive outcomes such as machinery acquisition, energy efficiency, technology upgrading, local raw material development, and export expansion. Transfers that do not support production should be reduced.

v. Stronger transparency and accountability in public capital expenditure. Government projects should be monitored from approval to completion. Procurement processes should be open, and abandoned projects should be audited. This will help ensure that capital expenditure produces measurable benefits for manufacturing and the wider economy.

The study contributes to knowledge by showing that disaggregated capital expenditure analysis provides clearer evidence than total capital expenditure alone. It shows that social and community services can improve manufacturing capacity utilization, while poorly implemented economic services, transfers, and total capital expenditure may reduce it. Future studies may examine the moderating role of institutional quality, corruption control, private investment, industrial policy stability, and exchange rate management in the relationship between government capital expenditure and manufacturing performance.

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