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Electricity Consumption and Manufacturing Sector Performance: Evidence from Nigeria

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ABSTRACT

Adequate supply of energy is important for sustainable growth in an economy. The rate of the growth of the Nigeria's electricity development is very slow and not effective compare to other emerging economies; this on the other hands has discouraged production, most especially in the manufacturing sector. In light of this, the study investigates the long-run impact of electricity consumption on manufacturing sector performance proxy by output, employment and capital using Canonical Cointegrating Regression for the period of 1981-2019. Evidence from the result in the output equation shows that electricity consumption and credit to manufacturing sector have a negative relationship with output. In the employment equation, consumption in electricity and interest rate have negative effects on employment. In the capital equation, electricity consumption is not statistically significant. In conclusion, effects of electricity consumption as input in the manufacturing sector have not improved the performance in the sector. To improve the situation, the study recommends among others the need to create a framework to promote energy efficiency by maximizing output from the power sector and minimize wastage.

Keywords: Electricity Consumption, Employment, Output, Capital
JEL Classifications: Q4, J2, O1, G1

1. INTRODUCTION

In recent time, there is a growing concern on high cost of electricity tariff in Nigeria, this is presumed that will result to unfair competition in the long-run in products and goods market, given the high level of importation in the country. Although, the argument on effect of electricity on the performance of manufacturing sector has been going on for a long period, which policy makers believed that inadequacy of electricity supply had been one of the major challenges hindering the competitiveness of the manufacturing sector in Nigeria. Consequently, industries have been closed down due to this effect resulting to the adverse effect on employment and aggregate output. Nigerian manufacturing companies spent about 40 per cent of the production overhead on electricity leading to increase cost of operation and prices of goods made in Nigeria when compared with prices of similar goods from other countries (Asaleye et al., 2018). The primary objective of this study is to examine the connection between electricity demand in the manufacturing sector and the effects on its performance. In the manufacturing and other output sectors of the economy, electricity supply is one of the main factors to been considered in ensuring efficiency (Lawal et al., 2020). Manufacturing sectors use about one third of the world's energy consumption. However, due to low or inadequate power supply, most manufacturing industries have engaged other alternative means which in the long-run increases overhead cost and resulting to low output and lower employment in the sector.

As far as energy sources are concern, the consumption of oil as alternative source of energy in most European manufacturing industries has been declining since the early 1970's, due to shifts to other source of power supply and improved energy efficiency. On the other hand, the consumption of electricity increased significantly in European countries, this has made the manufacturing sector to play its key role in the economy (Andersen et al., 2011). Even though Nigeria has produced electricity supplies, and render the services for the manufacturing sector over the years. The rate of the growth of the country's electricity development is very slow and not effective compare to other emerging economies. As a result of this, in 2013, the Nigerian government privatized two divisions, that is the generation and the distribution divisions to address problems connected to the monopoly of the power supply industry, which has resulted to wastage of resources over the years. However, the scale of problems has not changed. According the World Bank report (2020), roughly 76 million, or 40.7 per cent of the Nigerian population have no connection to the domestic electricity grid, this figure is on the extreme. For example, the figure is more than double the population of Canada. However, there was shortage of electricity supply to those that have access, where about 90 per cent of the total power needed is not supplied. World Bank (2020) stressed that the installed capacity is actually 12,522 MW but typical operating power is only 3,879 MW, 7.4 per cent of which resulted inadequate transmission with a refused load of up to 27.7 per cent at delivery. Nigeria currently have about 2.519MW available to be used by productive and non-productive sectors.

In addition, Nigeria produces less energy than other large African economies (Asaleye et al., 2017). While its population is much bigger, has struggled to increase its production of power along with its increasing growth. For instance, South Africa produced 35,000 MW from a 52,000 MW installed capacity in 2015 with a population of 48 million. The manufacturing sector serves as engine of growth for many developed economies, few among others included the United State of America and China. However, the shortage and inadequate of electricity supply have discouraged production, most especially in the manufacturing sector where most companies preferred to produce goods in neighboring countries and export to Nigeria. From theoretical point of view, this might have negative effects on employment and output in Nigerian manufacturing sector. Scholars have emphasised that high unemployment rate and underemployment are prevailing problems in Nigerian's economy, even after the era of diverse programmes and policies to improve the situation (Asaleye et al., 2020; Arisukwu et al., 2019; Asaleye et al., 2019a; Obadiaru et al., 2018; Popoola et al., 2018).

The literature seems to neglect a systematic study between electricity consumption and implications on employment and output in the manufacturing sector over a long period of time. Few of the studies include the work by Gautam and Paudel (2018) that investigate the cost of sectoral demands of electricity. The authors documented that electricity for the residential sector is responsive to its own price in the long-run but irresponsive to own price in the short run. Peñasco et al. (2017) examine the effect of gas and electricity demand on Spanish manufacturing industries. The authors found that price elasticity of gas demand is significantly negative. Also, Boluk and Koc (2010) investigate the effect of electricity demand on manufacturing sector in Turkey using a 'Translog Cost approach'. Boluk and Koc (2010) reported that electricity demand is price sensitive in the manufacturing sector. However, electricity relationship with labour and electricity relationship with capital are both discovered to have complementary nature. Using a cross-country input-output approach, Tarancon et al. (2010) examine the effect of electricity demand on manufacturing sector. Tarancon et al. (2010) used 18 manufacturing companies in 15 European countries and it was reported that manufacturing industries resulted to greater share of electricity demand in production. As a result of this, it has an impact by increasing the cost of the input (electricity) and price of the product.

Liu et al. (2018) investigate the causal relationship between electricity consumption and economic growth in Beijing. The scholars found out that there is one-way direction of causality from economic growth to electricity consumption. The sectoral analysis also shows one-way causality running from economic growth to electricity consumption. However, the scholars reported that independence was noticeable in cross sector level, secondary sector and tertiary sectors. Papiez et al. (2019) investigate the connection between renewable energy sector and economic growth in European countries using panel Vector Autoregression Model. Papież et al. (2019) concluded that the extent in which economic growth is affected by electricity consumption is determined by the degree of the development in renewable energy sector. In this case, if the renewable energy is more developed, more mutual dependence between economic growth and renewable electricity consumption is observed.

Tang and Shahbaz (2013) employed time series to establish the direction of sectoral causality between output and electricity consumption. The analysis of the authors are carried out using two approaches. The first approach examines the causality at the aggregate level while the second approach focuses on the sectoral analysis using three sectors, namely manufacturing, agricultural and service sectors. The findings of Tang and Shahbaz (2013) shows one-way direction of causality in the first approach that is causality moving from electricity consumption to aggregate output. While in the sectoral analysis, no relationship between agricultural sector and output. More so, it was reported by the authors that causality move from electricity consumption to manufacturing and service sectors. The study by Bianco (2020) is limited to tourism sector; the author examines the connection between electricity consumption and tourism sector. In a similar study, Grainger and Zhang (2019) analyses the impact of electricity shortage on manufacturing productivity in Pakistan. The study by Grainger and Zhang (2019) carried out using about 4500 manufacturing industries. The scholars documented that additional average daily hour of unexpected shortage in electricity decreases annual revenue. Also, an increase in shortage decreases annual value-added.

Li and Lin (2015) analyses difference sources of energy savers in manufacturing sector. The authors concluded that other source of energy including gasoline and diesel are vital more in saving energy than electricity. Kwon et al. (2016) takes another dimension by focusing on South Korea electricity-price policy and its implications on electricity demand and manufacturing sector. It was found that, increase in electricity prices increase electricity demand; this on the other hands affect the manufacturing output negatively. Likewise, region-uniform price is affected in the long run. In Nigeria, Ogunjobi (2015) examines the long-run effect of electricity consumption on industrial growth. In the scholar's analysis, aggregate employment in the economy was used to proxy labour in the industrial sector. The outcome of the result according to Ogunjobi (2015) shows that an increase in electricity generation will promote long-run output and employment in the industrial sector. From the foregoing, impact of electricity consumption on manufacturing performance, most especially in developing economies are scanty, with most studies focused on effect of tax, poverty, human capital, financial performance, among others (Oladipo et al., 2019b; Olopade et al., 2019; Popoola et al., 2019; Lawal et al., 2019; Asaleye et al., 2019c). Nigerian' economy in the 1970 and 1980s promote significant employment generation through the manufacturing sector (Adama et al., 2018; Asaleye et al., 2019b; Oladipo et al., 2019a). In light of the gap identified in the literature, this study examines the long-run impact of electricity consumption on manufacturing performance in Nigeria.

The remainder of this paper is organized as follows: Section II gives the material and method and Section III presents discussion of result. Section IV concludes.

2. MATERIALS AND METHODS

This paper investigates the connection between electricity consumption and manufacturing performance in Nigeria. Using the output model that stresses the importance of inputs in production activities. The simple model is given as:

$$OT = f\,(LB, CA) \tag{1}$$

Where OT represents aggregate output in the economy. LB and CA are inputs; that is aggregate labour and capital respectively. To achieve the objective of this study, output, capital and employment in manufacturing sector are used, and equation 1 is adjusted and becomes:

$$MOT = f\,(MLB, MCA) \tag{2}$$

In equation 2, MOT, MLB and MCA are output, employment and capital in the manufacturing sector respectively. The equation is double logged and the explicit form is simplified as:

$$InMOT_t=\alpha_0+\alpha_1InMLB_t+\alpha_2InMCA_t+\mu_t \tag{3}$$

Scholars have stressed the influence of electricity as input in industries (Peñasco et al., 2017; Tarancom et al., 2010; Kwon et al., 2016). Other variables also considered are manufacturing sector market capitalization, exchange rate and interest rate. Therefore, equation 3 can be re-write as follows:

$$InMOT_t=\alpha_0+\alpha_1InMLB_t+\alpha_2InMCA_t+\alpha_3InELC_t+\alpha_4InINT_t+\alpha_5InEXC_t+\alpha_6InMCU+\mu_t \tag{4}$$

In equation 4, ELC represents electricity consumption in the manufacturing sector, INT, EXC and MCU are interest rate, exchange rate and manufacturing sector capital utilization. This study uses Canonical Cointegrating Regression (CCR) to estimate the long-run behaviour between electricity consumption and manufacturing performance in Nigeria. Prior to the CCR, unit root test using KPSS and Johansen Cointegration were carried out to determine the statistical properties of the series. Evidence from the results presented in the next section shown the series are not stationary and has three cointegrating vectors. Based on this outcome, three single equations were established using the CCR for output, employment and market capitalization to determine how electricity consumption affects the behaviour of the manufacturing sector. The null hypothesis of trend stationarity for the KPSS equation is given as:

$$Y_q\,(k)= \phi(k)+q\delta(k)+q_q(k) \tag{5}$$

The alternative hypothesis is given as;

$$Y_q\left(k\right)=\varphi\left(k\right)+q\delta\left(k\right)+\sum_{i=1}^{n}\partial_1(k)+q_q(k) \tag{6}$$

In equations 5 and 6, q represents the number of observations and k is time for particular function. The null hypothesis is that there is presence of unit root in the series. Given Vector Autoregression (VAR) of order n as follows:

$$X_t=\omega+B_1X_{t-1}+\ldots B_nX_t-n+v_t \tag{7}$$

In equation 7, X_t is the vector of the series that are not stationary, however, are in first difference form. Likewise, v_t is the vector of shock or innovation by the series. Hence, the VAR could be given as:

$$\Delta X_t=\varpi+\Omega\sum_{i=1}^{n-1}\Phi\Delta X_{t-1}+v_t \tag{8}$$

In equation 8, $\Omega=\sum_{i=1}^{n}B_i\text{-}1$ and $\phi_i=\sum_{j=i+1}^{n}B_j$

Ω is the matrix of the coefficient. In a case where the r (number of cointegrating vectors) is less than n, then we can conclude that n x r matrices is present. If the linear combination of non-stationary becomes stationary. Hence, there is presence of cointegrating vectors. We used CCR equation to examine the long-run behaviour. The CCR uses the stationarity transformation of the series to derive the estimator from the least square approach. In doing this, the long run dependence between the cointegrating equation and the stochastic regression is removed in the process.

To obtain the CCR estimates, having the innovations as $v_t=(v_{1t}, v_{2t})'$ and the respective consistent values of the long-run covariance matrices as Ω and . Therefore,

$$\Lambda = \begin{bmatrix} \lambda_{12} \\ \lambda_{22} \end{bmatrix} \quad (9)$$

Using transforming processes (given the series are A and B) we have:

$$A_t^* = A_t - (\Sigma^{-1} \hat{\lambda}_2)' v_t \quad (10)$$

$$B_t^* = B_t - \left(\Sigma^{-1} \hat{\lambda}_2 \hat{\psi} \begin{bmatrix} 0 \\ \widehat{\Omega}_{22}^{-1} \quad \hat{w}_{21} \end{bmatrix} \right)' v_t \quad (11)$$

In equation 11, $\widehat{\Psi}$ indicates the numeric value for the cointegrating equation constant, likewise the sum of least square was employed to get the values for the series B. The CCR estimator is referred to as a transformed data obtained from the least square approach given as:

$$\begin{bmatrix} \psi \\ \widehat{B}_1 \end{bmatrix} = \left(\sum_{n=1}^{N} K_n^* K_n^* \right)^{-1} \sum_{n-1}^{N} K_n^* B_t^* \quad (12)$$

In equation 12, $K_n^* = K_n^{*1}, D_{1n}^{1}$,, by this transformation by the CCR, it removes asymptotically the endogeneity that may have been resulted in the cointegration analysis by correlation through the long-run process. In addition, the CCR improves the asymptotic bias that may have be generated in the process via the contemporaneous correlation. The data period used is from 1981 to 2019. The data from the analysis are obtained from Nigerian Statistical Bulletin, different issues, except from the data for electricity consumption that is obtained from National Electric Power Authority: Central Bank of Nigeria annual reports and statement of account, various issues, and Federal Office of Statistics Industrial Surveys. In addition, data for employment in manufacturing sector was obtained from National Bureau of Statistics.

3. PRESENTATION OF RESULTS

Table 1 presents the stationarity result using KPSS. Evidence from the result showed that the null hypothesis that the series are stationary cannot be accepted at the level form either with intercept or with trend and intercept at 5 percent significance level. The values of the level forms of the series either with intercept or with trend and intercept is greater than the asymptotic critical values at 5 percent of unit root test when carried out with intercept or when both trend and intercept are included with values of 0.463000 and 0.146000 respectively. Hence, the null hypothesis was rejected. However, the null hypothesis was accepted at the first difference since the asymptotic critical values with the inclusion of intercept and with the inclusion of both trend and intercept with values of 0.463000 and 0.146000 respectively are greater than the series coefficient values at 5 percent significance level. Therefore, all the series are integrated of the same order, that is order one. Based on the outcome of this result, we proceed to examine the long run relationship. Firstly, we determine the cointegrating vectors using Johansen Cointegration Approach. The result is presented next.

Table 2 presents the Johansen Cointegration Approach of the series. The Trace test indicates 3 cointegrating equations at the level of 5 percent level of significant while Max-eigenvalue test indicates 1 cointegrating equation. However, in this study, we followed the indication of Trace test statistics. Due to this outcome, 3 equations are established to achieve the objective of this study using Canonical Cointegrating Regression (CCR). The equations are for output, employment and capital in the manufacturing sector which are used to proxy the performance in the sector and are referred to as output equation, employment equation and capital equation respectively.

Table 3 shows the long-run impacts of electricity consumption on manufacturing performance in Nigeria. In the output equation, electricity consumption (ELC) and credit to manufacturing sector (MCA) are statistically significant at the level of 5 percent while exchange rate (EXC) and interest rate (INT) are not statistically significant. Electricity consumption and credit to manufacturing sector have a negative relationship with output. The result indicates that electricity usage in the manufacturing sector has adverse effect on the output, so many factors may be responsible for this, among it includes inefficiency in the power sector and high price of the electricity which can make the make to be less competitive to the local producer compare to their foreign counterparts. The findings is in line with the study of Kwon et al. (2016), they argued that increase in electricity prices increases the demand for electricity

Table 1: Presentation of KPSS stationarity result

Variable	With intercept			With trend and intercept		
	Level	1st Diff.	I (D)	Level	1st Diff	I (D)
MOT	0.723372	0.320494*	I (1)	0.217592	0.074035*	I (1)
MLB	0.868989	0.459852*	I (1)	0.241981	0.034628*	I (1)
MCA	0.693382	0.407838*	I (1)	0.184145	0.071163*	I (1)
ELC	0.565890	0.223395*	I (1)	0.212137	0.088173*	I (1)
INT	0.631096	0.263622*	I (1)	0.155814	0.087187*	I (1)
EXC	0.701631	0.215416*	I (1)	0.177198	0.068264*	I (1)
MCU	0.579227	0.132807*	I (1)	0.299788	0.124308*	I (1)
Asymptotic critical values (with intercept)				**Critical values (with trend and intercept)**		
1 percent Level		0.739000		1 percent Level	0.216000	
5 percent Level		0.463000		5 percent Level	0.146000	
10 percent Level		0.347000		10 percent Level	0.119000	

Source: Authors' Computation using Eviews 10. *Indicates significant values and acceptance of null hypothesis @ 5 percent

Table 2: Presentation of Johansen Cointegration

Series: ELC EXC INT MCA MCU MLB MOT				
Unrestricted cointegration rank test (trace)				
Hypothesized No. of CE (s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical value**	**Prob.****
None*	0.778327	156.7353	125.6154	0.0002
At most 1*	0.557825	102.4994	95.75366	0.0158
At most 2*	0.555057	73.12157	69.81889	0.0266
At most 3	0.484580	43.96842	47.85613	0.1106
At most 4	0.282899	20.10856	29.79707	0.4155
At most 5	0.179665	8.137166	15.49471	0.4509
At most 6	0.027602	1.007643	3.841466	0.3155

Trace test indicates 3 cointegrating eqn (s) at the 0.05 level. *Denotes rejection of the hypothesis at the 0.05 level. **MacKinnon-Haug-Michelis (1999) *P* values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE (s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None*	0.778327	54.23593	46.23142	0.0058
At most 1	0.557825	29.37781	40.07757	0.4655
At most 2	0.555057	29.15315	33.87687	0.1652
At most 3	0.484580	23.85986	27.58434	0.1397
At most 4	0.282899	11.97139	21.13162	0.5505
At most 5	0.179665	7.129523	14.26460	0.4740
At most 6	0.027602	1.007643	3.841466	0.3155

Max-eigenvalue test indicates 1 cointegrating eqn (s) at the 0.05 level. *Denotes rejection of the hypothesis at the 0.05 level. **MacKinnon-Haug-Michelis (1999) p-values. Source: Authors' Computation using Eviews 10

Table 3: Presentation of canonical cointegrating regression

Dependent Variable: MOT				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ELC	–0.178859*	0.064565	–2.770223	0.0089
EXC	–0.007061	0.254815	–0.027712	0.9781
INT	–0.425869	0.424564	–1.003075	0.3234
MCA	–0.028156*	0.010228	–2.752767	0.0093
C	3.515280**	1.554085	2.261961	0.0306
R-squared: 0.703727		Adjusted R-squared: 0.666692		
Dependent Variable: MLB				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ELC	–1.037733*	0.388238	–2.672927	0.0117
EXC	0.160420	0.112168	1.430177	0.1624
INT	–0.141093**	0.069887	–2.018858	0.0522
MCA	–0.044165	0.045056	–0.980225	0.3343
C	7.941213*	0.682683	11.63235	0.0000
R-squared: 0.433672		Adjusted R-squared: 0.350381		
Dependent Variable: MCU				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ELC	0.010423	0.024578	0.424056	0.6743
EXC	0.067165**	0.032102	2.092275	0.0444
INT	–0.206504**	0.097117	–2.126337	0.0410
MCA	3.921700	2.553000	1.536114	0.1343
C	0.247070*	0.016803	14.70364	0.0000
R-squared: 0.604496		Adjusted R-squared: 0.555058		

Source: Authors' Computation using Eviews 10. *,** and *** represent 10 percent, 5 percent and 1 percent significance levels respectively

consumption, which in the long-run will affect the manufacturing output negatively. Taranion et al (2018) also documented the same argument using 18 manufacturing companies in 15 European countries. Likewise, the credit given to the private sector has not yielded a desirable outcome most especially in the manufacturing sector. One of the factors that may be responsible for this may due to the high operating cost incurred in the sector.

In the employment equation, electricity consumption and interest rate are statistically significant while exchange rate and credit to private sector are not significant. Consumption in electricity and interest rate have negative effects on employment. The result shows that electricity consumption has not promoted employment in the manufacturing sector; this an indication of lower employment experience in Nigeria in the manufacturing sector. The result is in with the study of Peñasco et al. (2017) that shown the influence of high price of electricity consumption on manufacturing, it was concluded by the scholars that it has negative effect on output and employment in the sector. One of the factor could be the high cost of the electricity rate which makes most of the industries to search for alternative ways either by changing the location and produce in neighboring countries, then import to Nigeria or tends to lower their output to reduce expense. In the long run, this would have adverse effects on aggregate employment in the sector as depicted by the result. The interest rate on the other hands showed that a change in the interest rate will lower employment in the long-run. However, interest rate is mostly used to achieve short term goals with the aim to ensure stabilization in the economy. Capital induced to the manufacturing sector through credits has not stimulated employment. One of the factors may be as results of insufficient capital, lack of transparency in capital management and not prioritize the right channels to promote employment by increase aggregate output in the sector.

In the capital equation, exchange rate and interest rate are statistically significant. The exchange rate has positive relationship with the capital utilization. The interest rate has negative relationship with the capital utilization while electricity consumption and credit to private sector are not statistically significant. Boluk and Koc (2010) reported that electricity demand is price sensitive in the manufacturing sector. However, electricity relationship with labour and electricity relationship with capital are both discovered to have complementary nature.

In conclusion, effects of electricity consumption in the manufacturing sector have not improved the performance in the sector. To improve the electricity sector in Nigeria, the government privatized two divisions in 2013, that is the generation and the distribution divisions to address problems connected to the monopoly of the power supply industry, which has resulted to wastage of resources over the years. However, till date, the shortage and inadequate of electricity supply have discouraged production, most especially in the manufacturing sector where most companies preferred to produce goods in neighboring countries and export to Nigeria. Which has resulted to negative impact on output and employment in the sector. There is need to address the situation by ensuring the manufacturing sector plays a key role in the economy, most especially in employment generation.

4. CONCLUSION AND RECOMMENDATIONS

In this study we investigate the relationship between electricity demand in the manufacturing sector and the effects on its performance. In the manufacturing and other output sectors of the economy, electricity supply is one of the main factors to been considered in ensuring efficiency. Manufacturing sectors use about one third of the world's energy consumption. However, due to low or inadequate power supply, most manufacturing industries in Nigeria have engaged other alternative which in the long-run increases overhead cost and resulting to low output and lower employment in the sector. Even though Nigeria has produced electricity supplies, and render the services for the manufacturing sector over the years. The rate of the growth of the country's electricity development is very slow and not effective compare to other emerging economies, despite reforms in the electricity sector due to waste and inefficiency.

To achieve the objective of this study, we use Canonical Cointegrating Regression to establish the long-run equations between electricity consumption and manufacturing performance in Nigeria. The performance of manufacturing sector is proxy by output, employment and capital utilization in the sector. The unit root test and cointegration test are carried out prior to the Canonical Cointegrating Regression. Evidence from the unit root test shows that the series are not stationarity at the level of 5 percent and the cointegration result indicates three cointegrating vectors. Based on this outcome, output, employment and capital equations are generated. In the output equation, electricity consumption and credit to manufacturing sector are statistically significant while exchange rate and interest rate are not statistically significant. Electricity consumption and credit to manufacturing sector have a negative relationship with output. In the employment equation, electricity consumption and interest rate are statistically significant while exchange rate and credit to private sector are not significant. Consumption in electricity and interest rate have negative effects on employment. Likewise, in the capital equation, exchange rate and interest rate are statistically significant. The exchange rate has positive relationship with the capital utilization. The interest rate has negative relationship with the capital utilization while electricity consumption and credit to private sector are not statistically significant.

In conclusion, effects of electricity consumption in the manufacturing sector have not improved the performance in the sector. There is need to address the situation by ensuring the manufacturing sector plays a key role in the economy, most especially in employment generation. Adequate supply of energy is important for sustainable growth in an economy. Substitutability of electricity as input in manufacturing sector is possible. However, it may be more costly in the long-run. Electricity is the most commonly used and desired source of energy in our present world. Supply of electricity is widely known for its unreliability and high disruption costs affecting production in the manufacturing sector in many developed countries, especially in Africa. Most of the problems associated with high cost and inadequate electricity supply in Nigeria are technical issues. Hence, the study recommends: the need to create a framework to promote energy efficiency by maximizing output from the power sector and minimize wastage; linkage between energy sector and manufacturing sector through target-setting agreement programs and policies that will create strong economic incentive and promote long-run financial support need to be considered. Likewise, proper management through effective monitoring and evaluation is needed to increase the level of transparency and efficiency both to the electricity supply and credit given to the manufacturing sector. This study is limited to single country analysis due to data issues. It is suggested that future studies should embark on comparative studies of the effects of electricity consumption on manufacturing sector on selected African countries.

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