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Impact of Power Generating Capacity on the Nigerian Economy

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Abstract

The study focused on the impact of power generation capacity on the Nigerian economy. The specific objectives was to investigate the relationship between power generation capacity and economic growth. Secondary data sourced from Central Bank of Nigeria was analysed using ordinary least squares (OLS) method. In the model specified, real gross domestic product is a function of power generation, technology, and gross capital formation. The results of the estimation showed that there is a significant positive relationship between Power Generation Capacity (PGW), Gross Capital Formation (GCP), Technology utilization (TECHU). The study therefore recommended that government must ensure transparency in the overall implementation of its power sector policy and the attendant reform agenda in order to enhance growth of the economy in power generation capacity. Government should also increase its expenditure in the aspect of technology so as to foster economic growth.

1. Introduction

With the collapse of the World Bank and International Monetary Fund policy on Structural Adjustment Programme (SAP) in Africa, many questions have been raised by scholars on the factors impeding economic development in leading African nations including Nigeria [1]. They argued that economic liberalization in other parts of the world have continued to yield anticipated results, increasing global trade and technological advancements such that by the end of the 21st century some emergent economies have appeared on the global capitalist markets [2]. There is no gainsaying the fact that the likes of Indonesia, China, Japan and Malaysia are now making new waves in the global markets. While this thinking continues about global capitalist development, researches conducted by the United Nations and the World Bank [6] has shown that Nigeria's economic development is routinely constrained by some inherent cultural factors [3].

Although, Nigeria is rich in human and material resources, its economic and political developments have been fraught with crises since independence in 1960. Indices of the failure of the Nigerian state are today evident in the pervasive cases of hunger, inflation, budget deficits, debt overhang, street begging, prostitution, frauds, high crime rates in major cities, collapse of manufacturing industries, corruption in public service, stagnation in entrepreneurial development and epileptic power supply [4]. In the face of these crises, it becomes difficult for sustainable development to take place in the country. The interest of this research is not all the problems measured, but the huge expenditure injected annually into the power sector and its attendant impact on the Nigerian economy [5].

Nigeria's power sector had operated for several decades as a state monopoly then called National Electric Power Authority (NEPA) until 2005. NEPA controls electricity generation, transmission and distribution facilities with all the profound problems inherent in public monopoly. This over centralization made it impossible for electricity generation to keep pace with the growth in population and economic activities. Nigeria has the biggest gap in the world between electricity demand and supply, providing its population of over 160 million with less than 4000 megawatts of electricity. In contrast, South Africa with a population of less than 50 million people generates more than 40,000 megawatts while Brazil, an emerging economy like Nigeria, generates over 100,000 megawatts for its 201 million citizens [6]. Indeed, the gap in the power sector has far reaching implications for improving the business climate, sustaining economic growth and the social wellbeing of Nigerians. About 45 percent of the population has access to electricity, with only about 30 percent of their demand for power being met. The power sector is plagued by recurrent outages to the extent that some 90 percent of industrial consumers and a significant number of residential and other non-residential consumers provide their own power at a huge cost to themselves and to the Nigerian economy. Installed capacity is 8,000 megawatts as at 2013, but only 4,000 megawatts is obtainable of which about 1,500 megawatts is available to generate electricity. At 125 kWh per capita, electricity generation and consumption in Nigeria is one of the lowest in the world [1,6].

Power generation is a basic necessity and one of the vital components of development delivery process to consumers. The other processes include; power transmission, power distribution, and power regulation. Power generation must be in tandem with population growth and productive capacity in order to derive meaningful economic growth. Nigeria as a developing country with urgent need for increase in power generation has initiated many power generation policies in the form of Power Sector Development in the past decades. Power sector Development was one of the seven-point agenda of President Yar'Dua in 2007. Also, the Presidential Task Force on Power (PTFP) was established by the President Goodluck Jonathan administration, in June 2010 to drive the implementation of the reform of Nigeria's power sector. The task force was meant to bring together all the agencies that have a role to play in removing legal regulatory obstacles to private sector investment in the power industry. Its mandate was also to monitor the planning and execution of various short-term projects in generation, transmission, distribution and fuel-to-power that are critical in meeting the stated service delivery targets of the power reform roadmap [7]. The terms of reference of Power Transformation Project (PTP) included close collaboration with various ministries and agencies that have specific contributions to the reform process, these includes the Federal Ministry of Power, the Federal Ministry of Finance, the Bureau of public Enterprises (BPE), the Nigerian Electricity Regulatory Agency (NERC), the Nigerian National Petroleum Corporation (NNPC), the Bureau of Public Procurement, National Gas Company Limited (NGC) and the Power Holding Company of Nigeria (PHCN) [8].

The Nigerian government has also spent huge sums of money to increase power generation since returning to democratic governance in 1999. According to the Daily Trust Editorial on 30thDecember 2014, the electricity sector gulped nearly ₦4 trillion ($26 billion) since the beginning of the power reforms in 1999. Reiterating the importance of the power sector, former President Goodluck Jonathan, in his inauguration address in 2011, introduced Transformation Agenda (TA) policy of his regime in which the power sector was one of the key components. According to Dr. Sham Suddeen Usman, the former economic planning minister under Jonathan Administration, Transformation Agenda (TA) was a blueprint of the key policies, programmes and projects to be implemented by Federal Government from 2011 to 2015. Usman stated further that the agenda aimed at consolidating the achievements of previous administrations with strong emphasis on infrastructural development [9].

The power sector roadmap is an integral part of Infrastructural Master Plan (IMP) launched by former President Goodluck Jonathan in 2013, which preceded the Transformation Agenda's Mid-term Report. According to the policy statement of report, Nigeria was to invest heavily in transport, road construction, power, ICT and water resources in which the power sector had the largest of the expected investments. The report outlined the proposed investment, distribution and alternative energy. The government's strategy, according to the report was to unbundle the sector through creating a deregulated and competitive electricity market [10]. The unbundling of power has been a continuation of policy framework of subsequent governments in Nigeria towards power sector reforms. Unbundling of the power sector was thought as a strategic policy that somewhat would drive Nigeria's aspiration to become a major industrial developed nation of the world [11]. The Transformation Agenda (TA) report posited that the reform plan of former President Goodluck Jonathan was to resuscitate and deregulate the sector by investing $3.5 billion annually with the hope of moving the generation capacity from 4,000 MW in 2011 to 20,000MW by the year 2020. The former minister of power Prof. Chinedu Nebo said that Nigeria was capable of generating 16,000MW before the end of 2014, adding that the service companies – generation, transmission and distribution networks were to ensure that all rural areas not connected to national grid were connected even to renewable sources of electricity. Reiterating the investment opportunity in Nigeria, the former Minister viewed Nigeria as a very strategic country to invest in power sector. By investing in Nigeria's power sector, investors can capitalize on growth opportunities in the Nigerian electricity market where demand far outstrips current supply and the potential for strong economic growth is high. Since Nigeria is the largest market in Economic of West African State (ECOWAS) region, investors can use Nigeria to establish a strong presence in West Africa and also as a platform for acquiring further assets in the region. More importantly, in his view, investors can benefit from a Multi-Year Tariff Order (MYTO) which brings certainty to the tariffs. In power regulation MYTO is designed to be a cost reflective tariff that accounts for operating cost and capital recovery, incentivizing efficient operations, based on best new entrant capabilities and technology.

Unfortunately, by the end of 2014, the government policy target on power generation capability was not met despite the huge amount already invested in the sector [12]. The effectiveness and efficiency of the policy and investment in increasing the power generation in Nigeria is very much questionable. Referring on the success of power reform in Nigeria, Dr Sam Amadi, the former Chairman of National Electricity Regulatory Commission, stated in 2014 that for 13 years Nigeria has embarked on power sector reforms. According to him, it is arguable whether the reform has been greater success or partial success. He believes that the basic assumption behind the power sector reform in Nigeria was government ownership of electricity assets, which serves as a major cause of the collapse of the industry in the late 1980s. Amadi made passionate appeal for the unbundling, privatization of the sector and enlisted seven critical disciplines for a successful power sector reform in Nigeria through the discipline of maintaining the independence of the regulator, discipline of right pricing, discipline of transparent procurement, the discipline of smart project management, the discipline of accountable public sector investment, the discipline of consistent and intelligent policymaking and the discipline of public participation. Many experts have criticized the power policy reform and investment effectiveness given the increasing power deficiency in Nigeria. In essence, power deficiency has been identified as a major obstacle to Nigeria's economic growth [14].

The real situation of power generation deficiency in Nigeria is unimaginable. The Federal government has initiated many policies, projects and programs to tackle energy problems in Nigeria for decades. However, the problems of power generation deficiency persisted given that the capability is not meeting up to Nigeria's population growth rate and national economic aspiration. Power distribution, transmission and regulation are still issues to the nation. Depicting power deficiency in Nigeria, about 70% of rural communities do not have access to electricity in Nigeria, contributing to low rate of local economic development and increase to rural – urban migration [15]. In essence, power generation deficiency somewhat hampers industrial development, the growth of small and micro entrepreneurs, energy penetration to rural communities and to national economic growth. Even though Nigeria has potentials in energy development, the current situation of low power generation capacity depicts that the country is not well-prepared to benefit from the projected increases in power generation from coal, gas-powered and renewable sources. There have been many policy statements regarding Nigeria's willingness to increase power generation but the available generation capacity is not meeting up to the population growth. It is also retarding manufacturing capacity and the growth rate of gross domestic product (GDP), resulting in increased unemployment [16].

Nigeria's economic growth goal would remain a mirage unless the country explores ways to increase power generation that is commensurate with its population and market size as the largest economy in Africa. For instance available data, the country has not developed a comprehensive policy in renewable energy technologies which experts agrees is best suited for the electrification of remote areas and provide ample opportunities for communities and private sector involvement and subsequently foster local economic development. Moreso, Nigeria has not harnessed the full potentials of energy mix and new energy technologies such as coal and natural gas-fired electricity generation. International Energy Agency (IEA) projected that coal will dominate the power sector, with nearly 50 percent of the total power generation by 2050. According to IEA (2008), gas will come as second source with 23 percent projection. Other sources identified by IEA are nuclear and renewable, such as wind, hydropower and solar which will take bulk decreases from the fossil fuel share of power generation [17].

Depicting power deficiency in Nigeria, it is estimated that about 70% of rural communities do not have access to electricity in Nigeria, contributing to low rate of local economic development and increase to rural – urban migration [18]. In essence, power generation deficiency somewhat hampers industrial development, the growth of small and micro entrepreneurs, energy penetration to rural communities and to national economic growth. Even though Nigeria has potentials in energy development, the current situation of low power generation capacity depicts that the country is not well-prepared to benefit from the projected increases in power generation from coal, gas-powered and renewable sources. There have been many policy statements regarding Nigeria's willingness to increase power generation but the available generation capacity is not meeting up to the population growth. It is also retarding manufacturing capacity and the growth rate of gross domestic product (GDP), resulting in increase in unemployment [19].

Most studies in this subject matter on the development and emerging countries. While there are existence of large and growing literature on power generation and economic growth, there are very few empirical studies on the subject in Nigeria as regard to the power generation capacity. Most theoretical and recent empirical works used electricity consumption as a proxy for electricity generation or supply and economic growth in Nigeria. This study, however, adopted the power generation capacity and economic growth in Nigeria. For instance, Nwankwo and Njogo [16], investigated the links between a sustained economic growth and electricity in an economy through the analysis of multiple regression model to examine the effect of electricity supply on economic development and likewise the effect of electricity supply on industrial development. Variables employed by their studies were electricity generation expenditure, gross fixed capital formation, population and gross domestic product (GDP) per capita. This study used electricity general expenditure variable and failed to distinguish between public expenditure in electricity and private capital investment as separate variables.

Abdulwahed [1], conducted a study to determine the factors affecting Capacity Utilization (CU) in Nigeria. The study depended on SWOT analysis for the Nigeria manufacturing sectors as well as literature review, and then followed by applying the Vector Auto Regression model (VAR) to determine the most influential factors affecting Nigeria Manufacturing sector ability to benefit from Local Content Development Bill. The results showed that the most influential factors are Electricity Generation (ELEC), Capital Goods Import) IM and Interest Rate (IR). Abdulwahed [1] ignored the inclusion of private capital investment in power generation as one of the variables that can affect Nigeria manufacturing sector to benefit from the local content development bill. Local content development bill is a vital economic policy to increase power generation and economic growth in Nigeria.

While empirical studies reviewed tried to establish relationship between power generation and economic growth in Nigeria, this study tried to analyze relationship between real gross domestic product and power generation capacity in Nigeria, with public expenditure in electricity and private capital investment and population growth in Nigeria with hope to fill the gap of previous studies. The most significant of this study is the use of population data, government expenditure in power generation and private capital investment in power generation as control variables. The study ignored the bounds test as used by some previous researchers because the test is applied when testing for the existence of a long-run level relationship between a dependent variable and a set of regression, where it is not known with certainty whether the underlying regressors are trend-or first-difference stationary. The proposed tests in this study are based on standard F- and t-statistics used to test the significance of the lagged levels of the variable in a first-difference regressions. From the available literatures, it was imperative to notice that there is scare literature on the impact of Power Generation Capacity (PGW) on Nigeria economy. Therefore, this study filled the gap.

2. Materials & Method

2.1 Research Design

The research design in an overall approach used to integrate different components of the study in a coherent and logical way [17]. Ex-post factor research design is adopted for this seminar work. Ex-post design is a systematic and empirical inquiry in which the researcher does not have direct control of independent variable because their manifestations have already occurred or because they are inherently not manipulated. This design is used because the study intends to use what already exist and look backwards to explain why. More so, ex-post factor is based on analytical examination of dependent and independent variables. Independent variables are studies in retrospect for seeking possible and plausible relations and likely effects the changes in independent variable produce on a dependent variable. The variables used in this study are Real Gross Domestic Product (RGDP), specified to depend on power generation capacity in Kilowatt hours (PGCKWH), gross capital formation (GCF) and technology (TECH). In broad terms, co-integration method is employed and E-View analytical tool was used.

2.2 Model Specification

Having considered various theories on power generation, economic growth, gross capital formation and unemployment, this work is anchored on David Stern Model. In his model on factors affecting linkage between energy and growth, Stern [22] asserted that there has been extensive debate concerning the trend in energy efficiency in the development economies, especially since the two oil price shocks of the 1970s. He argued that in the United State of America. Economy, energy consumption hardly changed in the period 1973 to 1991, despite a significant increase in gross domestic product. According to Stern, these facts were indisputable and the break in the trend have been the subject of argument. He referred to Neoclassical perspective of the production function to examine the factors that could reduce or strengthen the linkage between energy use and economic activity over time and depicted that there has been a decoupling of economic output and resources, which implies that the limits to growth are no longer as restricting as in the past [21]. A general production function of Stern can be represented as follows:

$(Q_i,\ldots,Q_m) = f(A, X_i,\ldots, X_n, E_k,\ldots, E_p)$ (1)

Where:

Qi are various outputs (such as manufactured goods and services), the Xi are various inputs (such as capital, labor, etc.), the Ek are different energy inputs (such as coal, oil, etc.), and A is the state of technology as defined by the total factor productivity indicator.

Specifically, this study uses the following model:

$RGDP = f(PGW, GF, TECH) + \mu$ (2)

The linear form of the model become,

$$RGDP = \beta_0 + \beta_1 PGCW + \beta_2 GCF + \beta_3 TECH + \mu \quad (3)$$

Where:

RGDP is Real Gross Domestic Product proxied for Nigeria economy, PGW is power generation capacity , GCP is gross capital formation, TECH = Technology,β = Model Constant, β_1,β_2, β_3 = Model Parameters, and μ = Error term.

2.3 Data Discussion

The study employed annual data on selected variables related to power generation and economic growth in Nigeria from 1980 to 2020. The study adopts real gross domestic product as proxy for economic growth as its dependent variable. Power generation capacity, public expenditure in power generation, private capital investment in power generation, and population growth are used as independent variables.

2.3.1 Real Gross Domestic Product (GDP): GDP is a measure of the total flow of goods and services produced within a country in a given year or a quarter. GDP is obtained by valuing outputs of goods and services at market prices and then aggregating [18].

*2.3.2 Power Generation Capacity***:** It is the production of bulk electric power for industrial, residential, and rural use. Power generation is the process of generating electric power from other sources of primary energy [19]. Power generation capacity is the maximum quantity of energy that can be generated given certain amount of input [20].

2.3.3 Gross Capital Formation: Gross capital formation (formerly gross domestic investment) includes outlays on additions to the fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, power plants, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.

2.3.4 Technology: Is the collection of techniques, skills, methods, and processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation.

2.4 Method of data analysis and estimation procedure

The estimation technique that will be used in this work is the multiple regression analysis. This is because the explanatory variables are more than one. Eview was used to analyses the data. Econometric Views (E-view) is a powerful forecasting, simulation, modelling and data management software for statistical and econometric analyses.

2.5 Sources of Data

This study shall apply systematic time series economic approach of testing whether the data will be stationary or non-stationary is order not to obtain spurious result before using any economic technique. Data was sourced from CBN Statistical Bulletin from 1980-2020.

3.0 Results and Discussions

The estimates of these models were also subjected to economic, statistical and econometrics tests. In this chapter, the model will be tested in line with the objectives and hypotheses stated in chapter one (1). The results of the ordinary least square (OLS) are presented below.

3.1 Unit Root Test

Unit root test is a test for stationarity of the variables using the augmented Dickey Fuller (ADF) test in order to avoid spurious results. Table 3.1 showed the Unit root (ADF) test.

Decision Rule

Reject H_0 if the absolute value for the calculated ADF for any of the variables is greater than the 5% critical value in absolute terms, but do not reject if otherwise

Table 1: Unit root (ADF) test

Variables	ADF Test Statistic	Mackinnon Critical Value At 5%	Order of Integration	Assessment
LOGRGDP	-5.307491	-3.548490	I (1)	Stationary
LOGPGW	-6.504877	-3.568379	I (1)	Stationary
LOGTECH	-5.250814	-3.548490	I (1)	Stationary
GCF	-10.87632	-3.552973	I (1)	Stationary

3.2 Presentation of OLS Result

Table 2: Regression Result

VARIABLES	COEFFICIENT	STANDARD ERROR	T-VALUE	PROBABILITY
C	-6.431220	5.671246	-1.134005	0.2664
LOGPGW	0.333575	0.253362	1.316593	0.1987
LOGTECH	1.129352	0.051887	21.76556	0.0000
GCF	0.001443	0.001209	1.193518	0.2427
R SQUARED				0.994672
ADJUSTED R^2				0.994101
F- STATISTICS				1742.381
DURBIN-WATSON				2.080745

3.2.1 Evaluation of Results

The results of model would be evaluated based on the theoretical (a prior), statistical (first order), and econometric (second order) criteria.

3.2.1.1Evaluation Based on Economic (APriori) Criteria

Based on the underpinnings and theoretical assumptions, we would evaluate the above result to verify if they conform to the principles of economic theory (that is, if they conform to a prior expectation in signs and magnitude).

Constant: The coefficient of the constant is -6.431220. This shows that when other independent variables are held constant, there would be a decrease in Rgdp by -6.431 unit.

Logpgw: The slope coefficient of logpgw is 0.333575. This result shows that there is a positive relationship between logpgw and the dependent variable logrgdp. A unit increase in logpgw will result to a 0.33 to increase in logrgdp.

Logtech: The slope coefficient of logtech is1.129352. This shows that there is a positive relationship between logtech and logrgdp. A 1% increase in logtech will result to a 1.129% increase in rgdp.

GCF: The slope coefficient of GCF is 0.001443. This shows that there is a positive relationship between GCF and logrgdp. A unit in GCF will bring about an increase of 0.00143 unit increase in logrgdp.

Table: 3 (APriori) Criteria

Variables	Expected Sign	Obtained Sign	conclusion
PGW	+	+	Conforms
TECH	+	+	Conforms
GCF	+	+	Conforms

The Statistical Criteria (First Order) Test

The statistical criteria or first order tests aim at evaluating the statistical significance/reliability of the estimates and parameters of the model from simple observations. These statistical tests were carried out based on the following; multiple coefficient of determination (R^2), student t-test and the f-statistic test.

Coefficient of Determination (R^2): The coefficient of determination (R^2) measures the proportion of the variation in LOGRGDP which is explained by LOGPGW, LOGTECH and GCF. The coefficient of determination measures the goodness of fit of the estimated model. The R^2 for the model in this study is 0.994672. This implies that the explanatory variables (LOGPGW, LOGTECH and GCF) explain about 99% of the total variations in the dependent variable (LOGRGDP). This signifies that the model is a good fit.

The T-Statistic

In estimating the t-statistic, we compare the estimated t-statistic calculated with the tabulated t-value at 5% level of significance. The working hypothesis is stated thus;

H_0: $\beta_0=0$ (there is no significant impact of the explanatory variables on LOGRGDP)

H_1: $\beta_0\neq0$ (there is significant impact of the explanatory variables on LOGGDP).

At α=5% (that is at 5% level of significance) with n-k degree of freedom

Where;

n= number of observations

k= number of parameters.

Decision Rule

Reject H_0 if $/t_{cal}/>t_{\alpha/2}$(n-k) df but do not reject if otherwise.

NOTE: n =35 , k =4, therefore n-k =35-4 =31

Therefore $t_{tab0.05/2}$(35-4) = $t_{tab0.025}$ (31) = ± 2.064

t_{cal} 1 (LOGPGW) 1.316593

$t_{tab0.025}$= 31(0.025) = ±2.064

Since /1.316593/ </2.069/, we reject the null hypothesis (H_0) and conclude that our slope coefficient of LOGPGW is statistically insignificant at 5% level of significance and 31 degrees of freedom.

t_{cal} 2 (LOGTECH) = 21.76556
$t_{tab0.025}$= 31(0.025) = ±2.064
Since /21.76556/> /2.064/, we accept the null hypothesis (H_0) and conclude that our slope coefficient of LOGTECH is statistically significant at 5% level of significance and 31 degrees of freedom.
t_{cal} 3 (GCF) = $t_{tab0.025}$= 31(0.025) = ±2.064

Since /1.193518/</2.069/, we reject the null hypothesis (H_0) and conclude that our slope coefficient of GCF is statistically significant at 5% level of significance and 31 degrees of freedom.
t_{cal} 4(CONSTANT) = -1.134005
$t_{tab0.025}$= 31(0.025) = ±2.064

Since /-1.134005/</2.064/, we do not reject the null hypothesis (H_0) and conclude that our slope coefficient of the constant is not statistically significant at 5% level of significance and 31 degrees of freedom. The results of the t-test were presented on Table 3.5.

Table 4: T-statistic results

Variables	T-Values	T-tab	Conclusion
C	-1.134005	2.064	Statistically insignificant
LOGPGW	1.316593	2.064	Statistically insignificant
LOGTECH	21.76556	2.064	Statistically significant
GCF	1.193518	2.064	Statistically insignificant

The F-Test

The F-Test is carried out to determine the joint effect or impact of all the explanatory variables on the dependent variable. The F-test measures the overall significance of the model and follows the F-distribution. The underlying hypothesis for the F-test is stated thus;
H_0: $\beta_1=\beta_2=\beta_3=\beta_4=\beta_5=0$ (the overall model is insignificant)
Against
H_1: $\beta_1\neq\beta_2\neq\beta_3\neq\beta_4\neq\beta_5\neq0$ (the overall model is significant)
At α=5% with k-1 (v1) and n-k (v2) degree of freedom.
Where;
n= number of observations
k= number of parameters
Decision Rule:
Reject H0: if $F^*(F_{cal})>F\ (F_{tab})(k-1, n-k)$ at $\alpha=0.05(F_{tab})$ but do not reject if otherwise.
From the (F_{tab}), $F_{0.05}$ (7, 23) = 3.41
While F_{cal}= 3.446020
Since 3.446020>2.51, we do not reject the null hypothesis (H_0) and conclude that the variables in the model are jointly statistically significant
Decision Rule:
Reject H0: if $F^*(F_{cal})>F\ (F_{tab})(k-1, n-k)$ at $\alpha=0.05(F_{tab})$ but do not reject if otherwise.
From the (F_{tab}), $F_{0.05}$ (3, 31) = 5.17
While F_{cal}= 1742.381
Since 1742.381>2.51, we do not reject the null hypothesis (H_0) and conclude that the variables in the model are jointly statistically significant.

3.3 Econometric Criteria (Second Order) Test

The econometric criteria or second order test is carried out to test whether the assumptions of the classical linear regression model stated in the chapter three of this work are satisfied. The tests are as follows;

Normality Test

The normality test is used to test whether or not the error terms are normally distributed. The JarqueBera (JB) test will be used. This follows a Chi-Square distribution with 2 degrees of freedom.

3.4 Test of Hypotheses

From the result of the data analysis, it is observed that power generation capacity does not have any impact on the economic growth of Nigeria. This conclusion is reached because $t_{cal}<t_{tab.}$ So far, the regression analysis and interpretation have provided empirical back up for the topic under study. The implications of the results to the economy are discussed below:

For Power generation capacity**,** that there is a positive relationship between LOGPGW and the dependent variable LOGRGDP. A unit increase in LOGPGW will result to 0.333575% increase in real gross domestic product. It is advisable to that government should implement policies that would help improve the power generation capacity so as to foster economic growth.

For the result of real Technology, there is a positive relationship and significant relationship between LOGTECH and the dependent variable LOGRGDP, a unit increase in LOGtech will result to 1.129352% increase in economic growth. The implication of this result is that technology has a positive impact on economic growth

In addition, there is a positive relationship between Gross capital formation and the dependent variable RGDP. Therefore, a unit increase in GCF will result to a 0.001443 increase in economic growth.

4. Conclusions

The study examined the impact of power generation on the Nigerian Economy. The model specified, Real Gross Domestic product is a function of power generation capacity in kilowatts, Gross capital formation and technology. With the aid of econometric techniques employed (unit root test, cointegration and error correction mechanism tests was employed). The following results were found

Real Gross Domestic Product (RGDP), Annual Power Generation in Nigeria (PGW), Gross Capital Formation in Nigeria (GCF) were statistically insignificant while Technology (TECH) is statistically significant at 5% level of significance. Thus, all the variables were stationary at first different order of integration with the application of unit root test.

The Electricity variables used was consistent with Contribution to real gross domestic product as regard to a-prior assumption Thus, the result review that no presence of serial correlation in the model is inconclusive based on the Breusch-Godfrey serial correlation LM test

The F-ratio is statistically significant.

The R^2 is strong as it ranked 99% of total variation of (Real Gross Domestic Product (RGDP) which accounted by the presence of or influence of the explanatory variables.

Based on the individual test of statistical significance of the explanatory variables on the dependent variable, we found that there is a long-run relationship among the variables used in the study. Therefore, we conclude that Power generation capacity has significant impact on the Nigerian economic growth.

Based on the findings of this study, the researcher therefore recommended the following:

1. For the growth of the economy and improvement in power generation capacity, government must ensure transparency in the overall implementation of power sector policy and its attendant reform agenda.
2. Government should import various technologies that would help boost power generation capacity which would in turn foster economic growth.
3. Government as well as non-government organizations should send individuals abroad so as to get adequate training as well as education on various ways to how to improve on existing technology and also ways to improve economic growth
4. Stakeholders including the Federal Government must try and invest in key infrastructure such as gas pipelines, equipment used in the distribution, generation and transmission of electricity, and other facilities. Of note is the use of obsolete equipment such as transformers, feeders, sub-stations and other that need to be replaced with new ones by power distribution companies (Discos) to adequately supply power to the consumers. Since the operators are not having enough money to play around with, they need to bring in more investors into the industry to provide the fund needed to move the sector forward. By so doing, stakeholders are helping in accelerating the growth of the industry, and also by reducing problems such as pipeline vandalism, poor generation and supply of power, which have resulted in low activities in the sector. When this happens, gas producers and suppliers and the power generation companies (GENCO's) would be able to increase their output.
5. There is need for the government to build new power plants to increase the existing generation capacity. The government can also look into the deployment and development of renewable energy technologies in the country as a means of diversifying the energy mix and improving power production

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