Abuja Journal of Economics & Allied Fields, Vol. 6(2), April, 2018
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Industrialization and the Quest for Economic Diversification in Nigeria: 1970-2017

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Abstract

The study examines industrialization and the quest for economic diversification in Nigeria. Specifically; it examined the structure and trend of industrial output in Nigeria and evaluates the effect of industrial output for economic diversification in Nigeria. The theoretical framework is the Great Push Theory & Kaldor's First Law. The research adopted an econometric design and sourced secondary data from Central Bank of Nigeria, National Bureau of Statistics publications and World Bank Development Indicators. Both Descriptive and Analytical tools were employed and the Vector Error Correction Method were used for estimation of the model. The findings of the study based on the impulse response shows that solid mineral (SOM), manufacturing (MAN) and crude petroleum & natural gas (CPNG) exert negative relationship with real gross domestic product while variance decomposition, reveals that CPNG account for the highest percentage contribution followed by solid mineral, manufacturing, private investment (PI), government capital expenditure (GCE) and industrial energy consumption (IEC) respectively. Given the proportionality in the coefficient of SOM, MAN, CPNG, PI and IEC, the study recommends that government of Nigeria should go into public-private partnership (either domestic or foreign) to bring in their technological know-how and financial capability to develop these sub-sector for a diversified economy as against the current mono-economy.

Keywords: Economic Diversification, Economic Growth, Manufacturing Sector, Solid Minerals
JEL Codes: P33

1. Introduction

Prior to the attainment of political independence, the level of industrialization in Nigeria is skewed towards favouring British colonial economic structures (Vent for Surplus paradigm), targeted at increasing the flow of raw materials to British industries (Usman & Ibrahim, 2010). The tendency of the industrial sector to stimulate more economic growth has prompted many economists to formulate theories to encourage industrialization. Famous among the early theories formulated are: Rosenstein-Rodan's theory of the big push (Rosenstein–Rodan, 1943); the doctrine of balance growth; Hischman's doctrine of unbalance growth (Hirschman, 1958); the import substitution strategy; and export promotion strategy. Over time, the influences of these theories on policy decisions have been varied.

However, it should be noted that Nigeria is blessed with abundant solid mineral resources that could be beneficial to varieties of industries in the country. These solid mineral resources include Coal, Gold, limestone, bitumen, tin, iron ore, salt among others and these solid mineral resources cut across the states of the federation. With these and other raw materials from agricultural sector, it is expected that Nigeria's industrial sector should not lack the necessary inputs for its take off in the production of intermediate and finish goods. Nigeria is an agrarian economy with vast arable land,

large proportion of the population is into agricultural activities for their livelihood, and statistics shows that Nigeria has over 80% of its land arable but unfortunately, less than 40% of the land is cultivated (NBS, 2012). In addition, Nigeria is among the leading exporter of crude oil in commercial quantities since 1968 and this has remain so making oil money the major source of foreign exchange earning accounting for almost 80%.

The Nigeria industrial sector according to National Bureau of Statistics (NBS, 2012) shows that it has appreciated to engender the growth of Nigerian economy as figure in 1970 of industrial index stood at 41.8%, 119.50% in 1980, the development reflected the increased activities in the electricity, manufacturing, crude oil production and mining sub-sectors. This continues to witness an increase from 130.6% in 1990 to 138.9 in 2000, 184.7% in 2008, which is attributed to the increase in business confidence because of change in regime and new policy measures. Impressively the capacity utilization of the manufacturing sub-sector in 1970 stood at 80.2%, 70.1% in 1980, which is above average and an indication of vibrant and sustainable manufacturing sector. Consequently, capacity utilization of manufacturing sector fell drastically to 40.3% in 1990 and further drop to 36.1% in 2000 slightly after we ushered in new and fourth democratic regime. Although, it appreciated to 55.82% in 2010 and since then it has continues to harvor around 54.76% and 56.61% between 2011 and 2016 (CBN, 2016) respectively, which portends that manufacturing sector in the 1970s felt better when compare to this period of fourth democratic era. This set back in the subsector of industrial sector can be attributed to the focus on crude oil production with high foreign exchange earnings in Nigeria specifically from 1968 and the subsequent oil boom of the 1970s (NISER, 2015) till this current period.

This is undertaken given that industrial development is referred as necessary condition for economic development. Nigeria is still lagging behind as contribution of industrial sector to GDP stood at 24.91% in 2010 and has since drop to 18.3% in 2017 (CBN, 2018). In addition, the economy has continued to witness high import bill annually with adverse effect on macroeconomic indicators. Similarly, the decade infrastructure and neglect is one of the reasons for the current perennial stage. Empirical studies such as Anyanwu, & Kalu (2015), Jelilov, Enwerem & Isik (2016) on the industrial output and the quest for diversification, particularly in developing economies Nigeria inclusive, have produced mixed results as most of the studies look at the aggregate or index of industrial variable. This study will specifically examines the three components of industrial sector (crude petroleum and natural gas, solid minerals and manufacturing sector) simultaneously in addition to variables like investment in capital stock from both private and public sector, industrial energy consumption. The theoretical framework of this study is Great Big Push and Kaldor's Growth Law, which emphasis on investment in industrial sector because of its capacity to transform primary products into intermediate and finished goods. The study will examine industrial output as a tool for the economic diversification of the Nigeria economy. Specifically, it will (i) evaluate the effect of industrial on the Nigerian economy.

The study is organized logically in four sections to allow for understanding of the subject matter of the research. Section one covered the introduction. Section two dealt with the literature review including conceptual clarification, theoretical framework and review of empirical literature. Section three is about methodology of the study and analysis of the data obtained. Finally, section four presents the conclusion and policy recommendations.

2. **Literature Review and Theoretical Framework**

Industrialization

Industrialization is a concept synonymous to the development that took place in Western Europe and North America countries during the 19th and early 20th centuries (Nzau,

2010). According to Adejugbe (2004) industrialization has to do with value addition to human and material resources with the aid of science and technology to produce finish goods and services. To Todaro and Smith (2011), when structural transformation takes place, the contribution to national income by the manufacturing sector eventually supersede that of agricultural sector. The term industrial growth of industrialization has two distinct meanings: it can be conceived as a shift in a country's pattern of output and work force towards manufacturing or secondary industry (Clunies-Ross, Foresyth & Huq, 2010). O'Sullivan and Sheffrin (2007) defined industrialization as the process of societal and economic change that transforms a human from agrarian to an industrial one.

There three core components of industrial sector namely solid minerals, crude petroleum & natural gas and manufacturing sub-sector. The development of these sub-sectors is primary condition to usher any economy into industrialized nations. Most of the advanced economies (China, USA, Germany, UK, France, Russia etc) today are known for and self-sufficient in the production of finish goods from the three components of industrial sector. Hence, the need for Nigeria to take cue from them and transform these sectors simultaneously so as to reap the maximum benefit. The working definition of this study based on the idea from Adejugbe (2004), O'Sullivan and Sheffrin (2007) and Todaro and Smith (2011) sees industrialization as the process of transforming primary products into finish products using modern production technique.

Economic Growth and Economic Diversification

Samuelson (1967) views economic diversification as an act of investing in a variety of assets, mentioned its benefit as that which reduces risk especially in the time of recession, inflation, deflation etc. The idea of depending on one sector of the economy as the engine of growth has the tendency to distortion economic activities during price fluctuations, which is inevitable. A typical example is the case of Nigeria's mono-economy leading to recession in 2015 because of fall in the price of crude oil at the international market, which resulted to general rise in the price of goods and services, fall in the revenue consequently bringing untold hardship on the standard of living of the people. To this end, Okeke and Okafor (2014) further asserted that diversification entails widening of the economy to create opportunities for diverse economic activities in order to create a broad based economy. It does not necessarily entail increase in output but it enhances stabilisation of economies by diversifying their economic base (Anyaecie & Areji, 2015).

Economic growth has been conceived as an increase in per capita income over a period of time (Clunies-Ross, Foresyth, & Huq, 2010). Increase in productivity was a main concern of the fathers of modern economics, Adam Smith and David Ricardo in the eighteenth century. However, as time evolves, economic growth has gone beyond increase in national output to the need to research out to the most vulnerable people of societies. Because of the level of development among developing economies as postulated in Dudley Seers components of development and suggested by OECD, there is need to ascertain the level and growth of the three subsectors in the industrial sector. Hence, the need for economic diversification.

Theoretical Framework

The Great Big Push Theory and the Kaldor Growth Laws (1966) anchor the theoretical framework of this study. Kaldor's First Law states that there is a close relationship between the growth of manufacturing output and the growth of the gross domestic product (GDP). Kaldor's First Law concludes that the "manufacturing industry is the engine of economic growth". The Linear specification of Kaldor's first law is as follow:

$$\text{gGDP} = \text{a}_\text{o} + \text{a}_1\,\text{gMANU} \qquad Eqn.1$$

where: gGDP is the growth of total output; and gMANU is the manufacturing output's growth. The growth of manufacturing sector is expected to spur economic growth. This

means that high growth are usually found in cases where the share of manufacturing industry in GDP is increasing (Libanio, 2006). In addition, aside the manufacturing sector, other components of industry this study will incorporate into the above is the solid minerals and oil & gas sector.

On the other hand, for industrial development to take place, argues that a large comprehensive programme is needed in the form of a high minimum amount of investment to overcome the obstacles to development in an underdeveloped economy and to launch it on the path of progress. Then, as now, there were economists who advocated a big push involving a combination of a large increase in capital accumulation and a simultaneous increase in investment in numerous sectors, leading to economic growth and poverty reduction (Easterly, 2006). Taking cue from his quote, for meaningful development to set in, specific amount of resources must be available for all-inclusive programmes. Therefore, Rosenstein-Rodan's arguments became a major part of the way development economists thought about development problems in the 1950s and 1960s, and this has being taught in development course (Todaro & Smith, 2011). In addition, because of the forward and backward linkages, there is need for modernization of the agricultural sector to feed the industrial sector. Hence, the theory of balanced growth advocated by Rodenstin-Rodan, Ragnar Nurkse and Arthur Lewis, advocated for simultaneous investment in all sectors of the economy to ensure economic growth and development.

Empirical Review

Bennett, Anyanwu, and Kalu (2015) investigated the effect of industrial development on the Nigeria's economic growth from 1973-2013 using OLS (Ordinary Least Square) regression they found that the influence of industrial output on economic growth is not statistically significant. Jelilov, Enwerem and Isik (2016) the impact of industrialization on economic growth: the Nigeria experience (2000-2013) using Ordinary least square (OLS) technique, F-test as analytical techniques. The variables used include GDP as the dependent variable while industrial output, foreign direct investment, interest rate, foreign exchange rate and inflation rate were independent variables. The findings show that industrialization exerts negative impact on economic growth in Nigeria in the long-run.

David, Noah and Agbalajobi (2016) an empirical analysis of the contribution of mining sector to economic development in Nigeria covering the period of 1960 to 2012 using Error Correction Model (ECM). The results also suggest that economic development (per capita income) in the long run and short run is positively associated with value of solid mineral and value of agriculture within the study period. However, the coefficient of per capita income is inversely related to value crude petroleum and gas in the both long and short run equilibrium.

Oburota and Okoi (2017) manufacturing subsector and economic growth in Nigeria using co-integrating test and error correction (ECM) model using the data that covers the period of 1981-2013 under the theoretical framework of Kaldor's First Law of Growth and the Endogenous Growth Model. Findings from the study showed that manufacturing output, capital and technology were the major determinants of economic growth. Results also confirm that quality of institutions and labour force does not exert any impact on economic growth.

The available empirical works such Bennett, Anyanwu, and Kalu (2015), Jelilov, Enwerem and Isik (2016), reveals that industrialization exert negative relationship to economic growth except for David, Noah, Agbalajobi (2016) whose results shows positive relationship. For this study, the point of departure is more specific on the disaggregated components of industries such as solid minerals, manufacturing and crude petroleum and natural gas. This is in addition to private investment, government capital expenditure and industrial energy consumption to see how this variables help

to engender the desired growth of the economy.

3. **Methodology**

The study is an ex-post facto research design, which source secondary data from the Central Bank of Nigeria Annual Statistical bulletin and World Bank Development Indicator. To avoid spurious regression analysis, the Augmented Dicky Fuller unit root test was used to determine the level of stationarity of the time series data covering 1970 to 2017. Finally, analytical statistics of Vector Error Correction Method (VECM) under the VAR framework was used for the analysis.

Model Specification

The model for this study is built based on the works of Oburota and Okoi (2017) who also took cue from Kaldor First Law and the law states that there exists a close relationship between the growth of the manufacturing output and economic growth. The linear specification is stated below:

$$RGDP = f(MANU) \quad - \quad Eqn.3.1$$

The above model by Kaldor was further transformed, by substituting equation 2 into equation 1, which becomes the model of Oburot and Okoi (2017);

$$logRGDP = \alpha_0 + \alpha_1 logMANU + \alpha_2 logTECH + \alpha_3 logCIM + \alpha_4 logGFCF + \alpha_5 logLABF + \varepsilon_1 \quad Eqn.3.2$$

Where:

RGDP = Real Gross Domestic Product (RGDP), CIM = Contract Intensive Money, MANU = Manufacturing Output, GFCF = Capital proxied by Gross Fixed Capital Formation, LABF = Labour Force, TECH = Technology

The formulated model for this study and the departure point is in the investigation of the three disaggregated industrial components namely manufacturing sector, solid minerals and crude petroleum and natural gas. This is in addition to control variables like, private investment, government capital expenditure and industrial energy consumption. The linear specification is stated below:

$$RGDP = f(SOM, MAN, CPNG, PI, GCE, IEC) \quad - \quad Eqn.3.3$$

The explicit form of the model is specified as:

$$\mathrm{RGDP} = \pi_o + \pi_1 \mathrm{SOM} + \pi_2 \mathrm{MAN} + \pi_3 \mathrm{CPNGA} + \pi_4 \mathrm{PI} + \pi_5 \mathrm{GCE} + \pi_6 \mathrm{IEC} + \varepsilon_1 \quad \text{Eqn. } 3.4$$

The use of VAR in this study in achieving objective two lies in the predictive and forecasting power especially that it is one of the most flexible method of analysis because it has more efficient coefficient estimates and tool for authenticating results.

The Vector Error Correction Model is given as:

$$\Delta RGDP_{t-1} = \lambda_0 + \lambda_1 \Delta SOM_{t-1} + \lambda_2 \Delta MAN_{t-1} + \lambda_3 \Delta CPNG_{t-1} + \lambda_4 \Delta PI_{t-1} + \lambda_5 \Delta GCE_{t-1} + \lambda_6 \Delta IEC_{t-1} + ECM_{t-1} + V_{t-1} \quad Eqn.3.5$$

Where:

The time series data of Real Gross Domestic Product (RGDP) is the dependent variable while the independent variables are Solid Mineral Output (SOM), Manufacturing Sector Output (MAN), Crude Petroleum & Natural Gas (CPNG), Industrial Energy Consumption (IEC), Government Capital Expenditure (GCE) and Private Investment proxied by Gross Fixed Capital Formation (PI). Theoretically, it is expected that all coefficients of these variables should exert positive relationship with economic growth within the study period.

Justification of Variables

Manufacturing sector output, this is utilised in this model to capture the combined volume of production in oil refining, cement, food, beverage and tobacco, textile, apparel and footwear, wood and wood products, pulp, paper and paper products, chemical and pharmaceutical products, non-metallic products, plastic and rubber products, electrical and electronics, basic metal , iron and steel, motor vehicles & assembly, other manufacturing.

Crude Petroleum & Natural Gas capture the crude oil production with different components with high potentials to support

the growth of other sectors since to a large extent, it command some level of high rents in terms of foreign exchange earnings.

Solid minerals comprises of coal mining, metal ores, quarrying & other mining activities. Opportunities abound in the sector, which is expected to make the economy self-sufficient in steel production to support Nigeria's industrialization, expansion of low cost coal generated power, earn foreign exchange and generated revenue for government at all level.

Government Capital Expenditure (GCE) and Private Investment (proxied by gross fixed capital formation) are used to capture expenditure made on infrastructural development by the government to enhance the growth of the manufacturing and other sectors in the economy. Gross Fixed Capital Formation based on official national account is investment on physical assets and its inclusion in the model will help to ascertain whether the investment in physical asset (infrastructure) has the potentials to bring about growth in industrial sector.

Adequate energy (electricity) to industries to power machines is the one of the major input required for the smooth operation of the industrial sector because relying on standby generator only add or increase the cost of operation, which most times is transferred to the prices of goods and services.

4. Analysis of Results and Interpretation

To Examine the Effect of Industrial Output on Economic Growth in Nigeria

Result of the Unit Root

To carry out the unit root test, the data were normalized into log form to assume the same unit of measurement. It is based on the obtained log value using excel that the ADF statistics were tested against the 5% MacKinnon critical values. The result as presented in

Table 4.1: ADF Unit Root Test

Variables	@ Level	@ 1st Diff.	Critical Values			Prob.	Order of Integration
			1%	5%	10%		
RGDP	-2.55	-6.91	-3.58	-2.93	-2.60	0.0000	I(1)
SOM	-0.22	-9.08	-3.58	-2.93	-2.60	0.0000	I(1)
MAN	-0.08	-5.57	-3.58	-2.93	-2.60	0.0000	I(1)
CPNG	0.13	-5.20	-3.58	-2.93	-2.60	0.0001	I(1)
PI	-0.12	-7.69	-3.58	-2.93	-2.60	0.0000	I(1)
GCE	-0.78	-4.79	-3.58	-2.93	-2.60	0.0003	I(1)
IEC	-2.52	-8.32	-3.59	-2.93	-2.60	0.0045	I(1)

Source: Extract from E-view 9.0 Output

The result of the unit root presented in tables 1 shows that Augmented Dickey Fuller statistic indicating that all the variables of – solid mineral, crude petroleum & natural gas, private investment, government capital expenditure and industrial energy consumption became stationary (i.e no unit root) at their first difference that is, I(1). Therefore, this justifies the use of Vector Error Correction Method (VECM), Impulse Response & Variance Decomposition under the VAR framework.

VAR Lag Order Selection Criteria

An optimal lag is chosen for the empirical models based on Schwarz Information Criterion, Akaike Information Criterion, Sequential Modified LR Test Statistic, Final Prediction Error and Hannan-Quinn Information Criterion.

Table 4.2: Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-37.13	NA	1.75e-08	2.01	2.29	2.11
1	279.53	518.17	9.38e-14	-10.16	-7.89*	9.32
2	414.70	93.40*	3.36e-14*	-11.85*	-5.61	-9.53*

**indicates lag order selected by the criterion; Source: Extract from E-view 9.0 Output*

An optimal lag of 2 is chosen for the variants of the model.

Johansen Co integration Test

The Johansen system framework is employed to test for the presence of co-integrating relationship among the non-stationary variables. The result is presented below:

Table 4.3: Johansen Cointegration Test

Null Hypothesis	Trace Statistic	0.05 Critical Value	Null Hypothesis	Max-Eigen Statistic	0.05 Critical Value
r=0*	163.22	125.62	r=0*	49.79	46.23
r≤1*	118.43	95.75	r≤1	38.12	40.07
r≤2*	80.316	69.82	r≤2	32.84	33.87
r≤3	47.47	47.86	r≤3	19.59	27.58
r≤4	27.88	29.79	r≤4	13.13	21.13
r≤5	14.76	15.49	r≤5	8.25	14.26
r≤6	6.51	3.84	r≤6	6.51	3.84

Source: Extract from E-view 9.0 Output

The trace test and Max-Eigen value test shows a long run equilibrium relationship between the variables in the first and second series. Thus, the null hypothesis of no co-integrating equation is rejected since their statistics are greater than their respective critical values for the co-integrating equation at 5% significance level. This implies a stationary linear combination, as such the non-stationary time series are co integrated.

Responses of RGDP to SOM, MAN, CPNG, PI, GCE & IEC

An Impulse Response Function (IRF) traces the effect of a one-time shock to one of the innovations on current and future values of the endogenous variables. The IRF helps to trace the response of real gross domestic product to the components of industrial sectors. Table 4 presents the result of the IRF.

Table 4.4: Impulse Response Function

Period	RGDP	SOM	MAN	CPNG	PI	GCE	IEC
4	0.02	-0.01	0.04	-0.10	0.02	0.001	0.02
	(0.04)	(0.03)	(0.04)	(0.04)	(0.02)	(0.03)	(0.03)
7	-0.02	-0.03	-0.01	-0.10	0.02	0.01	0.04
	(0.04)	(0.03)	(0.03)	(0.04)	(0.02)	(0.03)	(0.03)
10	-0.02	-0.05	-0.03	-0.07	0.03	0.02	0.03
	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)

Source: Extract from E-view 9.0 Output

Figure 1 shows the graphical representation of the responses of real gross domestic product to impulses from solid mineral, manufacturing, crude petroleum & natural gas, private investment, government capital expenditure and industrial energy consumption. Real gross domestic product responds negatively to its own shock in the 7^{th} and 10^{th} periods while in the 4^{th} period it responds positively.

Real gross domestic product responds negatively to impulse from SOM, CPNG in the 4^{th}, 7^{th} and 10^{th} periods. The negative sign of SOM in 4^{th}, 7^{th} and 10^{th} periods obtained is not quite surprising going by reality where there are few existing industrial activities going on simultaneously in the solid mineral sector exception of cement industries leaving the harness of the rest mineral resources at a crude way by the local miners. This result is contrary to the findings of David, Noah & Agbalajobi (2016). It is improper for a country like Nigeria blessed with abundant minerals resources like gold, coal mining, metal ore & steel, quarry, tin, still import large proportion of some of the finished products from country like Dubai, China, Russia to meet domestic demand, it

shows the perennial stage of the sub-sector and calls for serious attention.

Real gross domestic product responds negatively to MAN in the 7th & 10th periods while it responds positively in the 4th period. This result is in line with the findings of Jelilov, Enwerem & Isik (2016) and contrary to the findings of Oburota & Okoi (2017). The manufacturing sub-sector is the hallmark of the industrial sector because of its transformation mechanism of converting primary products from solid minerals sub-sector, agricultural sector and even crude petroleum & natural gas sub-sector into finish goods. Given its current state, might be the reasons for the negative sign obtained in 7th and 10th periods, which can be attributed to the continuous increase in import bills of various products.

Real gross domestic product responds negatively to impulse from CPNG in the 4th, 7th and 10th periods. The signs is in line with the findings of David, Noah & Agbalajobi (2016) whose result shows negative relationship. Many scholars such as Bennett, Anyanwu, & Kalu (2015) has alluded that foreign exchange earnings from the sales of crude oil has hampered on the development of human capital/resources, which implies that crude petroleum and natural gas sub sector is not all-inclusive given the technological method of production and the Dutch Disease Syndrome as peculiar to Nigeria state.

Real gross domestic product responds positively to PI, GCE & IEC in the 4th, 7th, & 10th periods respectively. For GCE, In reality, Nigeria capital investment are long term project and sometimes it faces financial challenges and administration bottlenecks in terms of change in leadership hence, the reasons for the current state of our infrastructural gap.

Industrial energy consumption issue in Nigeria is worrisome because of inefficiency in the power supply for household consumption and other economic activities. Nigeria power sector faces a lot of challenges such as low gas supply, lack of capacity of the individual investors running the various privatize power plant, inadequate policy framework to support public-private partnership and political will to drive the implementation. Aside the aforementioned, our energy mixed is skewed towards hydro and natural gas with little attention in solar energy, coal, biomass and others and even the hydro and natural gas is yet to reach its maximum potentials. However, the short run result is positive and statistically insignificant.

However, only the impulse of CPNG significantly affects real gross domestic product in the 4th & 7th period (since ½b_i>S.E.) while the rest of the impulses shows no significant effect on real gross domestic product in any of the periods (since ½ b_i<S.E.).

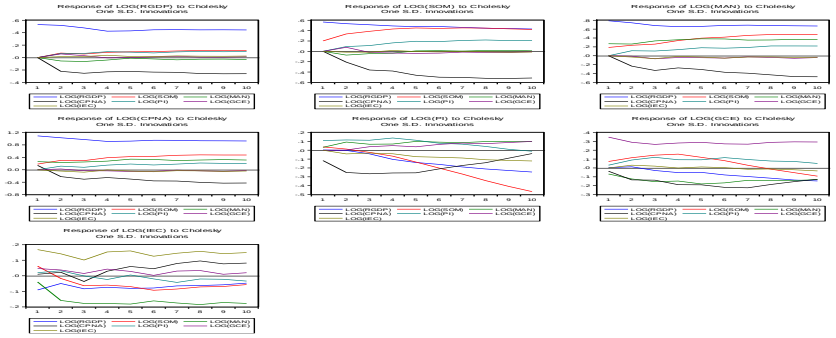

Figure 3.1: Impulse Response Function
Source: Extract from E-view 9.0 Output
Variance Decomposition Analysis

While impulse response functions trace the effects of a shock to one endogenous variable on to the other variables in the VAR, variance decomposition separates the variation in an endogenous variable into the components shocks to the VAR. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the VAR. The summary of the variance decomposition is presented in a table below.

Table 4.5: Variance Decomposition Analysis

Period	S.E.	RGDP	SOM	MAN	CPNG	PI	GCE	IEC
1	0.53	100.00	0.00	0.00	0.00	0.00	0.00	0.00
4	1.08	81.73	1.32	0.74	14.19	1.49	0.36	0.15
7	1.40	78.21	2.24	0.54	16.64	1.97	0.24	0.16
10	1.68	75.26	2.92	0.46	18.67	2.35	0.17	0.16

Source: Extract from E-view 9.0 Output

Table 5 displays separate variance decomposition for each endogenous variable. The second column, labeled "S.E.", contains the forecast error of the variable at the given forecast horizon. The source of this forecast error is the variation in the current and future values of the innovations to each endogenous variable in the VAR. The remaining columns give the percentage of the forecast variance due to each innovation, with each row adding up to 100. Figure 2 shows the combined graph of the variance decomposition of real gross domestic product with respect to the output of solid mineral, manufacturing, crude petroleum & natural gas, private investment, government capital expenditure and industrial energy consumption.

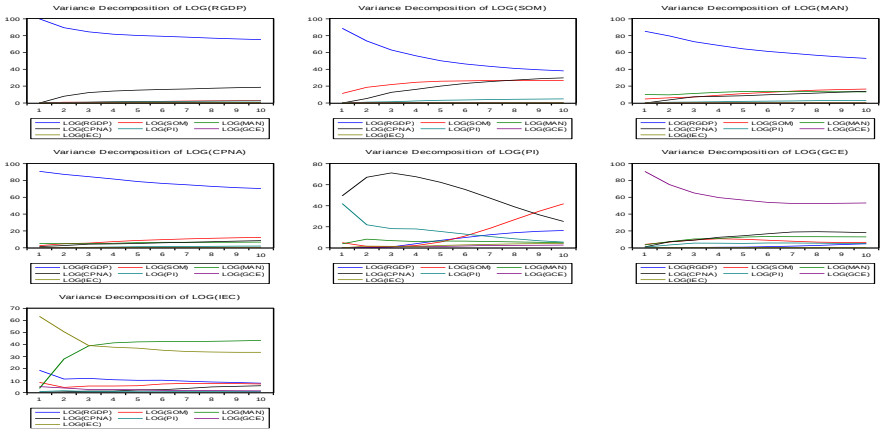

Figure 3.2: Variance Decomposition
Source: Extract from E-view 9.0 Output

Table 4.5 reveals that 75.26% of the variations in real gross domestic product can be accounted for by its own shocks, while 24.74% of the random innovations to real gross domestic product are accounted for by the variables in the endogenous system. SOM, MAN, CPNG,PI, GCE and IEC account for 2.92%, 0.46%, 18.67%, 2.35%, 0.17% and 0.16% respectively of these innovations.

4. Conclusion and Policy Recommendations

The result of the impulse response shows that SOM, MAN and CPNG exert negative relationship with real gross domestic product exception of MAN, which shows positive relationship only in the 4th periods. In

addition, variance decomposition, which measures the magnitude of the coefficient, reveals CPNG account for the highest percentage contribution followed by SOM, MAN, PE, GCE and IEC respectively. One of the major challenges confronting the diversification of the Nigerian economy is the capacity of the industrial sector to transform raw materials into finish goods for domestic consumption and subsequently as a source of foreign exchange earnings. The actualization of this requires huge investment across the three sub-sector of the industry but the crude petroleum and natural gas still account for the bulk of the industrial output owing to the mono economy of focusing only crude oil as the major exportable product accounting almost 80% of foreign exchange earnings. The study concludes that, the contribution of industrial sector is skewed towards crude petroleum and natural gas as a dominate sub-sector as against manufacturing sub-sector, which Kaldor's First Law states it is the engine of economic growth. The findings of this study have refuted the postulation of Kaldor's First Law and in line with the findings of the empirical work by Jelilov, Enwerem & Isik (2016). This study makes the following recommendations based on the statistical significance of the variable of solid mineral, manufacturing sector, crude petroleum and natural gas, private investment and industrial energy consumption. Given the proportionality in the coefficient of SOM, MAN, CPNG, PI and IEC, the government of Nigeria should go into partnership with private investors (either domestic or foreign) to bring in their technological know-how and financial capability to develop these sub-sector for a diversified economy as against the current mono-economy. This is because, over the years, the government has made a lot of effort to finance and bring to limelight the potentials in the sub-sectors unfortunately; they never see the light of the day. Hence, time to think outside the box by sourcing for private investors. The likes of China, Singapore, Malaysia, Indonesia, Vietnam has done it and revive their ailing sub-sector, as such Nigeria can take leave from them and call a spade a spade.

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