Manufacturing Sector Output and Economic Growth Nexus: Lesson from Nigeria

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ABSTRACT

This study examines the relationship between manufacturing sector output and economic growth in Nigeria from 1981 to 2022. The study adopts a quantitative econometric technique using ordinary least square method (OLS), after testing for level of integration of the macroeconomic variables in the specified model. The OLS result revealed that manufacturing sector output has a positive but insignificant relationship with economic growth in Nigeria within the period reviewed. This implies that as manufacturing sector output increases, economic growth will also increase. The reason for this insignificant effect of the manufacturing sector output on economic growth in Nigeria is attributed to insufficient investment on the manufacturing sector. Hence, the sector has not yield a meaningful impact on economic growth. Gross fixed domestic investment has a positive but also insignificant impact on Nigeria's economic growth, interest rate and exchange rate have insignificant impact on economic growth in Nigeria while labour force impact significantly on the growth of Nigeria economy. Based on these results, the study recommends that there is need to increase investment in the manufacturing sector, encourage industrialization, reduce lending rate and implement policies that will address how the country will achieve sustainable high level of economic growth through industrialisation, for Nigerian economy to make a meaningful progress.

Keywords: Industrialisation, Economic growth, Manufacturing Sector output

INTRODUCTION

Industrialization acts as a catalyst that accelerates the pace of structural transformation and diversification of economy, enable a country to fully utilize its factor endowment and to depend less on foreign supply of finished goods or exporting of only raw materials for its economic growth. It has been argued that the fastest channel by which rapid sustainable growth and development is achieved in any economy is via industrial capacity, technological innovation and enterprise development, rather than vast human resources and level of endowed material resources. Nigeria has a current population of over 200 million people. From an economic perspective, that's a huge market and there is a high demand for products that are required by this market. The Nigerian consumer uses different products on a daily basis. Everything from lotion, toothpaste, soap, clothes, phones to the cars and buses that carry them around and the petrol in these vehicles. All these products are consumed in Nigeria but a lot of these products are not made in Nigeria.

A lot of finished products in Nigeria are imported from countries that have grown and developed a very competent manufacturing industry. These countries have profited from the developmental benefits that a

flourishing manufacturing sector provides. A country as big as Nigeria, which is regarded as the giant of Africa, is still experiencing low manufacturing output for decades now.

Despite the government's efforts to increase industrial production and capacity utilization in the sector, there has been growing worry about the reduction in the manufacturing industry's output in Nigeria in recent years. Massive imports of finished goods and insufficient financial support for the manufacturing sector are the main causes of the sector's underwhelming performance in Nigeria, which has finally led to a decline in the capacity utilization of the industry in the nation. The underutilization of these potentials has exacerbated widespread poverty, low standards of living at the individual level, and rising unemployment in the country as a result of persistent mono-economic practice and blatant disregard for other sectors of the economy.

Nigeria's limited manufacturing sector is striking evident when considering trade flows. Regrettably today, the manufacturing sector contributes just little to export revenue but accounts more for imports which has caused the country to be used as a dumping ground for all sorts of imported goods from the foreign industrial countries and the Asian tigers (Aluko, Akinola and Fatokun, 2004). Also, many firms had closed down due to lack of enabling environment and high cost of production in Nigeria. In terms of trade, the country is consistently having trade imbalance on manufactured items and this is causing a severe drag on Nigeria's balance of payments (National Revolution Plan, 2019). Oil overwhelmingly dominates the nation's trade at over 90 per cent of total exports but drives a very small portion of other industrial activities including refineries.

The economic structure of Nigeria reflects typically that of an under-developed nation trait, where more than 50% of the total GDP is being contributed by a single primary sector of the economy (Afolabi & Laseinde 2019). Similarly, statistics showed that capacity utilization of the manufacturing sector has overtime been sluggish and very low compare to other strong economies of the world. For instance, the capacity utilization of the Nigeria's manufacturing sector in the late 1990s was only 40% and stood at about 54% in early 2009. By 2010, the manufacturing sector capacity utilization was about 56% and further rose to 61% in 2018 (Afolabi & Laseinde 2019). Theoretically, economic theory postulated that a rise in manufacturing activities in which manufacturing capacity utilization is the major indicator brings about improved gross domestic product of a nation. However, the trend analysis above showed that even though the manufacturing capacity utilization increases overtime, this sector's growth remains infinitesimal compared to the growth rate of manufacturing capacity utilization in the economy.

The inability of Nigeria to stimulate greater investment in manufacturing despite her substantial endowment in natural resources is mainly the result of lack of coherent and sustained strategies of economic transformation. The manufacturing sector in Nigeria is in a weak state and its contribution to the country's economic growth is abysmally low. Terrorism has caused many multi-national manufacturing industries to move to the neighbouring countries and most small enterprises have closed down, while rationalization and staff layoffs are being experienced in many medium and large-scale establishment. As depicted in the UNIDO survey, 33 per cent of firms have closed down; only 11% are operating at a sustainable level (UNIDO, 2021). There have been considerable studies that were carried on the impact of manufacturing sector on economic growth where scholars used several variables of economy as a unit of analysis (see Adugna, 2014; Rioba, 2014; Inakwu, 2013; Obamuyi, Edun, Kayode, 2012; Szirmai and Verspagen, 2011; Awad, 2010; Elhiraika, 2008; Mahdavi and Fatemi, 2007; Libanio, 2006).

Although, as revealed by Adugna (2014), Rioba (2014), Inakwu (2013), Szirmaiet al (2011), Elhiraika (2008), Mahdavi et al (2007), and Libanio (2006) that manufacturing has a positive and significant impact on economic growth but only Inakwu (2013) explored the Nigeria's case. Obamuyiet al (2012) posits that the relationship between manufacturing and economic growth cannot be established during the period of the study. The higher growth of the manufacturing sector can have multiple effect on the national economy (Adugna, 2014). Based on the findings of Awad (2010), Manufacturing has a significant impact on economic

growth in the long-run but has no significant impact on economic growth in the short-run. The upshot is that the findings of these scholars on this topic is contradictory, confusing and making it difficult to have a conclusion. Also, most studies on manufacturing focuses on challenges and prospects, banking sector reform, its productivity, performance, capacity utilization, fiscal policy, monetary policy, environment and globalisation, while studies on economic growth concentrates on the impact of FDI, deficit and macroeconomic variables, capital stock, capital formation, industrialisation and its determinants. Almost all the literature that explored the effect of manufacturing on economic growth were used to analyse the Western, Middle East, Asia and African countries as a whole without country specific studies and the few that investigated Nigeria's case did not capture recent development in the country like the NDP that was designed as the country's Medium-Term Development Plan meant to succeed the Economic Recovery and Growth Plan (ERGP) that was implemented from 2017 to 2020.

Therefore, this study seeks to fill these gaps by extending the scope to cover some recent development in the country. As manufacturing sector have valuable significant effect on economic growth in every country, results vary from country to country, but in Nigeria, there is little attention paid to study the relationship between manufacturing sector and economic growth. These research gaps are what this study intends to fill by exploring and providing more empirical evidence on the effect of Nigerian manufacturing sector on her economic growth.

LITERATURE REVIEW

Conceptual Literature

1. Manufacturing Sector Output

Manufacturing industry is the agglomeration of industries engaged in chemical, mechanical or physical transformation of materials, substances, or components into consumer or industrial goods. The manufacturing industry accounts for a significant share of the industrial sector in developed countries. The manufacturing industries are the chief wealth producing sector of economy because they employ a huge share of the labour force and produce materials required by sectors of strategic important such as national infrastructure and defence. Oxford advance learner's dictionary, defined manufacturing as the business or industry of producing goods in large quantities in factories. According to Ojijieme (2013), manufacturing industry refers to those industries that engage in the production of goods for use or sale using labour and machines, tools, chemical and biological processing or formulation. The term applies to industrial production in which raw materials are transformed into finished goods on large scale. Eze and Ogiji (2013), refers manufacturing industry as the key industries in an economy that motivates conversion of raw materials into finished goods. Zuvekas (1979:242) defines manufacturing industry as a process of transforming raw materials with the aid of human resources and capital goods into consumer goods, new capital goods which permits more consumer goods (including food) and social overhead capital, which together with the human resources provide new services to both individuals and businesses

2. Economic Growth

Economic growth is one of the five main macroeconomic goals of a society. A country's economic performance can be measured by looking at the country's economic growth and development. The economic growth of a country is usually indicated by an increase in that country's gross domestic product, GDP. In other words, gross domestic product is an economic aggregate that reflects the value of a country's output. Thus, a country's GDP is the total monetary value of the goods and services produced by that country over a specific period of time. Jhingan (2002) defined economic growth as a process in which the real per capita income for a country increases over a long period of time. He states that economic growth is measured by increase in the amount of goods and services in each successive time period. Thus, economic growth occurs

when an economy's productive capacity increases which in turns is used to produce more goods and services. The variables concerned may be real or nominal, and may be measured in absolute or per capita term. Anyanwu (1995) defined economic growth as increase overtime of an economy's capacity to produce those goods and services needed to improve the wellbeing of the citizens in increasing numbers and diversity. Todaro (1977), defined economic growth as a steady process by which the productive capacity of the economy is increased overtime to bring about rising levels of national income.

Thus, in discussing economic growth, it is imperative to examine the behaviour of the population overtime. This is because economic growth becomes a meaningful concept if it leads to an improvement in the wellbeing of the society overtime and this can happen only if the rate of population growth lags behind that of economic growth overtime. Thus, economic growth is a steady process of increasing the productive capacity of the economy and hence of increasing national income, being characterised by high rates of increase of per capita output and total factor productivity, especially labour productivity. If a country's capacity is increasing on a steady basis, more of its resource will be employed. Maddison (1970) claimed that the raising of income level is generally referred to as economic growth in rich countries and in poor ones. Kindle Berger (1965) cited in Jhingan (2008) defined economic growth as more output. In other words, economic growth simply means a change in national output (ΔY) and the rate of growth is defined mathematically as $\Delta Y/Y$, where Y is national output or income and Δ is change. Rapid economic growth has been a major pre-occupation of economists, planners and politicians in developing countries including Nigeria. Annually, statistics are compiled showing rates of Gross National Output growth and countries are often assessed by the degree to which their national output and incomes are growing. In fact, for many years, economists equated the rapidity of output growth with economic development. According to Lewis (1954), the advantage of economic growth is not that wealth increase happiness, but it increases the range of human of choices Schumpeter (1934) defined economic growth has to do with a gradual and steady rise in output as different from a fundamental rise of which alter the initial equilibrium may be defined as development

Theoretical Framework

1. Dual Economy Theory

This theory was propounded by a British citizen, Professor Arthur William Lewis in 1954 and it addressed the mechanisms of transferring surplus labour from the traditional activity to a modern capitalist sector under the condition of unlimited labour. According to Lewis a country's economy can be thought of as containing two sectors, a small "capitalist" (industry) sector and a very large "traditional" (agriculture) sector. For Lewis the capitalist sector is "*that part of the economy which uses reproducible capital and pays capitalists thereof*". The use of capital is controlled by the capitalists, who hire the services of labour. The capitalist manufacturing sector is defined by higher wage rates as compared to the subsistence sector, higher marginal productivity, and a demand for more workers. Also, the capitalist sector is assumed to use a production process that is capital intensive, so investment and capital formation in the manufacturing sector are possible over time as capitalists' profits are reinvested in the capital stock. Improvement in the marginal productivity of labour in the agricultural sector is assumed to be a low priority as the hypothetical developing nation's investment is going towards the physical capital stock in the manufacturing sector.

Also, the agricultural sector was defined by him as "that part of the economy which is not using reproducible capital". Lewis posits that surplus labour from traditional agrarian sector is transferred to the modern or industrial sector whose growth over time absorbs the surplus labour, promotes industrialization and stimulates sustained growth. In the model, the traditional agrarian sector is typically characterized by low wages, an abundance of labour, and low productivity through a labour-intensive production process.

The primary relationship between the two sectors is that when the capitalist sector expands, it extracts or

draws labour from the agricultural or traditional sector. This causes the output per head of labourers who move from the agricultural (subsistence) sector to the capitalist sector to increase. Since Lewis in his model considers overpopulated labour surplus economies he assumes that the supply of unskilled labour to the capitalist sector is unlimited. This gives to the possibility of creating new industries and expanding existing ones at the existing wage rate. A large portion of the unlimited supply of labour consists of those who are in disguised unemployment in agriculture and in other over–manned occupations such as domestic services casual jobs, petty retail trading. Lewis also accounts for two other factors that cause an increase in the supply of unskilled labour, they are women in the household and population growth. The agricultural sector has a limited amount of land to cultivate, the marginal product of an additional farmer is assumed to be zero as the law of diminishing marginal returns has run its course due to the fixed input, land. As a result, the agricultural sector has a quantity of farm workers that are not contributing to agricultural output since their marginal productivities are zero. This group of farmers that is not producing any output is termed surplus labour since this cohort could be moved to another sector with no effect on agricultural output.

Therefore, due to the wage differential between the capitalist and agricultural sector, workers will tend to transition from the agricultural to manufacturing sector over time to reap the reward of higher wages. However even though the marginal product of labour is zero, it still shares a part in the total product and receives approximately the average product. If a quantity of workers moves from the subsistence or agricultural sector to the capitalist or industrial sector equal to the quantity of surplus labour in the agricultural sector, regardless of who actually transfers, general welfare and productivity will improve. Total agricultural product will remain unchanged while total industrial product increases due to the addition of labour, but the additional labour also drives down marginal productivity and wages in the manufacturing sector. Over time as this transition continues to take place and investment result in increases in the capital stock, the marginal productivity of workers in the manufacturing will be driven up by capital formation and driven down by additional workers entering the manufacturing sector. Eventually, the wage rates of the agricultural sector for the manufacturing sector will equalize as workers leave the agricultural sector for the manufacturing sector, increasing marginal productivity and wages in agriculture whilst driving down productivity and wages in manufacturing

2. Nicholas Kaldor Growth Model

This theory was propounded by Professor Nicholas Kaldor in 1957 and his analysis of growth captured the relationship between manufacturing sector and economic growth. Kaldor, writing in the post-war period, noted that the link between manufacturing growth and the performance of the economy as a whole was imperative for the growth trajectory of developed economies then, (Ibbih and Gaiya, 2013). Kaldor growth theory has three basic laws which are;

i. Increasing returns in manufacturing

This first law is that there exist a strong positive relationship between the growth of manufacturing output and the growth of the GDP. Kaldor found evidence that the manufacturing is the engine of growth for every country at every stage of growth. He tested this proposition using regression $q_i = a_i + b_m m_i$…… (i). Where q and m refers to growth of total output and manufacturing output. Kaldor also argues that the growth in non-manufacturing output also responds to the growth of manufacturing output. Two reasons have been deducted for this

1. This reason is in line with Lewis model of a dualistic economy, which means that the expansion of manufacturing leads to the transfer of labour from the low productivity areas to the industrial activities. This invariably has little or no negative impact on the traditional sector given surplus labour.
2. This reason has to do with the existence of static and dynamic returns to scale interval to the firm as well as increasing productivity that arises as a result of technology and on the job training (Libiano,

2006).

ii. Effective demand – constrained growth;

The second law, also known as Kaldor –Verdoorn's law, is that there exist a strong positive correlation between the growth of manufacturing output and the growth of labour productivity in manufacturing. This law provides an explanation of the first law: the more the output of manufacturing sector grows the greater is the increase of productivity gain in the system as a whole which allows for a reduction of unit labour costs and consequently a fall in prices. This increases the competitiveness of the country and allows for further output expansion through increased exports which reinitiate the cycle, (Libiano, 2006).

The first two laws imply that capital accumulation is self-generating as output increases. The limit on growth of the capital good sector (the manufacturing sector) has consequently not to be found in some supply constraint, not even in the shortage of labour (which was his original idea in 1966), but in some demand constraint. In other words, the growth of industrial output must be induced by autonomous demand, which derives from outside the sector, either from the agriculture sector or from the rest of the world.

iii. The agricultural – Industrial relation and the two sector model;

The third law is that there exists a strong positive relationship between the growth of manufacturing output and the growth of productivity outside manufacturing sector. This law refers to the assumption of disguised unemployment in the economy (at the early stages in agriculture and subsequently in services), which together with the hypothesis of rigid wages in the industrial sector exceeding agriculture wages leads to an elastic supply of labour for industry. The basic argument of this law is that the non-industrial sector has diminishing returns to scale and as such when resources moves to the industrial sector, average productivity of those that remain will rise (Ibbihet al, 2013).

iv. The two-sector model

The two-sector model describes the case of a single developing country, but Kaldor used it to describe the trade between less-developed countries exporting agricultural products and more developed countries exporting manufactured goods. He could not envisage, but would have welcomed, a third wave of globalization during which countries with nearly half of the planet's population would enter into world trade by exporting industrial goods and then growing at a pace previously unknown. Furthermore, he was writing at the time of the two oil shocks and hence in a period of stagflation of the world economy; in Kaldor's view (1975), international trade relations give the world economy a deflationary bias, because when there is a surplus in primary production, the fall in these prices leads to a reduction in the purchasing power of these countries which, as we have seen, is a demand constraint on the output of advanced countries. By contrast, if there is a shortage of primary products, their prices increase, money wages increase, inflation increases and anti-inflationary policies will reduce output and employment on a world scale. This is the reason why Kaldor (1966) called for reform in the international monetary system that would offset this bias. He argued for the issuance of anew international reserve currency, similar to Keynes's bancor that would be backed by a great deal of major commodities and would operate as a buffer stock. A boom in the output of primary commodities would increase the creation of this international money, which would then be spent on buying industrial output. Conversely, a shortage of agricultural output would reduce the creation of this international money, which would reduce demand from the industrial sector instead of creating inflation

3. Rostow's Stages of Growth Theory

In 1960, an economic historian, Prof. W.W Rostow posits that all countries of necessity pass through five stages in the process of growth. These stages include;

1. **The traditional society:** Refers to a country that has yet to begin developing, where a high percentage of people are involved with agriculture and a high percentage of the country's wealth is invested in activities such as the military and religion, seen as "nonproductive" by Rostow. They make economic decision based on custom, tradition and obligations

2. **The precondition for take-off/transitional stage:** This stage is characterized by advances in agriculture and jettisoning of uneconomic culture as well as the emergence of an entrepreneurial class

   i.e. the process of development begins when an elite group initiates innovations economic activities. Under the influence of these well-educated leaders, the country starts to invest in new technology and infrastructure, such as water supplies and transportation systems. These projects will ultimately stimulate an increase in productivity likely increasing the GDP. There is a limited production function, and therefore a limited output. There are limited economic techniques available and these restrictions create a limit to what can be produced. Increased specialization generates surpluses for trading. There is an emergence of a transport infrastructure to support trade. External trade also occurs concentrating on primary products.

3. **The take-off stage:** This stage is characterized by increased rate of saving emergence of leading sectors which helps to pull along other sectors contributing thereby to the realisation of sustained growth; this means that rapid growth is generated in a limited number of economic activities, such as textiles or food products. These few, takeoff industries achieve technical advances and become productive, whereas other sectors of the economy remain dominated by traditional practices. After take-off, a country will take as long as fifty to one hundred years to reach maturity. Globally, this stage occurred during the Industrial Revolution. Industrialization increases, with workers switching from the agricultural sector to the manufacturing sector. The level of investment reaches over 10% of GNP. The growth is self-sustaining as investment leads to increasing incomes in turn generating more savings to finance further investment.

4. **The drive to maturity:** This stage of growth is characterized by the consolidation of industrial revolution. Moreover, within this stage, the other sectors catch up with the leading sectors and the economy, having attained the "critical minimum speed to be airborne in the growth process in stage 3(three) actually becomes airborne in this stage of growth. Modern technology, previously confined to a few takeoff industries, diffuses to a wide variety of industries, which then experience rapid growth comparable to the takeoff industries. Workers become more skilled and specialized. The economy is diversifying into new areas where the economy is producing a wide range of goods and services and there is less reliance on imports.

5. **High mass consumption:** The economy shifts from production of heavy industry such as steel and energy, to consumer goods, such as motor vehicles and refrigerators. Of particular note is the fact that Rostow's "Age of High Mass Consumption" dovetails with (occurring before) Daniel Bell's hypothesized "Post-Industrial Society." The Bell and Rostovian models collectively suggest that economic maturation inevitably brings on job-growth which can be followed by wage escalation in the secondary economic sector (manufacturing), which is then followed by dramatic growth in the tertiary economic sector (commerce and services). Under this last stage of growth, an economy is deemed to have matured, making it possible for the citizens to enjoy appreciable levels of living standard. The more developed economies such as the US, UK, Sweden, Germany, Norway, Netherland, France, china, most likely falls under the Rostow's fifth stage of growth classification.

For the emerging nascent economies, the second stage is probably more relevant to their growth since it is in this stage that resistance to change in traditional values and in the social, cultural and economic institutions is finally overcome and modern industries begin to emerge

Empirical Literature Review

Rioba (2014), studied the importance of manufacturing industry for the economic growth of Kenya economy from Kaldorian perspective. The study utilized a time series data covering 1971 – 2013. The study employed real GDP growth rate as the dependent variable and manufacturing output growth rate; Non-manufacturing output growth rate; manufacturing employment growth rate. The data obtained were analysed using ordinary least square method. The study found that there exists a positive relationship between manufacturing production and economic growth in Kenya but the relationship is weak to spur up increased growth.

Adugna (2014), examined the impact of manufacturing sector on economic growth in Ethiopia based on Kaldorian approach. The study used a time series data covering 1980 – 2010. The study employed real gross domestic product (RGDP) as the dependent variable and manufacturing sector output(mf); manufacturing number of employment (emp); and labour productivity in the manufacturing sector (lpdrt) as the independent variables. The data obtained were analysed using both descriptive (ration and percentage) and econometrics (double log multiple regression analysis) method. The study found that a unit change in manufacturing sector increases the economic growth by 42 percent, that is, the higher growth of the manufacturing sector can have multiple impact on the national economy.

Inakwu (2013), examined the impact of manufacturing sector on economic growth in Nigeria. The study employed time series data covering the period of 1980 – 2008. The study assessed the effect of Manufacturing output (MANGDP); Investment (INVEST); Government expenditure (GOVEXP); and Money supply (M2) on log of real Gross Domestic Product (LRGDP). The data obtained were analysed using ordinary least square Method. The result indicate there is a positive and significant relationship between manufacturing and economic growth within period of investigation

Obamuyi et al (2012), investigated the link between bank lending, economic growth and manufacturing output in Nigeria. The study utilized a time series data covering the period of 1973 – 2009. The study employed Manufacturing production (MOT) as the dependent variable and Bank Lending (BLD); Lagged Value of Manufacturing (LVM); Inflation Rate (INFL); Maximum Lending Rate (MLR); Capacity Utilization (CAP_U); Financial Deepening (FDP); Exchange Rate (EXR) and Gross Domestic Product (GDP) as the independent variables. The data obtained were analysed using co-integration and vector error correction model (VECM) techniques. The findings of the study show that manufacturing capacity utilization and bank lending rates significantly affect manufacturing output in Nigeria. However, the relationship between manufacturing output and economic growth could not be established in the country. The study recommended that government should put concerted effort in reviewing the lending and growth policies of manufacturers and lending institutions and also provide appropriate macro-economic environment, in order to encourage investment-friendly lending and lending by the financial institutions.

Dan et al (2011), examined the impact of industrialization on economic growth 0f Nigeria. The study utilised time series data covering the period of 1980 – 2010. The study employed per capita output (Per capita GDP) as the dependent variable and Per capita output of the previous year (Per capita GDP) Capital/industrial output (KAP/INQ); capital/industrial out of the previous year (KAP/INQ Labour/industrial output (Labour/INQ) as the independent variables. The data obtained were analysed using co-integration and Vector Error correction model. The study found result shows that capital-industrial output ratio decreases per capita GDP; the labour /industrial output ratio also contributes negatively to per capita GDP which means that industrialization has a negative impact on economic growth in Nigeria. The study recommended that policy measures should be put in place to improve human capital development so as to make people capable of using modern technology and to diffuse it in the society.

Szirmai et al (2011), examined the importance role of manufacturing as a driver of growth in 88 developing countries. The study used panel dataset spanning from 1950 – 2005. The study employed growth of GDP per capita (GR)as the dependent variable and share of manufacturing in GDP (MAN); share of service in GDP (SER); GDP per capita relative to USA (RELUS); human capital (EDU); log population size (LNPOP); climate zone (CLIMATE); and the degree of openness (OPEN) as independent variables. The data obtained were analysed using basic random effect (RE), fixed effect (FE), Hausman Taylor (HT) and between (BE) specifications. The study found a moderate positive impact of manufacturing on economic growth in line with the engine of growth hypothesis.

Awad (2010), examined the role of increased manufacturing share of non-oil GDP in Gulf cooperation council economies (they include: Bahrain, Kuwait, Qatar, Saudi Arabia, Oman, and United Arab Emirate). The study used panel data spanning from 1997 – 2007. The study employed share of manufacturing in GDP (MAN) as the dependent variable and population (POP); growth of manufacturing share in GDP (MSG); labour force (LF); investment as a share of GDP (INV); government expenditure as a share of GDP (EXP); and world GDP growth rate (WG) as independent variables. The data obtained were analysed using Ordinary Least Square (OLS) Method and two-stage least squares (G2SLS). The study shows that manufacturing is strongly linked to GCC non-oil economic growth over the long run but however, results for the short run demonstrates that manufacturing efforts in the GCC countries have no significant effects on stimulating the growth levels of non-oil GDP.

Obasan et al (2010), examined the role of industrial sector in the economic development of Nigeria. The study used time series data covering the period of 1980 – 2008. The study employed Real Gross Domestic Product (RGDP) as the dependent variable and Manufacturing output (MOT); Exchange rate (EXR); Inflation Rate (INFR); Interest Rate (IR); Government Expenditure (GEXP) as independent variables. The data obtained were analysed using Ordinary Least Square Method. The study found that there is an empirical correction between the degree of industrialisation and economic growth in Nigeria. If one plots the share of industrial sector in commodity production against per capita incomes, there is a positive relationship between the two. The study investigates the Nigeria economy as one that is developing and changing due to rapid changes in the world economy. Also, the study found that the country exhibits a high level of economic openness that is not industrial sector, increase in exchange rate movement, particularly foreign direct investment do not seem to provide the necessary stimuli for industrialisation in the country. The study recommended that economic openness and interest rate must be combined with other vital factors to give the desired boost to industrial development and if Nigeria industrial sector is to benefit maximally from globalisation, emphasis should first be placed on deregulation at the sub-sector level to form a formidable block for effective and efficient linkage with the economic growth.

Elhiraika (2008), examined the key determinant of manufacturing share in aggregate output and its relationship with real GDP growth and growth volatility of 36 African countries. The study used cross-section with panel data covering 1980 – 2007. The study employed GDP growth (g) as the dependent variable and investment rate (GDIGDP); labour force (LF); official development assistance relative to GDP (ODAGDP); the share of manufacturing value added in GDP (MFGGDP); and public expenditure as percentage of GDP (GEGDP) as the independent variables. The data obtained were analysed using ordinary least square and two-stage least squares. The study found a positive relationship between share of manufacturing in aggregate output and real GDP and a negative relationship between share of manufacturing in aggregate output and growth volatility. This is so, because an increase in the share of manufacturing in total output has the potential to raise GDP growth and reduce growth volatility.

Mahdavi et al (2007), investigated the impact of non-exports on the economic growth in Iran. The study utilized a time series data covering the period of 1959 – 2003. The study employed annual growth rate of non-oil GDP (RGDP) as the dependent variable and share of investment in non-oil sector, annual growth

rate of labour force in non-oil sectors; annual growth rate of non-oil exports, weighted non-oil exports growth as the independent variables. The data obtained was analysed using Ordinary Least Square Method. The study found that non-oil exports exert a positive and significant effect on economic growth of Iran during the period of the research but also in absence of fundamental changes in export composition, the also find that there is low, or no, potential for positive effect of non-oil exports on economic growth through external economies and productivity increase

Libanio (2006), analysed the relationship between manufacturing output growth and economic performance from a Kaldorian perspective in seven Latin American economies (they include: Brazil, Argentina, Chile, Colombia, Mexico, Peru, and Venezuela). The study utilized panel data covering the period of 1985 – 2001. The study employed growth of total output (q) as the dependent variable and manufacturing output (m); growth rate of employment (e); growth of capital stock (k); growth of total factor input (tf); and the degree of return to scale as the independent variables. The data obtained was analysed using feasible generalized least square method. The study found that increasing returns to scale in manufacturing sector, and the possibility of cumulative growth cycle in the region is based on the expansion of industrial activities; this means that there is a positive relationship between manufacturing output growth and the overall performance of the economy

Evaluation of Literature Review

From the foregoing, it has become obvious that there is agreement amongst scholars on the meaning of various concepts used in the study. Also, the theoretical literature opened our minds on the various theoretical underpinning, inducing manufacturing growth, which all points to the positive influence of manufacturing sector on economic growth. Theoretically, these positions seem plausible, but for want of empirical substance, there were still grave need for an empirical enquiry. However, after going through the available literature on the topic, we were able to discover and understand that due to lack of a unifying theory on economic growth, a substantial volume of empirical research has multi-theoretical bases. Also, notwithstanding the volume of study carried out on this topic, there exist inherent disagreements between various scholars as to the relevance of manufacturing on the growth process of countries, which means that results from the various studies have so far yielded mixed results that are inconclusive and contradictory in nature. The divergent views halted our rushing to hasty conclusion and create a grave need for an empirical enquiry.

Looking at the available literature reviewed, emphasis has been on the challenges and prospects of manufacturing sector, impact of globalisation on manufacturing sector on economic growth, impact of industrialisation on economic growth with little attention to study the relationship between manufacturing sector and economic growth. Research shows that most of the literature on the effect of manufacturing sector on economic growth were used to analyse the Western, Middle East, Asia and African countries as a whole and the few that investigated Nigeria's case did not capture recent development in the country. The gap in the relevant literature on Nigeria is what the researcher needs to cover by studying the situation in Nigeria and providing more empirical evidence on the effect of manufacturing on economic growth.

METHODOLOGY

Research Method

This study adopts the ex-post facto experimental design. This is motivated based on its attribute of relying on already existing data, especially from secondary sources. Similarly, it is an econometric research design in that the data collected will be analysed by employing an econometric methodology of multiple regressions and statistical tools. Specifically, the Ordinary Least Square (OLS) method is preferred because it has the best, linear, unbiased estimator (BLUE).

Data and Source

All the data collected for this research work are secondary data spanning from 1981 – 2021 and are sourced from various publication of Central Bank of Nigeria Statistical Bulletin and unpublished Dissertation. Specifically, the quantitative data of macroeconomic variables employed in this study include; Real Gross Domestic Product (RGDP) (a proxy for economic growth), manufacturing sector output (MSOP), labour force (LBF) Interest Rate (INT), Gross fixed Capital formation (GFCF) and Exchange Rate (EXR)

Model Specification

The role of manufacturing as an engine of growth has often been recognised in economic literature. The theoretical construct of this work is rooted in the Lewis-Kaldor framework which discusses explicitly the effect of manufacturing on the growth of a country. According to the model, the only way to spur economic growth and development in a poor country is to shift labour into manufacturing, which is more productive.

In presenting a model for the effect of manufacturing sector on economic growth in Nigeria, the study draws from Obasan et al (2010). According to Obasan et al (2010),

RGDP = f (MOT, EXR, INFR, IR, GEXP)................................. (i)

Where;

Real Gross Domestic Product (RGDP),

Manufacturing output (MOT),

Exchange rate (EXR),

Inflation Rate (INFR),

Interest Rate (IR),

Government Expenditure (GEXP), were their variables.

For the purpose of this research work, the above model specification will be adopted and build upon so as to effectively capture various variables considered imperative in this study. Therefore, in line with Cobb Douglas production function a simple model is specified as;

RGDP= f (IMP, GFCF, LBF, INT, EXRT, GEX, INF)............................ **(I)**

Where;

RGDP – Gross Domestic Product proxy for economic growth

MSOP – Manufacturing Sector Output

GFCF – Gross Fixed Capital Formation

LBF –Labour Force

INT – Interest Rate

EXRT – Exchange Rate (Naira Per US$)

GEX – Government Expenditure

INF – Inflation Rate

When equation one is expressed mathematically, the equation becomes;

RGDP= f (MSOP + GFCF + LAF + INT +EXRT + GEX + INF).....................**(II)**

This function may be further represented in a linear econometric format thus:

$RGDP_t = \beta_0 + \beta_1 MSOP_t + \beta_2 GFCF_t + \beta_3 LBF_t + \beta_4 INT_t + \beta_5 EXRT_t + \beta_6 GEX_t + \beta_7 INF_t + U_t$**. ....…… (III)**

Where;

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ are estimated Parameters, Ut - Error term

A priori Expectations: $\beta_1, \beta_2, \beta_3 > 0 > \beta_4, \beta_5$

Estimation Techniques and Procedure

This empirical investigation shall involve four-step procedures. These procedures are Unit Root test, Johansen Co-integration Technique, Granger causality test, and finally, the estimation of the parameters of our regression model using OLS. Furthermore, the OLS result will be investigated by conducting; normality test, heteroskedasticity test and Serial Correlation (Breusch-Godfrey Test). These procedures are justified below:

1. Unit Root Test

The use of time series data in econometric analysis poses several challenges to researchers. Stationarity of time series data is one of these problems, since a time series variable that is non-stationary is bound to yield spurious regression result. A series is said to be stationary if its mean and variance are constant over time and the value of covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which one covariance is computed (Gujarati, Porter and Gunasekar, 2012). Considering that most time series data are non-stationary and therefore produce spurious results, unit root tests was conducted before testing for co integration. This was done using the Augmented Dickey-Fuller (ADF) test. The ADF test addresses a shortcoming of the Dickey-Fuller test (tau statistic) of not considering the possibility of autocorrelation in the error term by adding a lagged difference term, and therefore corrects for high-order serial correlation.

2. Johansen Co-integration Test

A crucial condition for the use of Johasen co-integration test is that the time series involved should be integrated of the same order, say series Y is I(0) and series X is I(0) or series Y is I(I) and series X is I(I). This is because if the series are stationary at level, a standard regression could be carried out, as there is no risk of spurious regressions. As was pointed out by Harris (1995), if two series are integrated of order I(1) and the residuals from regressing them are I(0), then the two series are co-integrated. This implies that although both series may individually be non-stationary, their linear combination can be stationary. A co-integration relationship may however only be observed in the long run, as it is possible that the series

deviate in the short run, but in the long run regain their trends (Gujarati, Porter and Gunasekar, 2012). Finding out if there is a long-run relationship between the variables in the estimated model motivates the use of a co-integration approach in this research, as it aims to investigate the long-run relationship between manufacturing and Economic Growth in Nigeria.

3. The Ordinary Least Square (OLS) method: The econometric package used in this analysis is the Econometric Views (E-views). Prior to the estimation, the OLS result will be analysed based on economic criteria, statistical criteria (first order test), and econometric criteria (second order test).

4. Normality Test: This will be used to know whether the error term of the estimated model is normally distributed. This test is carried out to determine if the data set is well-modelled by a normal distribution, it is also used to know whether the error term of the distributed model is normally distributed.

5. Serial Correlation (Breusch-Godfrey Test): Serial correlation is used in statistics to describe the relationship between observations of the same variable over specific periods. If a variable serial correlation is measured as zero, there is no correlation, and each of the observation is independent of one another.

6. Heteroscedasticity (Breusch-pagan) Test: Heteroscedasticity refers to data for which the variance of the dependent variable is unequal across the range of independent variables. Heteroscedasticity is the opposite of homoscedasticity.

EMPIRICAL EVIDENCE

Unit Root Test

Table 4.1 Unit Root Test Result

Variables	ADF statistics	Critical value 5 per cent	Order of Integration
LRGDP	-3.987404	-2.938987	I(I)
LMSOP	-4.685860	-2.938987	I(I)
LGFCF	-5.157162	-2.941145	I(I)
EXRT	-5.395720	-2.938987	I(I)
INT	-5.785843	-2.938987	I(I)
LLAF	-10.81021	-2.941145	I(I)
LGEX	-4.775860	-2.938987	I(I)
INF	-5.495724	-2.941145	I(I)

Source*: Authors Computation.*

The unit root (or stationarity) test was conduct using Augmented Deckey Fuller (ADF) test. The result of the ADF test shows that all the variables were stationary at first difference I(I). Furthermore, the result of the ADF test statistic above showed that the ADF statistics of the entire variables are greater than their critical values at 5 per cent level of significance. According to Pesaran and Yongcheol (1999) and Pesaran, Yongcheol and Richard (2001), if the data used in the econometric analysis is not stationary at level but is stationary after differencing the data, it means that information regarding the long run relationship between the variables has been lost during the process of differencing the data. As such they advocate for the test of long-run relationship to ascertain the long run status of the model.

Co-Integrations Test

The variables were subjected to co-integration test to determine whether they are co-integrated (i.e. whether there is a long-run relationship between them). Both Trace value and Maximum Eigen values indicate one co-integrating equation at 5 per cent level of significant. This is shown in the table below

Table 4.2   Co-integration Test Result

Series: LRGDP LMSOP LGFCF LLAF INT EXRT LGEX INF				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.679475	109.0124	95.75366	0.0045
At most 1	0.521435	64.63829	69.81889	0.1208
At most 2	0.355458	35.89669	47.85613	0.4016
At most 3	0.277022	18.76732	29.79707	0.5097
At most 4	0.134845	6.116640	15.49471	0.6817
At most 5*	0.231678	94.09700	82.76570	0.0433
At most 6*	0.756447	102.6671	70.12109	0.0082
At most 7	0.011919	0.467640	3.841466	0.4941
Trace 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 E–Views 10 Outputs.

The result of the co-integration test presented in table 4.2 shows that both trace value and maximum Eigen value indicate at least one co-integrating equation at 5 per cent level of significant. This is shown by the value of the co- integrating likelihood ratio compared with 5 per cent critical value. Hence, the variables are co- integrated which implies that there is a long run relationship between the variables in the model.

Ordinary Least Square

As stated earlier in the chapter three of this study, the ordinary least square technique would be used for analysing the long run relationship existing among the variables

Table 4.3 Ordinary Least Square (OLS) Result

Dependent Variable: LRGDP				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-28.35057	2.432357	-11.65560	0.0000
LMSOP	0.299453	0.069056	1.336358	0.0601
LGFCF	0.199484	0.080963	2.463880	0.0188
LLAF	1.986778	0.131213	15.14160	0.0000

EXRT	-0.001348	0.000383	-3.515364	0.0012
LGEX	0.028655	0.083214	5.880922	0.0041
INF	-0.001891	0.588041	-2.480311	0.0308
INT	-0.006682	0.003173	-2.106080	0.0424
R-squared	0.937690	F-statistic		226.7810
Adjusted R-squared	0.934500	Durbin-Watson stat		1.954845

Source: Author's Computation Using E–Views 10.

From the Regression Analysis Computed with the aid of E-view 10, the estimated equation is presented below;
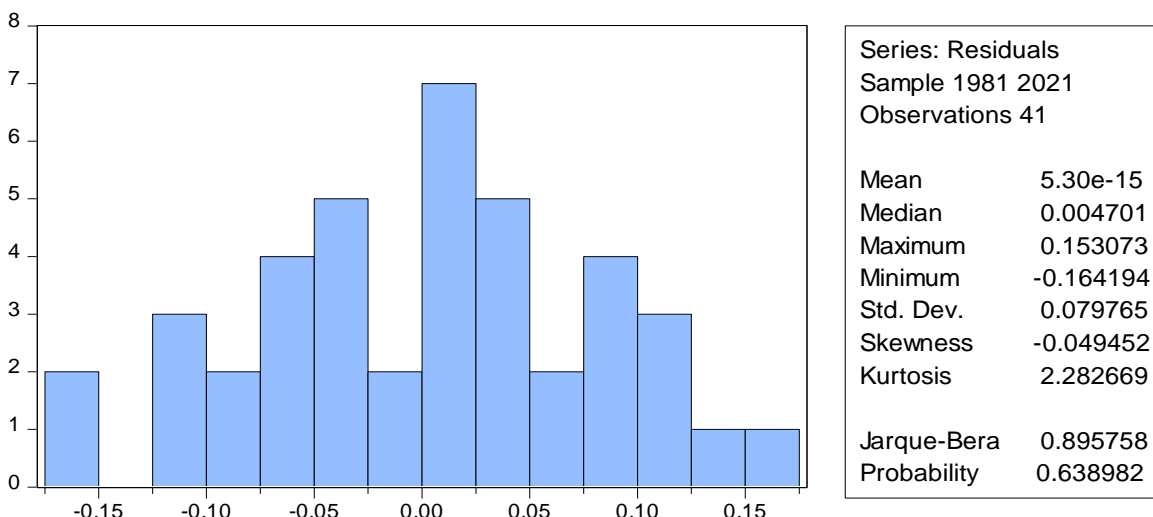
$$LRGDP = -28.35057 + 0.199265LMSOP + 0.199484LGFCF - 0.001348EXRT - 0.006682INT + 1.986778LLAF + 0.028655LGEX - 0.001891INF$$

The value of the intercept is -28.35057. This shows that economic growth (proxy by RGDP) will decrease by -28.35057 per cent in the independent variables in the estimated model are held constant. The sign and value of manufacturing sector output (LMSOP) is 0.199265, conforms to a priori expectation. This implies that a one per cent increase in manufacturing sector output will lead to 0.19 per cent increase in economic growth. Interest rate (INT), inflation rate (INF) and exchange rate (EXRT) have a negative relationship with RGDP meaning that an increase in any of the variable will bring about a decrease in LRGDP by 0.006682 per cent, 0.001891 and 0.001348% per cent respectively, this, agrees with theoretical expositions. Gross fixed capital formation (LGFCF), government expenditure (LGEX) and labour force (LLAF) conform to a priori expectation since their signs are positive. This implies that a one per cent increase in LGFC, LGEX and LLAF will lead to an increase in LRGDP by 0.199484, 0.028655 and 1.986778 per cent respectively.

The coefficient of multiple determination value (adjusted R^2) which shows the explanatory power of the model is 0.934500 shows that the model has a good fit. It implies that about 93 per cent of the total variation in the dependent variable is explained by the independent variables. The remaining 7 per cent can be accounted for by the error term, that is, all other explanatory variables not captured in the model.

Normality Test

Table 4.4   Normality Test Result

Series: Residuals	
Sample 1981 2021	
Observations 41	
Mean	5.30e-15
Median	0.004701
Maximum	0.153073
Minimum	-0.164194
Std. Dev.	0.079765
Skewness	-0.049452
Kurtosis	2.282669
Jarque-Bera	0.895758
Probability	0.638982

Source: Authors" Computation Using E–Views 10 Outputs.

Jarque-Bera test was used to test for the normality of the data. The table above shows that the P-value of 0.638982 is greater than a 0.05 level of significance. This means that the variables in the estimated equation are normally distributed. Hence, we have a good model.

Serial Correlation Test

The test result is presented below

Table 4.5   Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	21.37646	Prob. F (2,33)	0.1300
Obs*R-squared	23.13930	Prob. Chi-Square (2)	0.2100

Source: Authors'' Computation Using E–Views 10 Outputs.

Based on the decision rule, we cannot reject the null hypothesis since the probability of Chi-Square which is 0.2100 is greater than 0.05 at 5 per cent level of significance. Thus, we conclude that our data is not serially correlated

Heteroscedasticity Test

Table 4.6   Heteroscedasticity Test Result

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	4.080629	Prob. F(5,35)	01050
Obs*R-squared	15.09894	Prob. Chi-Square(5)	0.3099
Scaled explained SS	7.056664	Prob. Chi-Square(5)	0.2165

Source: Authors'' Computation Using E–Views 10 Outputs.

From the Breusch-Pagan-Godfrey test for heteroscedasticity above, the probability of Chi-Square is greater than 0.05, thus, we cannot reject H_0 and conclude that our data set is homoscedasticity and is good for a good regression

Discussions of Major Findings

The unit root test shows that all the macroeconomic variables in the estimated model are not stationary at levels. However, all the variables are stationary at first difference in ADF tests. Considering the time series using Augmented-Dickey Fuller at Trend & Intercept, all their calculated statistics are greater than the critical values at 5% level of significance. The results show that the time series are integrated of the same order; I (I), with the application of ADF test. According to Pesaran and Yongcheol (1999) and Pesaran, Yongcheol and Richard (2001), if the data used in the econometric analysis is not stationary at level but is stationary after differencing the data, it means that information regarding the long run relationship between the variables has been lost during the process of differencing the data. As such they advocate for the test of long-run relationship to ascertain the long run status of the model using Johansen co-integration.

The summary of the Johansen Co-integration Test revealed that there is one co-integrating variable among

the co-integrating equation. As can be seen from the trace statistics and Eigen-value above, the trace statistics is greater than the critical value at 5% level of significance and was collaborated by the Eigen-value which is significantly different from zero. In other words, the null hypothesis of no co-integration among the variables is rejected since at least three equation at 5% critical value is statistically significant. The test result shows the existence of a long-run relationship among the variables. Based on this result, the study then proceeds to estimate the equation using ordinary least square method.

The ordinary least square results indicate the relative impact among the independent variables and the dependent variable; the sign and value of LMSOP conforms to a priori expectation. This implies that an increase in manufacturing sector output will lead to an increase in economic growth. This result is consistent with our a priori expectation and also in line with the studies of Afolabi & Lanseinde (2019), and Obamuyi et al (2012). Moreso, the LMSOP has an insignificant impact on LRGDP. The reason for this result is attributed to insufficient investment on the manufacturing sector. However, government resources allocated to the manufacturing sector may increase but corruption on the part of government officials has limited its impact hence, the sector has not yield a meaningful impact on economic growth during the period under study.

It was revealed that gross fixed capital formation has a positive relationship with economic growth in Nigeria within the period under review. This finding means that the higher the GFCF the higher the economic growth of Nigeria. This result is evidence from the domestic investment in industrialization education and agriculture in Nigeria. This finding conforms to a priori expectation which state that a country's investment overtime will bring about an increase in the economic growth of a country. However, GFCF has an insignificant impact on economic growth in Nigeria. This is true as insecurity level increases during the study period, unfavourable government policies, corruption and unstable exchange rate limits private investors from fully putting the resources on investment thus, GFCF has a positive but insignificant impact on RGDP.

Interest rate (INT), inflation rate (INF) and exchange rate (EXRT) have a negative relationship with RGDP meaning that an increase in any of the variable will bring about a decrease in LRGDP by 0.027771 per cent, and 0.014442% per cent respectively, this, agrees with theoretical expositions. LGEX and LLAF conform to a priori expectation since their signs are positive. This implies that a one per cent increase in LGEX and LLBF will lead to an increase in economic growth by 0.028655 and 1.665939 per cent respectively.

The F-statistic revealed that the entire model is statistically significant. This implies that the explanatory variables in the estimated model have joint impact on the dependent variable. The coefficient of multiple determination value (adjusted R^2) which shows the explanatory power of the model is about 0.94 and indicates that the model has a good fit. It implies that about 94 per cent of the total variation in the dependent variable is explained by the independent variables. The remaining 6 per cent can be accounted for by the stochastic error term, that is, all other explanatory variables not captured in the model. Jarque-Bera test was used to test for the normality of the data. The result revealed that the variables are normally distributed. Hence, we have a good model. From the serial correlation test, we could not reject the null hypothesis since the probability of Chi-Square is greater than 0.05 at 5 per cent level of significance. Thus, we conclude that our data is not serially correlated. Also, from the Breusch-Pagan-Godfrey test for heteroscedasticity, the probability of Chi-Square is greater than 0.05, thus, we accept H_0 and conclude that our data set has homoscedasticity and is good for a good regression.

SUMMARY, CONCLUSION, AND POLICY RECOMMENDATIONS

Summary of Major Findings

The empirical analysis of the relationship between manufacturing sector output and economic growth in

Nigeria reveals the following findings;

1. There is a long-run relationship between manufacturing sector output and economic growth. This is evident from the co-integration test. This means that manufacturing sector output affects economic growth in Nigeria.
2. There is a positive impact of manufacturing sector output on economic growth in Nigeria. This is in line with Afolabi & Laseinde (2019).

Conclusions

In this paper, we explored the contributions of manufacturing sector output to economic growth in Nigeria through; a review of empirical studies; and theoretical issues; and centred on empirical findings using an econometric method of ordinary least square (OLS). From our findings, we discovered that manufacturing sector output in Nigeria has a positive effect on real gross domestic product (RGDP). This means that an increase in the level of manufacturing sector output in the Nigerian economy will lead to an increase in economic growth. This is in line with previous studies conducted in Nigeria like Afolabi & Laseinde (2019). Our findings show that manufacturing sector output in the Nigerian economy is a propeller to rapid economic growth.

Policy Implications and Recommendations

Having concluded from the findings of the study, the study therefore suggests policy implications and recommendation.

From the findings of the study, manufacturing sector output acts as a catalyst for rapid economic growth in Nigeria. This implies that adequate funding channelled to this sector by the government will lead Nigeria to fast economic recovery.

Also, government policy should encourage an enabling environment for investors to invest in the manufacturing sector since this sector promotes economic growth. The policy could be in form of incentives to investors, tax holiday or influencing the financial and capital market to prioritise credits to the manufacturing sector. These will increase investment in the sector thereby promoting economic growth in Nigeria.

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