**Relationship between Natural Resource Earnings and Industrialization in Nigeria**

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**Abstract**

Natural resource earnings need sound management for proper development towards industrialization. Despite this realization, natural resource earnings have not translated into industrialization in Nigeria due to poor infrastructural facilities, weak institutions, inadequate government policies, lack of funding, corruption, mismanagement of resources and import dependent economy. The study therefore aimed at assessing the relationship between natural resource earnings and industrialization in Nigeria. Time series data was used from National Bureau of Statistics. Error-correction modeling and OLS regression modeling were used while Unit Root and Co-integration test were conducted to check the stationary of the time series data. The result shows that despite the strong link between natural resource earnings and industrialization, its exploitations and export is yet to impact positively on socioeconomic, infrastructural and standard of living of the people. The study therefore recommends that government should develop natural gas and solid minerals sectors thereby increasing government revenue which may be used in the development of critical infrastructures needed for industrialization of the Nigerian Economy. Government should again develop Human Capital as the key to enhanced innovation and better adoption of technologies in order to increase economic growth. Finally, Crude oil sector should be developed and adequately funded in order to achieve its desired industrialization status and diversification of the Nigerians Economy.

**Keywords**: Natural resource, exploitation, sustainable development, earnings, industrialization

1. **Introduction**

Nigeria's development and improvement possibilities stay positive with expanded private utilization and speculation as the significant drivers and Nigerian economies are gradually changing. Be that as it may, progress in social advancement has not been similarly solid, particularly corresponding to destitution, imbalance, administration and social security (Ayara, 2017). Fast investigation of common assets, industrialization and basic change are goals for Nigeria to expand efficiency, make conventional occupations, and diminish disparity and destitution. Characteristic asset profit can assume a synergist job in advancing basic change and industrialization in Nigeria. These assets are factors which can be utilized to fulfill human needs (wellsprings of raw materials). Assets for the most part can be portrayed as credits joins to things which prompted exchange off and can likewise be seen as far as material for example crude materials, land or in dynamic terms for example Human Knowledge and properties of work. Common assets can be organic (inexhaustible) model: woods, fishes and natural life or non-natural (non-sustainable) model: mineral assets like oil, tin, and gold. One of the boundaries used to decide the achievement of government strategy is monetary strategies which necessitate that most extreme advantages be gotten from these assets. It is in this manner no mishap that most creating countries have made industrialization a national need.

Industrialization is a fundamental part of long-run development in that most countries that have achieved socio-monetary turn of events, howev er with some attendant natural outcomes, have additionally seen structural change from essential production towards industrialization, (Aneta, 2006). Keeping the pace of such improvement to meet the prerequisite of the present without endangering the necessities of the future, is economical turn of events (Classzone, 2007).

Sustainable development can accordingly, be viewed as a complex, multi-dimensional and an associated process which must be drawn closer from an international, interdisciplinary and dynamic perspective Muhammad, *et al*. (2014). Sustainable improvement may not be accomplished in a hegemonic and unipolar world in which everything is commoditized and market driven. It could be a humanistic approach, for example, an option frame work for destitution destruction which is a significant method to ensuring advancement (Famade, 2007). Sustainable development is currently generally acknowledged as laying on three mainstays of the maintainability of financial development, social development and natural security (United Nation Industrial development Organization (UNIDO), 2004). Nations like Britain, India and others from Asia and the Pacific, have additionally acknowledged this concept which is likewise fundamentals of industrialization.

In Sub-Saharan Africa, the economic and social advantages of industrialization are far being overrun by mechanical contamination which is becoming highly focused because of frail modern advancement strategies (Nabende, 2002). These weak policies couldn't bolster the endeavors towards improving a spotless air condition favorable to human exercises simultaneously upgrading economic and social advancement towards an industrialized yet sustainable future. The extensive exploitation of regular assets could prompt the depletion of such assets in this manner threatening industrialization and reasonable development. Nations in the mainland of Asia and the Pacific though experienced monetary development and infrastructural development achieved by industrialization, they also experienced ecological outcome of solid waste removal (Osita,2007). The strong waste disposal is because of atomic force innovation and creates health perils in this way undermining sustainable development.

In Nigeria, industrialization has been sought after since the early 1960s, (Famade, 2007). This was done through formulation of arrangement of mechanical development policies. Despite the fact that the degree of industrialization in Nigeria is low, it has impacts on the economic and social improvement as well as, makes pressure on the condition. One of the financial advantages is the rise total national output (GDP) between 2008 and 2009 (Beckerman, 2007). Likewise, industrialization brought about improved social insurance administrations through manufacture of medications and other clinical ancillaries. In the territory of natural, the issue of greenhouse gas from nonstop gas flaring of worldwide oil companies in the oil area which the FG, despite several arrangements, have not had the option to curtail (UNIDO, 2004). All these are issues relating to industrialization and practical turn of events. These issues require reconsidering the routes in which industrialization strategies are defined. Need of adequate industrialization strategies or their proper implementation may achieve environmental insecurity, social and monetary underdevelopment which could in this way encroach on industrialization and maintainable turn of events.

The focal point of this investigation is to break down the connection between natural resource earnings and the degree of industrialization in Nigeria. The investigation is likewise proffering powerful ways through which income from natural resources might be saddled in implementing these SDGs in a way that will achieve industrialization, especially where there may be clashes between natural resources earnings and sustainable development principles. The study therefore seeks to determine to what extent has natural resource earnings impacted on industrializing the Nigerian Economy? The study also examines comprehensively the relationship between natural resource earnings and industrialization in Nigerian. In other to close whether natural resources have contributed fundamentally to industrialization in Nigeria, we test the hypothesis in the null (Ho) form as in this manner: natural resource earnings do not have any fundamental relationship on industrialization in Nigeria.

1. **LITERATURE REVIEW**

**Conceptual issues:** Adejugbe (2004) sees industrialization as the procedure of harnessing human and material assets, with increasing use of science and innovation to the production of merchandise and ventures, whereas Osita (2007), takes a gander at industrialization as the progressive ability of a people to saddle human and material resources for the creation of merchandise and enterprises as is a key segment of monetary development. This definition regarded industrialization as an all-out procedure impacting on society through a one of a kind increment in merchandise and services. On the entire, the vast majority of the definitions tend to overlook the issue of natural effect of industrialization. Hence, with the end goal of this investigation, industrialization is defined as "a specific method of arranging production with a steady procedure of socio-economic, technological and environmental changes which continually builds society's ability to deliver a wide scope of merchandise and ventures with associated environmental results." In contrast, Wilfred Beckerman (2007), one of the conspicuous creators in the field of economical turn of events, states that" sustainable advancement shows an interdependent concern with advancing human government assistance, satisfying basic needs, ensuring the earth, achieving equity among rich and poor, and partaking on abroad premise being developed choice making". This definition however catches the requirement of this investigation, is less brief and is not clear about the situation of future needs in accordance with the Brundtland Report which considers sustainable development to be the “advancement that meets the needs of the present without trading off the ability of people in the future to address their own issues.

The Performance of the Oil Sector in Nigeria can be classified into three principle sub-sectors, to be specific: upstream (creation), downstream (distribution) and gas (Antai, 2016). The most hazardous throughout the years has been the downstream sector, which is the circulation arm and association with final consumers of refined oil based product in the household economy. The unremitting emergency in supply of oil products concluded in the choice by Government in 2003 to deregulate the downstream sub-sector. Be that as it may, the way of its usage has been disputable on the grounds that it overlooks the financial realities in Nigeria. Oil creation by the joint venture (JV) organizations represents around 95 percent of Nigeria's unrefined petroleum production. Shell, which owns the biggest joint venture in Nigeria, with 55 percent Government shares through the Nigerian National Petroleum Corporation, produces around 50 percent of Nigeria's unrefined petroleum. Texaco, Total, Elf, Chevron, Exxon Mobil and ENI/Agip operate the other JV's, in which the NNPC has 60 percent shares. The over-reliance on oil has made weakness to the fancies of the global market, as noticed in the previous sections that show the commitment of oil to some full scale macroeconomic factors. Specifically, the position of oil in the mind of the normal Nigerian has gotten more significant since the deregulation of the downstream sector of the Nigerian oil industry in 2003. The inconsistency is additionally glaring now with the ongoing ascent in crude oil prices at the global markets, which implied more outer income for Nigeria, yet additionally expanded the cost trouble on imported refined crude oil products. It is such inconsistencies that cause the Nigerian economy to seem strange, as strategies appear to disregard what seems evident to do. All things being equal, strategies intended to address the inadequacies and imperfections in the structure end up being inadequately enunciated as well as actualized due to political, rent seeking or regional narrow minded interests. Clearly, it is a similar lease-seekers that ceaselessly damage the revitalization of the local refineries, making Nigeria to rely upon importation of refined product to meet the local need. As indicated by Antai, at present, Nigeria has four processing plants, with a combined refining capacity installation of 445,000 barrels for every day. More so, these four refineries includes: the primary Port Harcourt Refinery was built in 1965 with an installed capacity of 35,000 barrels per day and later extended to 60,000 barrels per day, Warri Refinery was built in 1978 with an installed refining limit of 100,000 barrels per day, and later expanded to 125,000 barrels per day in 1986, Kaduna Refinery was built in 1980 with an installed refining limit of 100,000 barrels per day, and later expanded to 110,000 barrels per day in 1986 and second Port Harcourt Refinery was built in 1989 with an installed refining limit of 150,000 barrels per day and intended to satisfy the dual role of providing the local market and exporting out its overflow. Interestingly, the consolidated capacities of these plants surpass the local utilization of refined products, head of which is premium motor spirit whose request is assessed at 33 million liters per day. The refineries are nonetheless, working far beneath their installed limits, as they were pretty much neglected during the military time, skirting the daily schedule and obligatory turnaround upkeep that made product importation inescapable. Importation in any case, there have been constant product deficiencies that invigorated the contention for deregulation of the downstream oil sub-sector in Nigeria. Most importantly, the monetization of oil income has been a central point in Nigeria liquidity management. Estimating liquidity as the restricted and broad money classifications by the CBN, the mid 1990s saw rise that were hosed by 1995 up until the civilian administration went ahead board in 1999. The new Government kept up restrained monetary activities for one fiscal year and from that point, the conduits were opened. From that point forward, the CBN has been fighting to hold liquidity within proper limits, so as to guarantee that it does not make unfavorable consequences on the three key macroeconomic costs (exchange rate, inflation rate and interest rate). The greatest challenge is when Nigeria make more income from raw petroleum sales than it planned, similar to now. Such overabundances have consistently been adapted, making inflationary pressure and market distortions (Adedipe, 2004). Now, there is adequate ground to look at how economic policy definition has been affected or actuated by crude oil in Nigeria.

Natural resources and industrialization in Nigeria development advancement turned into a significant test to the African continent during the1960s as most of African nations picked up their freedom. The particular governments considered industrial development as a method for the continent to increase independence and lower their reliance on the industrialized economies. The philosophy and beliefs of Africa depended on the vision that industrialization would change the African economies from conventional agrarian to dynamic and industrialized based economies. Industrialization was seen as an instrument of economic growth that will help the continent to accomplish its macroeconomic goals (improved standard of living, high income, self-reliance, balance of payment stability and job creation). Nigeria presents a case of a developing economy. The main part of the total national output is from the primary sector with agriculture conveying the main share. The oil and gas sector is a significant part in the economy and contributes around 95 percent to the nation's export earnings contrasted with the industrial sector which just records for little bit (around 6 percent) of the economic growth. The manufacturing sector recorded 4 percent of the GDP. The Nigerian economy began encountering serious trouble in facilitating its industrial advancement following the discovery of oil in the last part of the 1960s. These troubles can be attributed to a frail crude material base (more consideration was diverted into mining), poor policy implementation, corrupt government institutions, political instability, poor entrepreneurship, poor technical know-how and inadequate technical manpower (Chete, et al. 2014). In addition, industrial strategy can be a significant and amazing instrument for animating quick monetary development and advancement. Nigeria, nonetheless, has neglected to gain considerable and huge ground and progression because of powerless approaches and helpless execution. From the initiation of the Nigeria's autonomy, different governments have been giving a scope of approaches focused a shot the sets of people with significant influence and their guides. The result of these strategies has been an immense disappointment and eccentrically, preferring "lease chasing" (Mike, 2012). Strategy disappointment can be competent at two unique levels; the first is related with the development of arrangements that neglect to accomplish enhancement, or perceive the genuine issues and their answers. Disappointment can likewise happen when the approach creators are affected by vested advantages or outside and inward weights. The subsequent level is related with execution. One primary deformity in modern strategy is the inability to perceive the significant partners and an arrangement that isn't individuals focused and comprehensive is ensured to fizzle. As of late, there has been an improved pattern in the modern approach of the created economies, for example, the United States, Britain, France, Germany and Japan, following dynamic government intercession. This new activity was enlivened by four main considerations to include: strain to decrease joblessness and invigorate development, want to balance out certain economies from money related administrations, normal requests for expanded government activity, and saw need to respond to evidently viable approaches being sought after in China.

Natural Resources earning and Sustainable Development in Nigeria:

In figure 1 above, natural resource earnings in billions naira (N’ Billion) was the Y-axis. From the graph, crude oil and natural gas earnings stood at N4,979.42 billion in 1981 and steadily decreased reaching N4,052.98 billion in 1983. However, it increased to N4,559.20 billion in 1984. Thereafter, crude petroleum and natural gas earnings continued to increase and decrease in the other years that followed until it reached an all-time high of N9,294.05 billion in 2005. In 2015, it decreased to N6,629.96 billion (CBN, 2017). Solid minerals earnings were not as impressive (as it was represented by almost a flat line) as what was earned through crude petroleum and natural gas. In 1981, solid minerals earnings were a paltry N67.14 billion and decreased steadily to N43.08 billion in 1984. In 2015, it increased impressively to N102.54 billion (CBN, 2017). Relating the natural resource earnings to industrial output, it is evident that only crude petroleum and natural gas earnings trended closely with industrial output while earnings from solid minerals were far away from industrial output. This might be an indication that solid minerals have not contributed significantly to industrialization in Nigeria. Interestingly, the difficulties and Prospects to improving Industrialization and Sustainable improvement depended on the examination of industrialization and practical advancement in Nigeria. It has been affirmed that six principal challenges influencing industrialization and reasonable improvement were recognized. These incorporate Corruption, absence of institutional structure co-appointment, deficient infrastructural advancement, in sufficient financing, absence of between sectoral mix and in-powerful human capital turn of events.

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Source: Author’s compilation from Central Bank of Nigeria Statistical Bulletin, 2020.

Figure 1**:** Trends showing Crude petroleum, solid mineral earnings and industrial output in Nigeria

A few theoretical literary works were surveyed among which incorporates: Harrod-Domar development hypothesis has advanced throughout the years as a significant component of improvement financial matters. Probably the most punctual endeavor to display monetary development is famously alluded to as the 'Harrod-Domar' Model related with the English market analyst, Sir Roy Harrod and American Economist, Evsey Domar. The model is an early endeavor to show that development is legitimately identified with investment funds and by implication identified with the capital/yield proportion. As indicated by the model, development (G) can be composed emblematically as: G=  **. . . . . . . . . . . . . . . . .**(1)

Where: *k* - incremental capital-output ratio and *s* - the average propensity to save. The model showed that sparing influence development straightforwardly, while the gradual Capital and yield proportion influences development in a roundabout way or contrarily. More so, the endogenous development hypothesis has all the earmarks of being generally reasonable for this examination. The endogenous development models recommend that inner factors, for example, capital arrangement, innovation, government approaches, political solidness, and human capital among others can altogether impact the general monetary development of countries. The endogenous development models are unarguably the most broadly utilized models that give a methodical examination of the human capital and monetary development nexus, remembering that the investigation fundamentally explores the connection between characteristic asset profit and industrialization in Nigeria. It is basic to embrace a model that would have the option to foist a nexus between human capital and financial development.

Empirically, the literature that supports the hypothesis of the natural resources earnings and industrialization to includes: Hausmann and Rigobon (2002) just as Sala-I-Martin and Subramanian (2003) contend that that oil and different minerals negatively affect development. Sachs and Warner (2001) contend that "exact investigations have indicated that this revile is a sensibly strong actuality." van der Ploeg (2011) presents a decent union of the writing, which offers interesting proof for most components of the resource curse. More so, Ajose and Oyedokun (2018) argued that gross fixed capital formation does not significantly impact on output growth in Nigeria while Otu and Adenuga (2006) identified that human capital development was the key to enhanced innovation and better adoption of technologies (industrialization) in order to increase economic growth.

**3.0 Methodology**

The study adopted the *ex-post facto* research design. The *ex-post facto* research design was used to foist a link between the dependent and independent variables relying on already existing secondary data. The beauty of using the ex-post facto research design is that the researcher relies on already existing data devoid of manipulation by the researcher (Osuala, 2010). The study was anchored on the endogenous growth theories which established that economic growth was caused by internal factors not external factors and calls for investment in human capital and Harrod-Domar model which show that growth is directly related to savings and indirectly related to the capital/output ratio. The model for this study is eclectic in that it is anchored on endogenous growth theory and Harrod-Domar growth theory. According to the model, growth (*G*) can be written symbolically as: G=**- - - - - - - - - - - - - - - - - - - - - - - - 1.**

Where: K- Incremental capital-output ratio and; S- The average propensity to save. In line with Akintoye et al (2013), the model for the study is modified and specified as:

IND = ʃ (CPG, SM, CM) …………….. . . . . . . . . . . . .(2.)

Where: IND = Industrial output earnings measured by industrial output/GDP ratio, CPG = Crude petroleum and natural gas export earnings, SM = Solid mineral earnings, and CM = Coal mining.

Integrating equations ( 2) and (3) into equation (4), we obtain:

IND = ʃ (CPG, SM, CM, G, L, K) … . . . . . . . ……… (3)

Transforming equation (5) into its linear econometric form, we obtain

INDt = β0 + β1CPGt+ β2SMt + β3CMt + β4Lt + β5Kt + β6Gt + et ………… (4)

Where: β0 = Constant (intercept) term, β1, β2, β3, β4, β5and β6 = Coefficient parameters of the explanatory variables, e = Stochastic error term, t = time series notation. By a priori, β0> 0, β1> 0, β2> 0, β3> 0, β4> 0 and β5> 0

Analytical Framework:

Unit root test adopted the Augmented Dickey-Fuller (ADF) approach to solve the problem of correlation of error terms. This test is conducted by adding the lagged values of the dependent variable. The Augmented Dickey-Fuller (ADF) emphasizes rejection of a null hypothesis of unit root which signifies non-stationarity and accepting the alternative hypothesis which indicates stationarity. Based on the estimation of the ADF test equations, we say that if the computed absolute value of the tau statistic (/t/) exceeds the critical tau values, the null hypothesis is rejected. Hence, the time series is stationary (Nyong, 2011). On the other hand, if the absolute value of tau statistic (/t/) does not exceed the critical tau value, the null hypothesis is accepted. Hence, the time series data is non-stationary (Iyeli 2010).

Cointegration test is used to analyze and test for unit roots. Fundamentally, even though two time series may not by themselves be stationary, when they are combined linearly they tend to become stationary. When this occurs, the two non-stationary time series are said to be cointegrated. This is possible only when the two times series are of the same order. This means that the two time series must be stationary after the same number of differencing. In this study, the researcher adopted the Johansen Cointegration test using the Trace Statistic and Maxi-Eigen value so as to ascertain the number of cointegrating equations in these two models.

Error-correction modeling was designed to deal with short-term deviations. The primary aim of the study was to ascertain how natural resource earnings can lead to industrialization in Nigeria, thus efforts were made to analyze the coefficients of these variables. The simplest approach is to assume that we are dealing with an underlying model that contains a lagged dependent variable and a single lag on each of the independent variables.

4.0 RESULTS/FINDINGS

Table 1a: ADF Unit Root Test Result (At Level)

|  |
| --- |
| Variables ADF test statistic Test critical value at 5% Remark |
| INDQGDP 0.551243 (0.9862) -2.948404 Not stationary  CPNGGDP 1.072626 (0.9965) -2.948404 Not Stationary  SMGDP -5.086997 (0.0002)\* -2.945842 Stationary  GFCFGDP -1.476380 (0.9989) -2.945842 Not stationary  ADLITR -4.817080 (0.0004)\* -2.948404 Stationary |
| Source: Author’s computation using E-views software  Note: The optimal lag for ADF test is selected based on the Akaike Info Criteria (AIC), P-values are in parentheses where (\*) denote significance at 5 %. |

Source: Author’s computation using E-views software

Note: The optimal lag for ADF test is selected based on the Akaike Info Criteria (AIC), P-values are in parentheses where (\*) denote significance at 5 %.

The study adopted a time-series data so as to complete the investigation. Time series data are non-stationary by nature and any endeavor to utilize them in this temperamental structure prompts deceptive outcome. To test for stationarity or in any case of the factors, the investigation adopted the Augmented Dickey-Fuller (ADF) unit root test. From table 6.1a, the ADF result shows that when the unit roots test was done at level, solid minerals earnings (SMGDP) and adult literacy rate (ADLITR) were fixed. This is on the grounds that at level, the ADF esteems (in supreme terms) of solid minerals earnings (SMGDP) and adult literacy rate (ADLITR) which were 5.086997 and 4.817080 were more noteworthy than the basic qualities 2.95842 and 2.948404 individually. Be that as it may, the ADF esteems (in outright terms) of industrial output (INDQGDP), crude petroleum and natural gas earnings (CPNGGDP) and gross fixed capital formation (GFCF) which were 0.551243, 1.072626 and 1.476380 separately were less than the critical values 2.948404, 2.9448404and 2.945842 individually at five percent level of significance. Subsequently, there was a need to assist distinction the series so as to get overall stationarity for all the factors.

Table 1b: ADF unit test result at 1st difference

|  |
| --- |
| Variables ADF test statistic Test critical value at 5% Remark |
| INDQGDP -6.806154 (0.0000)\* -2.948404 Stationary  CPNGGDP -6.672734 (0.0000)\* -2.948404 Stationary  SMGDP -5.519569 (0.0081)\* -2.981038 Stationary  GFCFGDP -5.302647 (0.0001)\* -2.948404 Stationary  ADLITR -4.966937 (0.0003)\* -2.948404 Stationary |

Source: Author’s computation using E-views software

Note: The optimal lag for ADF test is selected based on the Akaike Info Criteria (AIC), P-values are in parentheses where (\*) denote significance at 5 %.

At first difference, all the variables became stationary as their ADF values (in absolute terms) 6.806154, 6.672734, 5.519569, 5.302647 and 4.966937 for industrial output, crude petroleum and natural gas earnings, solid minerals earnings, gross fixed capital formation and adult literacy rate were greater than the critical values 2.948404, 2.948404, 2.981038, 2.948404 and 2.948404 respectively. Since, all the variables are now stationary and integrated of the same order (i.e. order 1), cointegration analysis is justified

**Table 2:** Johansen Co-integration test result

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Hypothesized No. of CE(s) | Trace Statistic | 5 percent  Critical value | Max-Eigen  Statistic | 5 percent  Critical value |
| None\* | 78.17356 | 69.81889 | 37.31828 | 33.87687 |
| At Most 1 | 40.85528 | 47.85613 | 18.47284 | 27.58434 |
| At Most 2 | 22.38244 | 29.79707 | 15.94930 | 21.13162 |
| At Most 3 | 6.433135 | 15.49471 | 5.400061 | 14.26460 |
| At Most 4 | 1.033074 | 3.841466 | 1.033074 | 3.841466 |
| \* denotes significant Trace statistic  \*denotes significant Max-Eigen statistic  Note: Trace statistic indicates 1 cointegrating equation at 0.05 level  Max-Eigen statistic indicates 1 cointegrating equation at 0.05 level | | | | |

Source: Author’s computation using E-views 9.0 software

Based on the cointegration test result in table 4.2 above, the Trace statistic indicates that there exist one cointegrating equations at five percent level of significance. According to the result, Trace statistic of 78.17356 is greater than the critical value of 69.81889. More so, the Max-Eigen statistic of 37.31828 exceeds the critical value of 33.87687. Thus, we affirm that the variables of the model are related in the long run and with the evidence of a long run equilibrium relationship amongst the variables, the variables are suitable for the regression analysis.

The correlation matrix result in table 4 showed the relationship amongst the variables used in the study. From the result, there is evidence of a positive relationship between industrial output earnings and crude petroleum and natural gas export earnings in Nigeria. With a correlation matrix value of 0.984032, it is suggestive that as crude petroleum and natural gas earnings increased by 1%, industrial output earnings in Nigeria increased by 98.4% or vice versa. Secondly, the correlation matrix result showed that the relationship between industrial output earnings and solid minerals earnings was also a positive one. With a correlation matrix value of 0.414393, it is evident that as solid minerals earnings rise by 1%, then industrial output earnings increased by 41.4 % or vice versa.

More so, there is evidence of a negative relationship between gross fixed capital formation and industrial output earnings in Nigeria. With a correlation matrix value of -0.644574, it is suggestive that gross fixed capital formation increased by 1%, industrial output earnings in Nigeria decreased by 64.46% or vice versa. Finally, the result showed that there is a negative relationship between adult literacy rate and industrial output earnings in Nigeria. With a correlation matrix value of -0.606276, there evidence that as adult literacy rate increased by 1%, industrial output earnings decreased by 60.63% and vice versa.

From table 4, the causality test result in table 6.4 above, there is evidence that there is a unidirectional causality between crude petroleum and natural gas export earnings and industrial output earnings in Nigeria. The result showed that industrial output earnings determined crude petroleum and natural gas export earnings in Nigeria and not the other way round. However, the study showed that there are no causality between solid minerals earnings and industrial output earnings; gross fixed capital formation and industrial output earnings; and adult literacy rate and industrial output earnings. These results are shown in the probability values in table 6.4 above.

Table 3: Error Correct Model (ECM) Result

Parsimonious Error Correction Model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: INDQGDP | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 07/06/19 Time: 22:37 | | |  |  |
| Sample (adjusted): 3 35 | | |  |  |
| Included observations: 33 after adjustments | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| C | 0.045662 | 0.048968 | 0.932501 | 0.3597 |
| D(CPNGGDP) | 1.036259 | 0.069797 | 14.84680 | 0.0000 |
| D(CPNGGDP(-2)) | -0.049090 | 0.088251 | -0.556255 | 0.5828 |
| D(SMGDP) | 15.25865 | 7.363819 | 2.072616 | 0.0364 |
| D(GFCFGDP(-2)) | 0.060146 | 0.072593 | 0.828537 | 0.4149 |
| D(ADLITR(-2)) | 0.032914 | 0.061375 | 0.536278 | 0.5963 |
| ECM(-1) | -0.659199 | 0.179376 | -3.674953 | 0.0011 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.989356 | Mean dependent var | | 0.338306 |
| Adjusted R-squared | 0.986900 | S.D. dependent var | | 0.080574 |
| S.E. of regression | 0.009222 | Akaike info criterion | | -6.348593 |
| Sum squared resid | 0.002211 | Schwarz criterion | | -6.031152 |
| Log likelihood | 111.7518 | Hannan-Quinn criter. | | -6.241783 |
| F-statistic | 402.7868 | Durbin-Watson stat | | 2.047614 |
| Prob(F-statistic) | 0.000000 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Author’s computation

\*Significant at 5 percent

**5.0 Discussion**

Crude petroleum and natural gas earnings have positive and significant relationship with industrial output. A unit rise in crude oil and natural gas earnings lead to 1.04 units increase in industrial output in Nigeria. With the probability value of crude petroleum and natural gas earnings being less than the test significant level (i.e. P < 0.05), we conclude that crude petroleum and natural gas earnings have significant impact on industrial output in Nigeria. This finding is consistent with Odularu (2007) which found a positive and significant relationship between crude oil export (earnings) and Nigerian economic performance. This finding might be attributed to the fact that Nigeria has remained a monolithic economy with about 98 percent of her foreign earnings obtained from export of crude oil. With such huge role played by the oil and gas sector in Nigeria, the influence of this sector on the industrialization efforts of the government cannot be undermined given that crude oil and gas earnings has been deployed in financing the activities of the other sectors in Nigeria as well as developing infrastructures which are critical to industrialization.

Solid minerals earnings and industrial output in Nigeria are positively and significantly related, a unit increase in solid minerals earnings leads to 15.26 units increase in industrial output in Nigeria. The probability value of solid minerals earnings (0.0364) is less than the test significant level (i.e. P < 0.05). Hence, we conclude that solid minerals earnings have significant effect on industrialization in Nigeria. This finding is consistent with Maduaka (2014) which established a positive and significant relationship between solid mineral sector and economic development in Nigeria. Perhaps, this outcome might be attributed to the persistent call for diversification of Nigeria’s economy which has made the solid minerals sector to gain attention. Increased efforts of government in the solid minerals sector has led to increases activities in the construction industry, chemical industry and even the manufacturing industry thereby increasing solid minerals earnings. More so, increased solid minerals earnings are used to develop critical infrastructures which are needed for industrialization in Nigeria. Hence, it is not surprising that solid minerals earnings have significant influence on industrialization in Nigeria.

Gross fixed capital formation has a positive and insignificant relationship with industrial output in Nigeria, a unit increase in gross fixed capital formation (lagged two years) leads to 0.06 units increase in industrial output in Nigeria. The probability value of gross fixed capital formation (0.4149) is greater than the test significant level (i.e. P > 0.05). Hence, we conclude that gross fixed capital formation does not have significant effect on industrialization in Nigeria. This finding corroborates Ajose and Oyedokun (2018) which argued that gross fixed capital formation does not significantly impact on output growth in Nigeria. This finding underscores the role of investment as a catalyst for industrialization given that availability of investible funds encourages the level of industrial output. However, the positive and insignificant relationship between gross fixed capital formation and industrial output could be attributed to corruption which has pervaded the Nigerian economic space where funds meant for investment are diverted resulting in abandonment of several industrialization initiatives.

Similarly, adult literacy rate has a positive but insignificant relationship with industrial output in Nigeria. From the result, a unit rise in adult literacy rate leads to 0.03 units increase in industrial output in Nigeria. The probability value of adult literacy rate (0.5963) is greater than the test significant level (i.e. P > 0.05). Hence, we conclude that adult literacy rate does not have significant effect on industrialization in Nigeria. This finding is consistent with Otu and Adenuga (2006) which identified that human capital development was the key to enhanced innovation and better adoption of technologies (industrialization) in order to increase economic growth. However, the insignificant impact of adult literacy on industrialization in Nigeria as evidence in this study may be attributed to the inadequate infrastructures in Nigeria’s education sector which has limited the skills acquired from the nation’s institutions. The more limited the skill acquisitions are, the lower the productivity and the lower the level of industrialization in Nigeria.

The coefficient of the error correction term has the correct sign (as it is negative) and it is statistically significant at five percent level with the speed of convergence to equilibrium of 66 percent. This implies that in the short run natural resources earnings adjust to achieve industrialization in Nigeria by 66 percent of the past year’s deviation from equilibrium. This is a high speed of adjustment and it is essential for maintaining long-run equilibrium to reduce the existing disequilibrium over time. Again, the coefficient of determination (adjusted R-squared) shows that 99 percent of the variations in industrialization in Nigeria are caused by changes in crude petroleum and natural gas earnings, solid minerals earnings, gross fixed capital formation and adult literacy rate. Therefore, only 1 percent of variations in industrialization in Nigeria are caused by other factors not included in the model. This represents a very good-fit.

The Durbin-Watson (DW) statistic of 2.047614 is within permissible levels suggesting the absence of positive serial auto-correlation. More so, since DW > R2, we conclude that the regression result is not spurious and economically stable in measuring the level of industrialization given the hug natural resource earnings in Nigeria.

The broad hypothesis was tested in other to conclude whether or not natural resources have contributed significantly to industrialization in Nigeria as thus: Ho: Natural resource earnings do not have significant effect on the level of industrialization in Nigeria.

Decision**:** The decision rule follows that if t-value computed is greater than the tabulated t-value (i.e. t\*> tc), then we reject the null hypothesis and vice versa. This is where: t\* = t-value computed and tc = t-value tabulated. The result reveals that, since the t\*> tc(i.e 14.84680> 2.000), we accept the null hypothesis that natural resource earnings has not been translated into industrialization as such has no impact on industrializing the Nigerian economy.

**6.0 Conclusion**

The study explored the relationship between natural resource earnings and industrialization in Nigeria. The study did this by investigating the impact of various components of natural resources such as crude petroleum and natural gas, solid minerals, human capital and physical capital components on aggregate industrial output in Nigeria. The findings of the study indicate that crude petroleum and natural gas earnings and solid minerals earnings have positive and significant relationship with the level of industrialization in Nigeria while gross fixed capital formation and adult literacy rate, though positively related to the level of industrialization, was found to be insignificant. In the regression, the high coefficients of crude petroleum and natural gas and solid minerals, 1.04 and 15.26 respectively, has the policy implication that the petroleum sector and solid mineral sector holds the key to Nigeria’s industrialization drive. More so, adult literacy rate and gross fixed capital formation have positive but insignificant relationship with the level of industrialization in Nigeria. The implication is that both can lead to increase in the level of industrialization but this has not been achieved in the short run. Finally, the study offers an insight into the fact that natural resource earnings have the ability to quickly transform Nigeria into an industrialization haven if an only if all finances voted into human capital and physical are being monitored and evaluated (M&E). This is because with a fast speed of adjustment of 66 percent, any disequilibrium (distortion) in Nigeria’s industrialization can quickly be corrected through the instrumentalities of natural resources. More so, the study recommends that natural resources earnings have the potential to promote industrialization in Nigeria. The main channels available to achieving this lay in the use of crude oil earnings and solid minerals earnings. The study therefore recommends that government should develop crude petroleum, natural gas and solid minerals sectors thereby diversifying the economy, invest more on industrial development through adequate funding and viable government policies in order to achieve its desired industrialization status in Nigerians.

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**APENDIX 1.**

Table 6.3: Correlation Matrix

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Correlation | |  |  |  |  |
| t-Statistic | |  |  |  |  |
| Probability | INDQGDP | CPNGGDP | SMGDP | GFCFGDP | ADLITR |
| INDQGDP | 1.000000 |  |  |  |  |
|  | ----- |  |  |  |  |
|  | ----- |  |  |  |  |
|  |  |  |  |  |  |
| CPNGGDP | 0.984032 | 1.000000 |  |  |  |
|  | 32.70687 | ----- |  |  |  |
|  | 0.0000 | ----- |  |  |  |
|  |  |  |  |  |  |
| SMGDP | 0.414393 | 0.294631 | 1.000000 |  |  |
|  | 2.693760 | 1.824027 | ----- |  |  |
|  | 0.0108 | 0.0767 | ----- |  |  |
|  |  |  |  |  |  |
| GFCFGDP | -0.644574 | -0.721709 | -0.036786 | 1.000000 |  |
|  | -4.987763 | -6.168323 | -0.217779 | ----- |  |
|  | 0.0000 | 0.0000 | 0.8289 | ----- |  |
|  |  |  |  |  |  |
| ADLITR | -0.606276 | -0.515486 | -0.939441 | 0.291778 | 1.000000 |
|  | -4.510227 | -3.558952 | -16.21713 | 1.804712 | ----- |
|  | 0.0001 | 0.0011 | 0.0000 | 0.0797 | ----- |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Source: Author’s computation using E-views 9.0 software

**APENDIX 2.**

Table 6.4: Granger-causality Test Result

|  |  |  |  |
| --- | --- | --- | --- |
| Pairwise Granger Causality Tests | | | |
| Date: 07/06/19 Time: 22:04 | | | |
| Sample: 1 37 | | |  |
| Lags: 2 | |  |  |
|  |  |  |  |
|  |  |  |  |
| Null Hypothesis: | Obs | F-Statistic | Prob. |
|  |  |  |  |
|  |  |  |  |
| CPNGGDP does not Granger Cause INDQGDP | 35 | 2.77759 | 0.0782 |
| INDQGDP does not Granger Cause CPNGGDP | | 5.66048 | 0.0082 |
|  |  |  |  |
|  |  |  |  |
| SMGDP does not Granger Cause INDQGDP | 35 | 0.31370 | 0.7331 |
| INDQGDP does not Granger Cause SMGDP | | 2.22511 | 0.1256 |
|  |  |  |  |
|  |  |  |  |
| GFCFGDP does not Granger Cause INDQGDP | 35 | 0.11181 | 0.8946 |
| INDQGDP does not Granger Cause GFCFGDP | | 2.79413 | 0.0771 |
|  |  |  |  |
|  |  |  |  |
| ADLITR does not Granger Cause INDQGDP | 35 | 0.88454 | 0.4234 |
| INDQGDP does not Granger Cause ADLITR | | 0.05378 | 0.9477 |
|  |  |  |  |
|  |  |  |  |
| SMGDP does not Granger Cause CPNGGDP | 35 | 1.12386 | 0.3383 |
| CPNGGDP does not Granger Cause SMGDP | | 4.88332 | 0.0146 |
|  |  |  |  |
|  |  |  |  |
| GFCFGDP does not Granger Cause CPNGGDP | 35 | 0.50913 | 0.6061 |
| CPNGGDP does not Granger Cause GFCFGDP | | 3.51668 | 0.0425 |
|  |  |  |  |
|  |  |  |  |
| ADLITR does not Granger Cause CPNGGDP | 35 | 1.38187 | 0.2666 |
| CPNGGDP does not Granger Cause ADLITR | | 0.13386 | 0.8752 |
|  |  |  |  |
|  |  |  |  |
| GFCFGDP does not Granger Cause SMGDP | 35 | 0.22286 | 0.8015 |
| SMGDP does not Granger Cause GFCFGDP | | 0.67325 | 0.5176 |
|  |  |  |  |
|  |  |  |  |
| ADLITR does not Granger Cause SMGDP | 35 | 3.80209 | 0.0338 |
| SMGDP does not Granger Cause ADLITR | | 0.49072 | 0.6170 |
|  |  |  |  |
|  |  |  |  |
| ADLITR does not Granger Cause GFCFGDP | 35 | 0.38111 | 0.6864 |
| GFCFGDP does not Granger Cause ADLITR | | 0.64613 | 0.5312 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Source: Author’s computation using E-views 9.0 software