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# Human Capital Investment and Industrial Productivity, as a Correlate of Sustainable Development in Nigeria

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**Abstract**

The effects of low investment in human capital on industrial productivity have being the bane of sustainable development in the Nigeria industrial sector. The study examined the nexus between human capital investment and industrial productivity as a correlate of sustainable development in Nigeria. Secondary data which spanned from 1981 through 2019 were used for the study. Multiple regression analysis was used to achieve the objectives of the study. Stationarity tests were conducted on all the series before the estimations to affirm absence of stochastic processes. The study, due to the strong evidence of long run relationship among the variables, conducted ARDL model to determine the nature of the relationship between the variables. The findings showed that human capital investment is beneficial and remains an essential tool of industrial productivity in Nigeria. The primary, secondary and tertiary school enrolments, total government expenditure on health and on education were significantly related to industrial productivity in Nigeria. The study concluded that government expenditure on education both capital and recurrent positively influence economic growth in Nigeria. Also, the study revealed that government expenditure policy and implementation capacity are important, especially for determining education and health care contribution to the GDP. Based on the findings and conclusion, the study recommended among others that; there should be establishments of special agencies with the responsibility of improving the skills and capabilities of human capital, improved infrastructural facilities should also be provided for existing schools and hospitals while new training institutions should be established to provide quality education and training so as to improve the skills of the Nigerian labour force.

**Keywords:** Industrial Output, Education Investment, Composite School Enrolment and Sustainable Development

## 1. Introduction

### *1.1 Introducing the Problem*

Nigeria's most important macroeconomic objective remains how to achieve accelerated economic growth and reduce poverty. In order to achieve this laudable objective, certain variables which have the capacity to accelerate growth have to be identified. Of all the contributory variable or factors to economic growth and increased productivity, human capital stands out as a major catalyst. To this end, effective investment in human capital is a key component of long run economic growth and improved productivity for sustainable development (Simon-Oke, (2012)).

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The United Nation Development Programmed (UNDP) 1997 support this fact and argued that development should focus on investment in human capital which should be seen in the light of how the economy is managed and wealth is distributed for the benefit of the people. On the basis of his reasoning, UNDP has evolved the Human Development Index (HDI) including component variables such as standard of living, knowledge and longevity. The United Nation recommended that at least 26% of the annual government budget should be allocated to education sector in order to enhance human capital development. However, the human capital development indices in Nigeria do not reflect a substantial expenditure on education and health. For instance, an insignificant proportion of financial resources (less than 10% of local government expenditure) in 2009 were allocated to educational sector.

According to African Development Bank Report (1998), human capital development is an essential means of sustained economic growth and sustainable development. Also, World Bank (1998), assessment of 192 countries indicate that human capital on the average account for 64% of the total wealth while physical and natural capital account for 16% and 29% respectively. One conclusion that can be drawn here is that development process have gone from the resources exploitative model to the knowledge based technology driven which implies that the efficiency with which the physical and natural resources of an economy are being organized in the transformation process is a function of the sophistication of its human resources as rightly noted by Usman (1986). No country has achieved substantial economic development without substantial investment in human capital. Several studies have evolved to analyze the channels through which human capital can affect growth, much of this literature emphasized the complementary relationship between human and physical capital.

Empirical investigations from various studies have showed that adequate investment in human capital serves as catalyst for improved productivity and economic growth. The effect of low investment in human capital as noted by Bakare (2006); Lawanson and marimathu (2009), has therefore raised a number of concerns for various organizations and research institutions. For instance, Bakare (2006) noted that poor investment in human capital in Nigeria has been found to be consistent with a higher level of illiteracy and a low rate of economic growth. This is particularly worrisome as several questions have been raised on the situation; such as; what has been the trend of expenditure on education in Nigeria? How has the expenditure profile impacted on education? Is there any relationship between the pattern of education expenditure and economic growth in Nigeria? In the past, much of the planning in Nigeria was centered on accumulation of physical capital for rapid growth and development without recognizing the important role played by human capital in the development process.

### *1.2 Importance of the Problem*

Another area of concern as identified by Sanusi (2003) is the effect of low investment in human capital on the competitiveness of Nigerian labour force in the production of goods and services, bearing in mind the fact that low level of skills and knowledge will certainly reduce the quantity and quality of individual output.

Particularly worrisome has been the deterioration in the quality of educational service at all levels, especially at higher education levels where persons are trained to take up leadership roles in science, technology, management and business.

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Regretably, despite decades of experimentation in the art of industrialization, most of our industries still remain lukewarm to the fundamental concepts of industrial engineering technology. The level of technology has been very low. It is a common observation that many of the capital equipment and machinery used in the factories are obsolete with low capacity. In case of their breakdown, repairs are more difficult because their models have since been discarded. The result is that production is often disrupted in factories. The body of empirical research unequivocally leans toward an affirmation of direct causation for which the East Asian countries are recent examples. This consensus was not forged from the beginning; it was inspired partly by disenchantment with absolute growth-oriented development strategies pursued in the fifties and sixties which neglected or marginalized the social sector- education, health and others, yet failed to deliver robust growth in industries or achieve poverty reduction as well.

Human resources (not capital, income or material resources) are the basis for the wealth of nations, and ignoring human resource development in any Nation is a call to growth stagnation as it imperils the growth process in the economy. No doubt, human beings are the active agents who accumulate capital, exploit natural resources, build social, economic and political organizations to advance productivity in industries and national development. It is also worrisome that the deterioration in the quality of educational service at all levels, especially at higher education levels where persons are trained to take up leadership roles in science, technology, management and business have not been given adequate attention. Moreover, the expansion of human capital stock has not been matched by a commensurate advancement in physical capital. The net consequence has been paltry growth of productivity, income and meager returns to education over the years.

The developments in Nigeria's education system have attracted considerable empirical scrutiny (Yusufu 2000 in (Anumudu, 2010)). The mechanics of how human capital influences productivity has however attracted modest inquiry. The political rhetoric surrounding this issue is quite long, but argumentation with scientific investigation especially for Nigeria that is faced with astronomical level of unemployment unexpectedly among the highly educated. Therefore, it is pertinent to investigate how significant education and heaith care delivery are to industrial productivity, in the context of high unemployment among the well-read as a correlate for sustainable development. In view of this, the critical research questions are: Does government health expenditures have any significant impact on industrial productivity in Nigeria? Does education expenditures have any significant impact on industrial productivity in Nigeria? What significant impacts can composite school enrolment have on industrial productivity in Nigeria? These questions constitute the focal problem of this research. The broad objective of the study is to determine the nexus between human capital investment and industrial productivity as a correlate of sustainable development in Nigeria: The specific objectives include: (i) To examine the impact of health care expenditure on industrial productivity in Nigeria. (ii) To determine the impact of Education expenditure on industrial productivity in Nigeria. (iii) To examine the impact of school enrollment rate on industrial productivity in Nigeria.

### *1.3 Relevant Literature*

A number of studies have been carried out in the past on the nexus between human capital and industrial productivity. For instance, Mayer (2001) in his study, “technology diffusion, human

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capital and economic growth in developing countries" examined imports from both developed and developing countries, by using research and development expenditure to assess technology transfer to developing countries. The growth accounting frame work was also used to analyze the impact of machinery imports, in association with human capital on economic growth. They found out that machinery imports by developing countries have been higher between 1970s and 1980s; the growth accounting results suggest that machinery imports combined with human capital stocks have a positive and statistically strong significance on cross country growth differences.

Similarly, Schutt (2003), in a study examined "the role of human capital in the process of economic growth". In line with theoretical expectations, it was concluded that human capital should matter for growth; but the channel through which it may affect growth could be direct or indirect. This implies that human capital could have a direct impact on growth or could through other sectoral channels influence economic growth.

Arora and Badge (2008) in a study "private investment in human capital and industrial development: the case of the Indian software industry" examined the importance of skilled labour in the growth of Indian software industry between 1990 and 2003. Using the fixed effect estimate regression analysis, they found that engineering baccalaureate capacity had a significant effect on the growth of software exports.

Ismail, (2009) analysed the impact of human capital attainment among workers for the Malay owned manufacturing and services enterprises on output and labour productivity. The study employed the OLS method and the Principal Component Analysis. The analysis is based on 574 Malay firms surveyed in 2001/2002, which covers 264 manufacturing enterprises and 310 services enterprises in Peninsular Malaysia. The sample is selected from the Malay firms registered with the Malaysian Malay Chamber of Commerce (MMCC). The output and labour productivity of the firms are regressed against the human capital variables like education and training together with physical capital stock. The study showed that for the manufacturing enterprises an effective labour plays a higher and significant role on output and labour productivity growth. The capital-labour ratio is an important determinant of labor productivity.

Anumudu, (2010) examined the effect of human capital on labour productivity in manufacturing industries in Enugu and Anambra States. The study applied the OLS method and the principal component Analysis in the estimation. The results showed that human capital has a positive effect on the sectoral labour productivity level of the industry.

Labuschagne and Kleynhans, (2012) explored potential human capital constraints in the South African economy. Human capital constraints are aspects of human capital that limit the productivity and effectiveness of the workforce. The work indicated that an inadequately educated workforce and restrictive labour regulations are the two major human capital constraints facing the South African economy. Empirical evidence indicated that there is a positive relationship between educational attainment and output per worker and therefore productivity. Managers with higher levels of education achieved higher levels of output per worker from their labour force.

Ojokuku & Sajuyigbe (2015), examined the relationship between human capital development and SMEs' performance in Nigeria, through a survey of 80 randomly selected SMEs operating in Ibadan, south western Nigeria. Pearson Product Moment Correlation Coefficient and Multiple

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Regression Analysis were used to analyse the data. The results showed that human capital development variables have significant effect on SMEs performance.

Okuwa, Nwuche & Anyawu, (2016) conducted a study on the impact human capital development and organizational resilience in selected manufacturing firms in Rivers state. Using simple random sampling technique and Taro Yamen's formula, 119 managers were drawn from the 31 manufacturing firms in Port Harcourt. The statistical tool adopted was spearman rank order correlation coefficient. Their findings showed that performance management and training have influence on organizational agility and organizational adaptive capacity in manufacturing firms. The study concluded that human capital development has significant influence on organizational resilience.

Asghar, Danish, & Rehman, (2017), discussed human capital and labour productivity. This study was designed to investigate the role of human capital in labour productivity in district Lahore. For analyzing this relationship, cross sectional study was conducted, and data was collected from 243 firms, which include manufacturing, trading and service sector. The empirical analysis reveals that all the sectors have heterogeneous effect of human capital on labour productivity. Education appears to be significant and positively related to labour productivity in all the sectors with greater effect in manufacturing sector. Skills and training have also noticeable effect on labour productivity.

Maryam and Bassey (2018) evaluated the effect of industrial sector on economic growth in Nigeria. The result of the OLS revealed that industrial output has an effect on economic growth in Nigeria.

Several studies have been carried out on the nexus between human capital and industrial productivity. Most of these studies made use of data period below 2020 and a more recent study which cover research period extended to 2020 is presumably has the capacity to produce more outcome on the nexus between human capital investment and industrial productivity as a correlate of sustainable development in Nigeria. Also, most of the studies reviewed were unable to reach a consensus due to variations in their findings, thereby creating inconclusiveness. This has created a research gap which this study intends to fill. In terms of methodological framework, past studies made use of static models as estimation techniques, there is need to employ more robust and advanced technique in examining the nexus between human capital investment and industrial productivity in Nigeria.

### *1.4 Research Hypotheses*

The following research hypotheses were formulated for the study:

i Government health expenditures have no significant impact on industrial productivity in Nigeria;

ii Government education expenditures have no significant impact on industrial productivity in Nigeria,

iii Composite school enrolments have no significant impact on industrial productivity in Nigeria.

## 2. Material and Methods

The session discusses model specification, identification of variables, a prior expectation, estimation techniques and sources of data.

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*2.1. Model Specification*

The model specification used in this research study is followed by the model of Romer (1986), which was established due to the weakness of the Solow growth model. The production function under the Solow growth model implies that $Y = f(K, L)$, where technology is exogenously determined. The Romer model is different as technology which is seen as energy, is an endogenous variable. Romer takes investment in research technology as endogenous factor in terms of the acquisition of new knowledge by rational profit maximization firms. His aggregate production function of the endogenous theory is as follows: $Y = f(A, K, L)$ ……. (1)

Where:

Y= aggregate real output;

K= stock of capital;

L= stock of labour; and

A= Technology (or technology advancement). Adopting this model, Y or the aggregate real output is used as a proxy for Industrial output growth is expressed as a function of capital, labour employed, energy disaggregated into electricity generation and consumption. The Romer model specified in equation one above is modified in the present study. The functional relationship among the variables is specified as follows:

$IOTP = f(EDEX, HTHEXP, CSE)$…….. (2)

For the purpose of estimation, equation (1) can be expressed as:

$IOTP = \beta 0 + \beta 1EDEX + \beta 2HTHEXP + \beta 3CSE + ut$……. (3)

*2.2. Identification of Variables*

***IOTP*** *is* industrial output proxied by industrial GDP,

***EDEX*** *is* Education investment in Nigeria proxied by public expenditure on education

***HTHEXP*** *is* Health Investment in Nigeria proxied by public expenditure on Health care

**CSE** is Composite School Enrolment in Nigeria proxied by primary, secondary and tertiary school enrolment rate.

*2.3 A Priori Expectation*

The economic a priori test is conducted to examine the magnitude and size of the parameters estimate. This evaluation is guided by economic theory to ascertain if the parameter estimate conforms to expectation. The a priori expectations of the variables are summarized below.

$$\frac{\partial IOTP}{\partial EDEX_t} > 0, \quad \frac{\partial IOTP}{\partial HTHEXP_t} > 0, \quad \frac{\partial IOTP}{\partial CSE_t} > 0$$

Government education investment is the spending of the government as part of the total education spending. It is expected education should have positive relationship with industrial output.

Government health investment is the spending of the government as part of the total health spending. It is expected health care should have positive relationship with industrial output.

Composite school enrolment as a control variable should also have positive relationship with industrial productivity in Nigeria.

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*2.4 Estimation Technique*

The methods of estimation employed for this study are based on Autoregressive Distributed Lag (ARDL) approach to co-integration. The study analyzes time series properties of the research variables using the Augmented Dickey Fuller (ADF). The advantage of the ARDL method is that, it can be applied to the model whether the independent variables are stationary at I (0) or I (1). The dependent variable must stationary in I (1). Whether long run relationship exists or otherwise, among the choice variables is checked using co-integration analysis.

*2.5 Types and Data Source*

Data used for this study are time series secondary data obtained from the Central Bank of Nigeria publications Various Issues and the Federal Bureau of Statistic as well as Economic Statistical websites.

## 3. Findings and Discussion

*3.1 Unit Root Tests*

The use of ARDL models does not impose pre-testing of variables for unit root problems. However, unit root test was conducted in this study to find out if there are mixtures in the order of integration of our variables. The order of integration of the time series was investigated by applying the Augmented Dickey and Fuller (1979) test with maximum lag of five (5) as suggested by the AIC criteria.

Table-1. Unit Root Test Results

| **Variable** | **ADF Test Statistic** | **95% Critical ADF Value** | **Order of Integration** | **Remark** |
|---|---|---|---|---|
| IOTP | 6.329** | 2.954 | *I* (0) | Stationary |
| D(HTHEXP) | 3.776** | 3.553 | *I* (1) | Stationary |
| D(EDEX) | 4.307** | 3.552 | *I* (1) | Stationary |

**Source:** Authors' Computations, 2021.

**Note:** ** = 5 percent significance.

From table 1, the ADF test statistics for each of the variables are greater than the respective critical values. Thus, we accept the hypothesis of unit roots in each of the time series. In the final evaluation, all the variables became stationary after first difference except industrial output that was stationary at level. Hence, they are integrated of order *I* (1) and *I*(0). Once all the series are non-stationary in the level, one can estimate an econometric model only if they are co-integrated. Thus co-integration tests can be applied for all variables.

*3.2 Johansen Cointegration Results*

The main theoretical argument of co-integration analysis is that even if individual variable is non stationary, the group of variables may drift together. In support of this, Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. If such a stationary linear combination exists, the non-stationary time series are said to be *co-integrated*. The stationary linear combination is called the *co-integrating equation* and may be

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interpreted as a long-run equilibrium relationship among the variables. There is the need to test for co-integration relationships using Johansen approach. This approach is preferred to the Engle and Granger two step procedure because the later conceals information on the coefficients of the explanatory variables in the co-integrating vector, hence makes it in appropriate for this study.

Table 2. Co-Integration Test

| Unrestricted Cointegration Rank Test (Trace) | | | | |
|---|---|---|---|---|
| Hypothesized | | Trace | 0.05 | |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.** |
| None * | 0.745129 | 87.74314 | 47.85613 | 0.0000 |
| At most 1 * | 0.472918 | 37.16429 | 29.79707 | 0.0059 |
| At most 2 | 0.212395 | 13.46949 | 15.49471 | 0.0987 |
| At most 3 * | 0.117752 | 4.635433 | 3.841466 | 0.0313 |
| Trace test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | |
| * denotes rejection of the hypothesis at the 0.05 level | | | | |

The results of the Johansen co-integration test showed that the trace statistics indicate two (2) co-integrating equations. This indicates that there is a long run relationship among the variables, hence the variables have high tendency to converge to long-run equilibrium level. Since the ADF test value for the residual is greater than the critical value, it is said to be stationary. Thus, the time series are co-integrated, implying that a long-run stable relationship exists among the variables used in this study. This means that any short run deviation in their relationships would return to equilibrium in the long-run.

Table 3: ARDL Bounds Test Results

| **BOUND TEST RESULT ARDL (1, 0, 4, 0, 2, 3)** | | | | |
|---|---|---|---|---|
| **Significance** | **Lower Class Bound.** | **Upper-Class Bound** | **F-statistics** | **Decision** |
| 10% | 2.37 | 3.2 | 22.44285 | Long-run |
| 5% | 2.79 | 3.67 | 22.44285 | Long-run |
| 2.5% | 3.15 | 4.08 | 22.44285 | Long-run |
| 1% | 3.65 | 4.66 | 22.44285 | Long-run |

**Source:** Author's Computation, 2021

Based on the outcome of the unit root test, this study estimated the ARDL to test for the existence of a long-run relationship among the series. Table 3 showed the ARDL results using industrial output productivity in Nigeria (IOTP) as the dependent variable, it is depicted that long-run relationship exists since the F-statistics is greater than the upper-class boundary at levels 10, 5, 2.5 and 1 significance level.

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Table 4: Auto-Regressive Distributed Lag (ARDL) Results

| **Variable** | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.*** |
|---|---|---|---|---|
| CSE | 0.726261 | 23.55164 | 0.030837 | 0.9757 |
| EDEX | 18.59258 | 16.20123 | 1.147603 | 0.2654 |
| HTHEXP | 2.350119 | 25.08816 | 0.093674 | 0.9263 |
| C | 60.77543 | 2683.665 | 0.022646 | 0.9822 |
| R-squared | 0.997071 | Mean dependent var | | 8338.695 |
| Adjusted R-squared | 0.994758 | S.D. dependent var | | 10588.16 |
| S.E. of regression | 766.5901 | Akaike info criterion | | 16.42516 |
| Sum squared resid | 11165547 | Schwarz criterion | | 17.13617 |
| Log likelihood | -271.4403 | Hannan-Quinn criter. | | 16.67060 |
| F-statistic | 431.1495 | Durbin-Watson stat | | 1.988003 |
| Prob(F-statistic) | 0.000000 | | | |
| *Note: p-values and any subsequent tests do not account for model selection. | | | | |

**Source:** Author's Computation, 2021

Table 4 presents the ARDL result using IOTP as the dependent variable. The Durbin-Watson statistics value is 2 by virtue of approximation which means that there is no autocorrelation problem in the model which is good for the study. The F-statistic measures the joint significance of the variables. The F-statistics value is 431.1495 with the probability value of 0.000000; this indicates that the independent variables jointly explained the dependent variable at 5% significance level. The R-squared measures the determination of coefficient, measuring the fit of the model. The value of the R-squared is 0.997071, this showed that about 99% variation in the dependent variable is been explained by the variations in the independent variables. Hence, there is a good fit in the model. Likewise, the adjusted R squared measure the goodness of fit with putting the degree of freedom into consideration. The value is 0.994758, showing that the model has a good fit at 99%.

The long run estimation coefficient of Education investment in Nigeria (*EDEX*) carries positive sign (18.59258) implying that there is positive impact of education expenditure on the performance of industrial output productivity in Nigeria and its t-value is (1.147603) with the p.value of 0.2654 which is statistically not significant at 5% level. This implies that education expenditure has not affected industrial output significantly in the long-run. Though theoretically, education expenditure contribute to the growth of industrial output in Nigeria since the long run coefficient conform to the apriori expectation of the study. It is estimated from the result that 1% increase in (EDEX), on the average, will lead to 18.6% increase in (IOTP) in the Nigerian economy in the long run.

The statistical findings showed that the quality of health expenditure in Nigeria does contribute significantly to industrial output. The long run regression coefficient of (HTEXP) carries positive sign i.e. 2.350119 and its p-value 0.9263 which is greater than 0.05% level of significance, meaning that theoretically the coefficient is significant, but statistically, the health expenditure is not significant to industrial output in Nigeria as confirmed by the p.value. This result conforms to our apriori expectation, which affirmed a positive relationship between health expenditure and industrial output productivity in Nigeria. In this case, Expenditure on health has a positive effect

on labour productivity thereby increasing the growth of industrial output by 23.5%. This is due to the fact that, although government undertakes capital projects like health care expenditure, they do not provide sufficient finance for the maintenance and continuity of these projects.

The findings of the study showed that there is positive relationship between Composite School Enrolment in Nigeria at all levels of education (primary, secondary and tertiary) and industrial output productivity growth in Nigeria. The value of CSE coefficient being 0.726261 and its p-value of 0.9757 which is greater than 0.05% level of significance meaning that the coefficient is highly not significant in the long run, and this implies that a unit increase in school enrolment in Nigeria is likely to lead to about 72.6% increase labour force thereby leading to an increase in industrial output productivity in the long run in Nigeria. This is in line with the a priori expectation, of a positive relationship between the composite school enrolment and industrial output growth in Nigeria.

Table 5: ARDL Short-run Relationship Results.

| **Variable** | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.** |
|---|---|---|---|---|
| CointEq(-1)* | -0.294086 | 0.079793 | -3.685625 | 0.0016 |
| R-squared | 0.934312 | Mean dependent var | 1138.031 | |
| Adjusted R-squared | 0.902896 | S.D. dependent var | | 2235.922 |
| S.E. of regression | 696.7486 | Akaike info criterion | | 16.19659 |
| Sum squared resid | 11165547 | Schwarz criterion | | 16.72985 |
| Log likelihood | -271.4403 | Hannan-Quinn criter. | | 16.38067 |
| Durbin-Watson stat | 1.988003 | | | |

**Source:** Author's Computation, 2021.

Table 5, showed the results of the short-run relationship between human capital investment and industrial productivity in Nigeria. To investigate the existence of a short relationship among the variables of interest, restricted error correction model regressions was estimated. The most important thing in ECM (CointEq(-1)*) model is the sign and significance status of the error term. It measures the speed by which the short term deviations in the model can converge back to, or diverge from its long run equilibrium. In this case, it is negative and highly significant implying that any short term distortions in the model could be corrected; and the short term deviations could converge towards the long run equilibrium at the annual speed rate of -0.294086. The equilibrium adjustment level reported that about 29% of disequilibrium will be adjusted periodically. It revealed that the model will revert to its equilibrium path whenever shocks occur. The coefficient of error term is 29% indicating that Nigeria industrial productivity corrects its disequilibrium at a speed of 29% yearly. The error correction term is significant at 0.05% level since the p-value is less than 0.05%. it thus means that our short run is given validity that Nigeria Industrial growth have long run relationship with the education and health expenditure by the government. We can accept this model because the value of $R^2$ is smaller (0.93) than the value of Durbin-Watson statistic (1.98) which means that the model is not a spurious model.

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## 4. Discussion of Findings

The study showed that there is positive relationship between human capital investment and industrial productivity in the long run. This is in consonance with the apriori expectation. However, the study revealed that Education investment in the long run in Nigeria has significant effect on the performance of industrial productivity. This conforms with the work of Karim and Shabbir (2012) which concluded that investment in education programmes assist in strengthening the skills, knowledge and capabilities of individual workers in the sector. Supporting this finding is the work of Anumudu, (2010) and Okuwa, Nwuche & Anyawu, (2016) with a conclusion that human capital has a positive effect on the sectoral labour productivity level of the Nigerian industry and that performance management and training through education have influence on organizational agility and organizational adaptive capacity in manufacturing firms. However, Adejumo and Adejumo, (2017) opposed their outcome and concluded that human capital investment did not cause industrial productivity growth in Nigeria.

Evidence from the long run results posited that there is positive relationship between expenditure on health as a component of human capital development and industrial productivity in Nigeria. Supporting this finding is the work of Karim and Shabbir (2012) who concluded that health programmes investment assist in strengthening capabilities of individual workers in the sector.

Findings of the study showed that there is a positive relationship between Composite School Enrolment in Nigeria at all level of education (primary, secondary and tertiary) and industrial output productivity growth in Nigeria. Supporting this outcome is the work of Anyanwu and Ozurumba (2017) that composite school enrolment has significant impact on industrial productivity in Nigeria. Finally, the findings from the study showed that the F-statistics value indicates that the independent variables jointly explained the dependent variable at a 5% significance level.

## 5. Conclusion and Policy Recommendations

The study concluded that government expenditure on education has no significant impact but it has a positive relationship with industrial productivity, as a percentage increase in government expenditure on education will lead to a 18.59258 units increase in industrial productivity output as a percentage of gross domestic product. This suggests that government expenditure on education is geared towards the development of human capital needed to raise industrial output though, with very low impact on the sector when compared with happenings in developed economy.

It was discovered that government expenditure on health has no significant impact, but has a positive relationship with industrial productivity output as percentage of GDP, as a percentage increase in government expenditure on health will lead to a 2.350119 percent increase in industrial output as a percentage of gross domestic product.

It was concluded that school enrolment has no significant impact but has a positive relationship with industrial productivity sector output as percentage of GDP. As the school enrolment increases it will lead to a 0.726261 percent increase in industrial output.

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Considering the results from various tests and estimations, we can therefore conclude that government expenditure on education both capital and recurrent positively influence industrial growth in Nigeria and that although capital expenditure is not statistically significant in the model. Thus, there is the need to increase spending on capital expenditure in order to raise the growth level of the economy. The general lesson that emerges from this study is that government expenditure policy and implementation capacity are important, especially for determining education and health care contribution to the GDP.

Based on the findings and conclusion, the study recommended that; there should be establishment of special agencies with the responsibility of improving the skills and capabilities of human capital, substantial amount of government budgetary allocation should be directed towards the educational sector with special monitoring to avoid diversion to individual pocket, better infrastructural facilities should also be provided for existing schools and hospitals while new training institutions should be established to provide quality education and training so as to improve the skills of the Nigerian labour force, more stock of physical infrastructures should be priotized to enhance more investment in education and health to promote human capital development in Nigeria and government should increase not just the amount of expenditure on education and health sector but also the percentage of its total expenditure accorded these sectors.

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