Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.11, No.18, 2020

Human Capital Investment and Economic Growth in Nigeria: An Econometrics Analysis, 1981-2019

Emmanuel Uzoma Makwe (Ph.D)[1] Akeeb Olushola Oladele[2] Ernest Tubolayefa[2]
1.Department of Economics, Faculty of Social Sciences, School of Graduate Studies, University of Port Harcourt, PO box 488, Uniport Nipost, Choba, Port Harcourt, Rivers State, Nigeria
2.Department of Economics, Faculty of Social Sciences, School of Graduate Studies, University of Port Harcourt

Abstract
This study investigated the effect of human capital investment on economic growth in Nigeria within the periods 1981-2019. Time series data covering these periods of study were obtained and analyzed using Ordinary Least Square method. The data were further subjected to unit root test using the Augmented Dickey-Fuller (ADF) test, and a test of co-integration was performed using Johansen rank based test. The result of the ADF test showed that the variables were all integrated at order one, and the Johansen co-integration test confirmed the existence of at least a co-integrating equation. The researchers went further in estimation an Error Correction Model (ECM) aimed at reconciling the short run deviations from the long run equilibrium. The test results showed that capital and recurrent expenditures on education and health have not impacted significantly on the growth of the Nigerian economy both in the short run as well as the long run periods. Recommendations proffered include; government should intensify investments in education and health sectors in Nigeria to improve quality of services; government should embark on a general upgrade of the health sector in Nigeria as well as provision of adequate educational facilities in public schools.
DOI: 10.7176/JESD/11-18-05
Publication date: September 30th 2020

1.0 Introduction

1.1 Background to the Study

The concept of human capital is one of the popular phenomenon's which have transcended the area of economic thought. Myers in Adamu, (2003) posits that the most obvious way of developing human capital is through education, and that they are closely related as they complement each other. While formal education constitutes the primary form of human capital, other secondary elements may include direct and indirect costs of health, on the job training, apprenticeship programs, and the search for relevant information, all of which are capable of improving on a nation's level of productivity and consequently her economic growth (Todaro & Smith, 2009).
Dauda (2010) observed that financial and economic constraints have affected all levels of education and the capacity of the students and their families to finance formal education, and also the capacity of the government to adequately fund education. Nigeria as a nation is currently caught up in a web of economic, social as well as political crises with far reaching consequences for the welfare of her teaming population. The country now finds itself under a gapping incidence of poverty which is estimated to be rising at an average of 10% in the last eight years, while access to social services continued to deteriorate with an uncontrollable rise in the cost of living, resulting from a high inflation rate lingered by macro-economic disequilibrium (Ogujiuba and Adeniyi, 2005).
In Nigeria, as in other developing countries, the causes of poor health situations are primarily from; infectious diseases, lack of clean drinking water as well as poor nutrition (Okojie, 2003). Arabi and Abdalla, (2013) posits that the need to improve on the quality of education and public health care system in Nigeria is becoming increasingly important since this has a direct influence on the desired economic growth. Consequently, the researchers in this study intends to examine the effect of human capital investment on the economic growth of Nigeria.

1.2 Statement of the Problem

The development of the human capital of a nation as well as her level of employment is instrumental determinants in measuring the performance of that nation's economy. The amount of financial resources which the government in Nigeria appropriates annually to the educational sector depends to a large extent on the interests of this government for education, the total income per annum as well as the investment in other key sectors of the economy (Okojie, 2003). This means that in Nigeria, and indeed any other country, the educational development is dependent on the level of financial resources channeled into the educational sector.

Scholars in the field of economics (Galor and Omer, 2004; Ichi 2002, Lee, 2003; Ogunleye, Owolabi, Sanyaolu & Lawal, 2017; Muhammad, Abiodun & Manzoor, 2017 etc) have argued that human capital constitute the ultimate means of production and thus the wealth of a nation, in Nigeria, the government is well informed about this arguments and thus has made several efforts to build on the human capital of the nation, thus government has continued to invest in education and health sectors by ways of increasing allocation of resources to these

sectors, all of which are geared towards improved human capital formation. Despite all the resources and efforts which have been expended on the development of Nigerian human capital by the government, it is sad to note that the country has not yet attained her desirable level of economic growth. The question that often comes to mind is where are we not getting it right? Therefore, this study intends to examine the effect of human capital development on Nigeria's economic growth by critically examining the separate effects of capital and recurrent expenditures on education and health on the real gross domestic product respectively. This is therefore, the existing gap the study intended to fill in.

1.3 Objectives of the Study

The aim of this study was to examine the effect of human capital investment on the economic growth of Nigeria. Specially, this study examined the following: -

1. The relationship between capital and recurrent expenditures in education and economic growth.
2. The relationship between capital and recurrent expenditures in health and economic growth.

1.4 Research Hypotheses

Ho_1: There is no significant relationship between government capital and recurrent expenditures in the educational sector and economic growth

Ho_2: There is no significant relationship between government capital and recurrent expenditures in the health sector and economic growth.

2.0 Review of Related Literature

2.1 Conceptual Framework

2.1.1 Human Capital

The concept of human capital is no longer new, when Robert Reich wrote in his famous "who is us" 1990 Harvard Business Review article that "a nation's most important competitive asset becomes the skill and cumulative learning of its work force", he was merely popularizing something economists have appreciated since Adam Smith. More recently, two bodies of research of note have intensified interest in the "new growth" theories associated with Romer, Barro and Lucas. Human capital is a key determinant of economic growth. Secondly, there is a growing interdisciplinary consensus on the critical importance of the first few years of childhood to the formation of intelligent well-adjusted adults and human capital.

Economists like Alfred Marshall (1930), for example stressed the significance of education in human capital formation which follows that a reduction in the investment on education would necessarily affect the stock of the overall human capital base and productivity. Adam Smith (1737) alluded to the idea that one might invest in education to increase the productive capacity of society.

The neoclassical theory of growth developed by Solow and Swan centered Macroeconomists' attention throughout the 1960's and 1970's on tangible (physical) capital formation as the driver of economic growth. But, the theory showed that because of decreasing marginal returns in substituting physical capital for labour, the accumulation of capital would not indefinitely support a steady state of growth in labour productivity.

However, it is Gary Becker who is generally considered the founding father of the economics of education as a distinct research field. In his treatise- Human Capital (1964), he presented an analytical framework to explain why individuals invest in education and training in a manner analogous to investment to physical capital The resulting human capital theory is still the basis of most research in the economics of education field today, and it is certainly the theoretical framework used, or at least the starting point for most of the discussions in human capital investment or economics of education.

Finally, Galor and Moar (2004) in their analysis of income and growth relationship opined that in economies in which the return to physical capital is relatively higher than return to human capital, inequality is beneficial for economic growth, where as in economies in which the returns to human capital is relatively higher and credit constraints are largely binding, equality is beneficial for economic growth.

2.1.2 Economic Growth

Economic growth according to Todaro and Smith (2009) means the steady process by which the productive capacity of the economy is increased over time to bring about rising levels of national output and income. Economic development can also be defined as consistent improvement in the various aspects of the life of the entire population of a country. This improvement according to Kalu (2001), manifest in the greater ability of the people to solve their problems.

Important components of economic growth according to Todaro and Smith (2009) are as follows;

(i) Capital accumulation, which includes a new investment in land, physical equipment and human resources through improvements in health, education and job skills.
(ii) Growth in population and hence eventual growth in labour force.
(iii) Technological progress-new ways of accomplishing tasks.

On Capital accumulation Todaro and Smith (2009) emphasized that investing in human resources can improve its quality and thereby have the same or even a more powerful effect on production as an increase in human numbers. They stressed further that formal schooling, vocational and on-the- job training programs, adult skill enhancement and other forms of informal education may all be made effective in augmenting human capital as a result of direct investment in buildings, equipment and materials. They further saw population growth and the associated increase in the labour force as a factor capable of stimulating economic growth. As a larger labour force means more productive workers and a large overall population increases the size of the markets. Given the ability of the economic system to absorb and productively employ the productive work force.

Also a third component of economic Growth-Technological progress accordingly results from new and improved ways of accomplishing traditional task such as growing crops, making cloths etc. They highlighted three basic classifications of technological process: natural, labour saving and capital-saving.

Natural technological progress occurs when higher output levels are achieved using the same quantity and combinations of factor inputs. Also the application of computers, automated systems, high speed electrical drills, tractors and mechanical plough can result in labour saving. Thus these are categorized as labour saving technological progress. The indigenous less developed country development of low cost, efficient techniques of production can be categorized as capital saving.

2.2 Theoretical Framework

2.2.1 The Romer endogenous growth model

The theoretical framework of this study will be based on the Romer's endogenous growth model. By broadening the concept of capital to include human capital, the new endogenous growth model argues that the law of diminishing returns to scale phenomenon may not be true as is the case for developed economies. What this means is that if the firm which invest in physical capital also employs educated and skilled workers who are also healthy, then not only will the labour be productive, but it will also be able to use the capital and technology more efficiently. This will lead to a shift in the production function and thus there will be increasing rather than decreasing returns on investment. In other words, technology and human capital are both endogenous to the system (Ujunwa 2009).

2.3 Empirical Review

There exists a plethora of research studies on the relationship between human capital investment and economic growth.

Muhammad, Abiodun and Manzoor (2017), evaluate the relationship between human capital and economic growth. Using data for 132 countries over 15 years, the empirical results revealed that human capital plays a positive role in per capita GDP growth only in the presence of better economic opportunities and high-quality legal institutions. The study declared that, economic opportunities reinforce the effect of human capital on growth: the easier it is to do business and trade domestically or internationally, the stronger the effect of human capital on growth.

Ogunleye, Owolabi, Sanyaolu and Lawal (2017), employed the ordinary least square regression analysis to examine the impact of human capital development on economic growth in Nigeria, using annual time series date from 1981 to 2015. The empirical results revealed that human capital development has significant impact on economic growth, proxy by gross domestic product. In their analysis, the human capital development indicators namely secondary school enrolment, tertiary school enrolment, total government expenditure on health and total government expenditure on education showed positive and statistically significant impact on economic growth in Nigeria which revealing that these indicators are indispensable in the achievement of growth in the Nigerian economy. On the other hand, life expectancy and primary school enrolment showed a negative and statistically insignificant impact on economic growth in Nigeria. The study thus resolved that the Nigerian government and policy makers should increase its total expenditure on education, ensure sufficient budgetary allocation on health expenditure, and ensure that a standard is set across all secondary and tertiary institutions in the country so that proper human capital development required for an individual to become productive is enhanced.

Obialor (2017), examines the effect of government human capital investment on the economic growth of three Sub-Sahara African (SSA) countries of Nigeria, South Africa and Ghana from 1980 to 2013. The objective is to analyze the growth effect of three government human capital investment variables of health, education and literacy rate on the economies of these countries; Secondary data were sourced from World Development Indicators (WDI) online Database and analyzed using Co-integration techniques and Vector Error Correction mechanism (ECM) at 1% and 5% significance levels. The results indicated that two out of the three human capital proxy variables; Health, (GIH), and Education (GIE), showed significant positive effect on growth only in Nigeria, while literacy ratio (LR) was insignificantly positive in all countries. This study concluded that in spite of the above result, the SSA countries' economies still exhibit the potentials for enhanced economic growth in the long run judging from the VECM test results. The study therefore, recommended that, Sub-Sahara African countries should prioritize skill development, increase budgetary allocations, as well as promote policies that enhances

school enrolment in secondary schools in the sub-region.

Jaiyeoba (2015), empirically investigated the relationship between investment in education and health in Nigeria, using time series data from 1982 to 2011. The study employed trend analysis, the Johansen co-integration and ordinary least square technique. Empirical findings however indicated that there is a long-run relationship between government expenditure on education, health and economic growth. The variables: health and education expenditure, secondary and tertiary enrolment rate and gross fixed capital formation appear with the expected positive signs and are statistically significant (except government expenditure on education and primary enrolment rate). The study therefore, recommended that in order to accelerate growth and liberate Nigerians from the vicious cycle of poverty, the government should put in place policies geared towards massive investment in the education and health sectors.

Isola and Alani (2014), examined the contribution of different measures of human capital development to economic growth in Nigeria. They used data from Nigeria and adopted the growth account model which specifies the growth of GDP as a function of labour and capital. The model also included a measure of policy reforms. Based on the estimated regression and a descriptive statistical analysis of trends of government commitment to human capital development, it was found that though little commitment had been accorded health compare to education, empirical analysis showed that both education and health components of human capital development are crucial to economic growth in Nigeria.

Eigbiremolen and Anaduaka (2014), employed the augmented Solow human-capital-growth model to investigate the impact of human capital development on national output, as proxy for economic growth, using quarterly time-series data from 1999-2012. Empirical results show that human capital development, in line with theory, exhibited a significant positive impact on output level. This implied that human capital development is indispensable in the achievement of sustainable economic growth in Nigeria, as there is an increase in economic performance for every increase in human capital development. The results further revealed a relatively inelastic relationship between human capital development and output level. The researchers thus recommended that, government and policy makers should make concerted and sincere efforts in building and developing human capacity through adequate educational funding across all levels, as this is the only way of attaining sustainable economic growth and development in any economy

Arabi and Abdalla (2013), empirically investigated the impact of human capital on economic growth in Sudan for the period 1982-2009, using a simultaneous equation model that linked human capital proxied by school attainment, investment in education and health on economic growth, total productivity, foreign direct investment, and human development index. Based on the three-stage least squares technique adopted for the analysis, the empirical results of the study revealed that quality of education has a determinant role in economic growth; health quality factor has a positive impact on economic growth as expected and total factor productivity which mainly represents the state of technology has adverse effect on economic growth and human development due to the obsolete and old fashion technology in the country.

Oboh, Rahmah and Abu (2010), studied the impact of human capital development on economic growth in Nigeria over the period 1970 to 2008. Johansen co-integration technique and vector error correction analysis was used to ascertain this relationship. The basic macroeconomic variables of concern derived from the literature review were: Real gross domestic product (RGDP), real capital expenditure (RCE) on education, real recurrent expenditure (RRE) on education, real capital stock (RCS), total school (SCHE) enrolments and labour force (LF), these were used to proxy human capital development. The result of their study revealed that human capital development has a significant impact on Nigeria's economic growth. The researchers thus,concluded that there can be no significant economic growth in any country without adequate human capital development.

Dauda (2010), examined investment in education and economic growth in Nigeria using annual time series data from 1977 to 2007. The study employed the Johansen co-integration technique and error correction methodology. The empirical results showed that there is a long-run relationship between investment in education and economic growth. The study further revealed that, the growth rate of educational expenditure had positive and significant effect on economic growth in Nigeria. The result indicated that educational investment plays a crucial role in developing an economy and it enhances growth in the nation’s income. The study also revealed that, the coefficient of growth of gross fixed capital formation has positive and statistically significant effect on the economy of Nigerian.

3.0 Method of Study

3.1 Research Design

This research work is based on the use of time-series data in the analysis. Therefore, the study made use of the quasi-experimental research design in determining the structural relationship existing between human capital development and economic growth in Nigeria.

3.2 Source of Data

The major source of data employed in this study was the secondary source. Thus, the data for this research analysis were obtained from the Central Bank of Nigeria Statistical bulletin. These data covered information on government investment (expenditure) on human capital, and the values of the real gross domestic product for the periods under investigation. The data for the investment in human capital were proxied by government expenditures on education and health.

3.3 Models Specifications

The formulation of the mathematical hypothesis here expressed the relationship between the dependent and the explanatory variables under consideration. Model specification enables empirical exploration of economic phenomenon which is strictly guided by theoretical consideration.

Of the numerous studies on the relationship between human capital investment and economic growth, certain models have been specified. A more reliable adoption is the use of the augmented Solow human-capital-growth model. This model is an improvement on the Solow growth model. Solow's original model did not explicitly incorporate human capital. In order to do that, Mankiw, Romer, and Weil (1992) came up with the augmented Solow model. The augmented Solow model is therefore specified as:

$Y= AK^{\alpha} (hL)^{\beta}$

Where,

Y=Output level; K=Stock of physical capital: h=Level of Human Capital; L=Labour, measured by number of workers: A=Leve1 of Total Factor Productivity; =Elasticity of capital input with respect to output; while β=Elasticity of labour input with respect to output. Hence, a modification of the model above for the purpose of our study.

Linear form $RGDP_t$ $f(CEE_t, RCE_t, CEH_t, REH_t)$ - - - - - (3.1)

In order to capture the stochastic variable (u), the explicit form of the first model is given as:

$RGDP_t = a_0 + a_1CEE_1 + a_2 RCE_2 + a_3 CEH_3 + a_4 REH_4 + U_t$ - (3.2), and the second model is given as:

GDP = f(THE, TEE)

$GDP = b_0 + b_1THE + b_2TEE + U_i$ - - - - - .(3.3)

Where:

GDP_t = GDP in the current period

THE_t = Total Health Expenditure in the current period

TEE_t = Total Education Expenditure in the current period

Also:

RGDP	=	Real Gross Domestic Product
CCE	=	Capital Expenditure on Education
RCE	=	Recurrent Expenditure on Education
CEH	=	Capital Expenditure on Health
REH	=	Recurrent Expenditure on Health
a_0	=	The slope (intercept) of the function
a_1	=	coefficient (slope) of capital expenditure on Education
a_2	=	coefficient (slope) of recurrent expenditure on Education
a_3	=	Coefficient (slope) of capital expenditure on health
a_4	=	Coefficient (slope) of recurrent expenditure on health
u	=	stochastic term
t	=	unit of time.

Recurrent Expenditures on Education and Health

The use of recurrent expenditure on education was to determine the extent in which changes in education service providers in government sectors could affect positively or negatively the development of the sector which directly affect the general human capital development. For instance, an increase in educators' salary will boost their moral thereby making them contribute more to the development of individual capacity of students, which will in turn increase real GDP, while the opposite will be case if their salaries are cut down in a fiscal year.

Further, changes in government health workers' payment /salaries also affect how they attend to the patients. For instance, if there is a decrease in salaries of health workers, they will protest, strike and this will negatively affect the health system as well as the economy as some patients will travel abroad for their medical attention. Foreign exchange is lost in the process and this is not good for any economy.

A priori expectation

(i) a_1 is expected to have a positive sign ($a > 0$) since an increase in capital expenditure on education is expected to bring about increase in Real Gross Domestic Product (RGDP) through increase in labour quality. This means higher expected returns as the benefit of this expenditure on education will stimulate

economic growth in the country.

(ii) a_2 is expected to have a positive sign ($a_2 > 0$). This is because increase in recurrent expenditure on education tends to bring about increase in Real Gross Domestic Product (RGDP) through increase productivity.

(iii) a_3 is expected to have a positive sign ($a_3 > 0$). Since an increase in capital expenditure on health is expected to bring about an increase in real gross domestic product (RGDP) in the country.

(iv) a_4 is expected to have a positive sign ($a_4 > 0$). This is because an increase in recurrent expenditure on health is expected to bring about an increase in economic growth (GDP).

3.3.1 Explanation of the Variables

In this section, the various variables which acted as proxies to both human capital investment and economic growth were explained as they are expected to feature in the model of our analysis.

(i) Independent Variables

(1) Investment (expenditure) on Education

For this variable, the actual government capital and recurrent expenditure in the education sector over the periods under investigation were used. This is considered because the researchers believe that there is a relationship between government expenditure on education and the quality of human capital of the country.

Therefore, these variables acted as proxies to human capital investment which served as part of the explanatory variables of our model

(2) Investment (Expenditure) on Health

To this variable also, the actual government capital and recurrent expenditures in the health sector over the periods under investigation were used as part of the explanatory variable. These were considered as part of the explanatory variables because it is believed by the researchers, that there is a relationship between government expenditure on health and the life expectancy of the population. Thus, these variables were adopted as proxies for human capital investment.

(ii) **Dependent Variable**

(1) Real Gross Domestic Product (RGDP)

In this study, the real gross domestic product (RGDP) served as proxy for the dependent variable (economic growth). The real gross domestic product is the total value of the final output of goods and services produced within the economy by residents and non-residents regardless of its attraction between domestic and foreign climates. To arrive at the real gross domestic product, the nominal gross domestic product is adjusted for price change; this is done by dividing the nominal value of the GDP by the deflator. In our model, the Real Gross Domestic Product served as our proxy for the dependent variable.

3.4 Method of Data Analysis

For the purpose of this study, the researcher will be using the ordinary least square method of multiple regression analysis. However, the co-integration test will be conducted to determine the long-run relationship among the variables. More so, the variables will be tested for stationarity using the Augmented Dickey-Fuller test (ADF) in order to avoid spurious regression. Again, the data's a priori signs and sizes will be tested to determine if they conform to the a priori expectations. Equally, the statistical tests will be conducted using the t-tests, f-tests, while the R^2, which is the coefficient of determination, will be used on determining the regression's goodness-of-fit.

Finally, econometric tests using the Durbin-Watson's (d) statistic will be used to test for the present of serial auto-correlation of the first order.

4.0 Results and Discussion

Table 4.1: Descriptive Statistics

STATISTIC	CEE	CEH	GDP	REE	REH
Mean	22309.34	19836.81	34690668	122997.5	73587.41
Median	12793	7123.8	23688280	43610.7	16638.8
Maximum	94200	90700	71387827	593330	388370
Minimum	139.1	51.1	13779255	162.2	41.3
Std. Dev.	25796.53	23593.56	20237776	163027.3	103171.1
Skewness	1.148465	1.074742	0.673787	1.250776	1.386084
Kurtosis	3.583688	3.432761	1.880848	3.391853	3.887597
Jarque-Bera	9.126941	7.812296	4.986242	10.41838	13.76821
Probability	0.010426	0.020118	0.082652	0.005466	0.001024
Sum	870064.3	773635.6	1.35E+09	4796901	2869909
Sum Sq. Dev.	2.53E+10	2.12E+10	1.56E+16	1.01E+12	4.04E+11
Observations	39	39	39	39	39

Source: Authors' Computation Using Eviews

Table 4.1 above shows the descriptive statistics of variables in our model. From the table, there are 39 observations. During the period under review Capital Expenditure on Education (CEE) had a minimum of 139.1 million naira. The maximum value of this variable was 94200 million naira; while the mean and median stood at 22309.34 and 12793 respectively. Going further, Capital Expenditure on Health (CEH) got to an all-time low of 51.1 million naira while it achieved the highest value of 90700 million with an average of 19836.81 million naira for the period under review. For a period of 39 years, Gross Domestic Product (GDP) averaged 34690668 million naira. The highest output level (GDP) during the period was about 71387827 million naira; while the lowest output level was 13779255 million. The maximum and minimum values for Recurrent Expenditure on Education (REE) for the period under were 593330 million and 162.2 million respectively. While the mean and median values are 122997.5 and 43610.7. Recurrent Expenditure on Health (REH) had 388370 million as its maximum and 41.3 million as its minimum with a mean of 73587.41 and a median of 16638.8.

The skewness values for all variables are greater than 0.00 indicating that all the variables are skewed. The kurtosis values for CEE, CEH, REE, REH are greater than 3.00. Thus, they have excess kurtosis while the kurtosis for GDP is less than 3.00 meaning its distribution has flatter top than the normal distribution. The Jarque Bera statistic for all variables shows that their distributions are not normal except for GDP given their respective probability values.

We estimated both the log and linear models but model selection criteria such as AIC, Sharwarz and Hannan-Quin suggest that the log model is preferred with the lower AIC, Sharwarz and Hannan-Quin statistic relative to the linear model. Thus, the log model is presented below on table 4.2.

Table 4.2: Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.82247	0.24116	65.60975	0.0000
LOG(CEE)	-0.075785	0.09607	-0.788855	0.4357
LOG(CEH)	0.025362	0.09227	0.274873	0.7851
LOG(REE)	-0.076320	0.07586	-1.006068	0.3215
LOG(REH)	0.285529	0.09727	2.935435	0.0059
R-squared	0.889683	Mean dependent var		17.19994
Adjusted R-squared	0.876704	S.D. dependent var		0.572482
S.E. of regression	0.201019	Akaike info criterion		-0.251630
Sum squared resid	1.373888	Schwarz criterion		-0.038353
Log likelihood	9.906780	Hannan-Quinn criter.		-0.175108
F-statistic	68.55036	Durbin-Watson stat		0.732359
Prob(F-statistic)	0.000000			

Source: Authors' Computation Using Eviews

From table 4.2 above, the coefficient for Capital Expenditure on Education (CEE) was -0.07 and not significant given its reported probability value 0.43 at the conventional 5% significance level. This suggests that capital expenditure on education is inversely related growth. The coefficient for Capital Expenditure on Health (CEH) appeared with its theoretically expected positive sign but not significant at 5%. The coefficient of Recurrent Expenditure on Education (REE) appeared with a negative sign and not significant given its associated probability

value 0.32 which is greater than the conventional 5% significance level. The coefficient of Recurrent Expenditure on Health (REH) appeared with a theoretical plausible sign and its associated probability of 0.00 suggests that it is significant at 5% level. The r^2 which is a measure of goodness-of-fit shows that about 88% of the variation in the dependent variable (GDP) is jointly explained by the independent variables (Capital Expenditure on Education, Capital Expenditure on Health, Recurrent Expenditure on Education and Recurrent Expenditure on Health) while the remaining 12% is explained by variables equally important to the model but not explicitly stated. Put differently, the model has an explanatory power of about 88%. The F-Statistic value of 68.55 and its associated probability value of 0.00 showed the overall significance of the model as the associated probability is less than the conventional 5% level of significance. The Durbin-Watson (DW) test statistic which measures first-order autocorrelation suggest its presence as the calculated DW of 0.73 is less than the upper limit of the tabulated DW value of 1.72 with 39 observations and 4 explanatory variables at 5% significance level. The r^2 value of 0.88 been greater than the DW value of 0.73 suggests that the relationship between the variables in the model is spurious therefore a formal unit root and cointegration analysis is required.

4.1 Unit Root Test

A formal unit root test was carried out to ascertain the order of integration of each series. In this regard, the Augmented Dickey-Fuller (ADF) was used. Extracts of the unit root test result is presented on table 4.3 below:

Table 4.3: Augmented Dickey-Fuller Unit Root Test Result

VARIABLE	LEVEL	5% CRITICAL VALUE	1ST DIFFERENCE	REMARK
LOG(CEE)	-0.64	-2.94	-7.66	Integrated at order 1
LOG(CEH)	-0.62	-2.94	-7.38	Integrated at order 1
LOG(GDP)	-0.09	-2.94	-3.43	Integrated at order 1
LOG(REE)	-2.58	-2.94	-5.55	Integrated at order 1
LOG(REH)	-1.54	-2.94	-10.13	Integrated at order 1

Source: Authors' Computation Using Eviews

From table 4.3 above, the Augmented Dickey-Fuller (ADF) test at levels show that all the variables are not stationary at level given that the test statistic for each variable is less than the critical value while the 1st difference statistic for all the variables are greater than the critical value, thus we conclude that all the variables are integrated at order 1. Put differently, all the variables are stationary at first difference.

4.2 Cointegration Test

The result of the unit root test showed that all the variables are integrated at the same order which is a precondition for Johansen rank based cointegration test. Thus, Johansen cointegration test was carried out and extract of the result presented on table 4.4 below:

Table 4.4: Cointegration Result

	TRACE			MAX-EIGEN		
Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	73.47731	69.81889	0.0248	32.81263	33.87687	0.0666
At most 1	40.66468	47.85613	0.1996	17.60733	27.58434	0.5281
At most 2	23.05736	29.79707	0.2433	16.98526	21.13162	0.1727
At most 3	6.072098	15.49471	0.687	5.736397	14.2646	0.6473
At most 4	0.335701	3.841466	0.5623	0.335701	3.841466	0.5623

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*

From table 4.4 above, the null hypothesis of no cointegrating equation (None) is rejected given that the trace statistic of 73.47 is greater than the 5% critical value of 69.81. Going further, the null hypothesis of 'At most 1' cointegrating equation could not be rejected for both the trace and max-eigen statistics thus implying that there is one (1) cointegrating equation associated with the variables in the model. This shows that long run relationship exist in the model.

4.3 Error Correction Model

An over-parameterized Error Correction Model (ECM) was estimated from which we obtained a Parsimonious Error Correction Model by systematically deleting the insignificant coefficient. The parsimonious error correction model is presented below on table 4.5.

Table 4.5: Parsimonious Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.79	0.62	1.28	0.21
LOG(GDP(-1))	1.33	0.16	8.39	0.00
LOG(GDP(-2))	-0.37	0.15	-2.45	0.02
LOG(CEE)	-0.02	0.02	-1.23	0.23
LOG(CEH)	0.02	0.02	1.20	0.24
LOG(REE)	0.01	0.01	0.65	0.52
LOG(REH)	0.00	0.02	0.12	0.90
ECT(-1)	-0.02	0.05	-0.50	0.62
R = 0.99		F-Stats. =1416.12, Prob. 0.00		

Source: Authors' Computation Using Eviews

From the table above, the first lag of Gross Domestic Product (GDP) is positively related to output and significant at 5% given its probability value which is less than 5% critical value. While the coefficient of the second lag appeared negative and significant. The coefficient of Capital Expenditure on Education (CEE) appeared with a negative sign while the coefficient of Capital Expenditure on Health (CEH) is positively related to GDP. The coefficient for Recurrent Expenditure on Education (REE) and Recurrent Expenditure on Health (REH) appeared with their theoretically expected signs but were not significant given their respective probability values. The error correction term coefficient which measures the speed of adjustment is less than unity; rightly signed but not significant at 5% level of significance. On a specific note, the model has a 2% speed of adjustment which implies that deviations from equilibrium are reconciled annually by 2%. The F-Statistic 1416.12 and its associated probability 0.00 shows that the entire model is significant at 5% level of significance. The r-square of 0.96 suggest that the model has an explanatory power of 96%.

Table 4.6: Post Estimation Tests for the Estimated Model

i	**Normality Test**	**Jarque-Bera Statistics**	**Probability**	**Decision**
		0.66	0.71	Error terms is Normally Distributed
ii	**The Breusch-Godfrey LM Result**	**F-Statistics**	**Probability**	**Decision**
		1.22	0.30	Model Free from Autocorrelation
iii	**The Breusch-Pagan-Godfrey LM Result**	**F-Statistics**	**Probability**	**Decision**
		0.83	0.56	Model Free from heteroskedasticity
iv	**Ramsey RESET Test**	**F-Statistics**	**Probability**	**Decision**
		0.71	0.40	Model is correctly specified

Source: Authors' Computation using Eviews

i. Normality Test

Since the p-value is 0.71 > 0.05, the decision is to fail to reject the null hypothesis. We therefore conclude that the data is normally distributed. The model passed the normality test.

ii. Serial Correlation Test

The serial correlation test was done using Breusch-Godfrey LM test. Since the p-value is 0.30 > 0.05, we reject the null hypothesis of the presence of autocorrelation. We therefore conclude that the specified model did not suffer from autocorrelation problem.

iii. Heteroscedasticity Test

From the Breusch-Pagan-Godfrey LM test coefficient and its associated p-value of 0.56 > 0.05 suggest the rejection of the null hypothesis. We therefore conclude that the specified model did not suffer from heteroscedasticity problem. The model satisfied the homoscedasticity assumption.

iv. Linearity Test

Given the coefficient of the Ramsey RESET test and its associated p-value of 0.40 > 0.05, we reject the null hypothesis of wrong specification and conclude that the model was well specified.

This shows that the estimated error correction model passed all the tests and fit for policy recommendation.

5.0 Conclusion and Recommendations

5.1 Conclusion

This research examined empirically, the relationship between investment in human capital and economic growth in Nigeria. Consequent on the empirical analysis, the general conclusion that emerged is that, human capital investment in the form of government expenditures on education and health, impacted positively on economic growth during the periods understudied. However, it is pertinent to state that even though total output (GDP) has increased over the years, this has not led to economic development nor improved welfare of the citizens of Nigeria.

Our regression results are consistent with relevant economic theories and strongly supports a published empirical study by Lucas (1988) which included human capital as an additional input in the production of goods

and services. His argument is that, the labour force can accumulate human capital which is employed actively in the production process to generate the output of the economy.

The result also revealed that there is a strong positive relationship between the selected variables of human capital investment, and economic growth, this is informed by the adjusted R-square value of 99 percent. Generally, we conclude that;

1. There is a negative and non-significant relationship between capital expenditure on education and economic growth in Nigeria
2. There is a positive and non-significant relationship between recurrent expenditure on education and economic growth
3. There is a positive and non-significant relationship between capital expenditure on health and economic growth of Nigeria.
4. There is a positive and non-significant relationship between recurrent expenditure and health and economic growth of Nigeria.

In conclusion therefore, suffice to state that Nigeria can only position herself as a potent force in the globe through the quality of her products as well as making her manpower relevant in the highly competitive and globalized world economy, through a planned, structured and strategic investment in her human capital.

5.1.1 Policy Implications

1. Increase in government capital expenditure to the health and education sectors will lead to a more sustainable economic growth and development. As the analyses have shown, an increase to these sectors will ensure that there is high turnover of trained, skilled and healthy work force for the businesses that operate within the country. It is clear that well-trained employees contribute more to the growth of the organization and ultimately, to the general growth of the economy.

2. Again, an increase in the budgetary allocations to these sectors will decrease the foreign exchange spent on travelling overseas to obtain these services. Annually, the economy loses billions of dollars spent by the citizens in travelling to other countries in search of better education and health services. It is therefore, believed that with increase in the allocations to these sectors, the country can save huge sums of foreign exchange annually and as well become a destination for other countries seeking to get a quality health and education services.

3. With the increase in these allocations to these sectors, there will be decrease in the Brain-Drain of the professionals. Although not specifically covered in this study, it is obvious that the country loses billions of dollars in brain-drain. This is a severe situation where professionals move to other countries in search of greener pastures. This has consistently affected the contributions of these sectors to the Nigerian economy. But with an increase in the budgetary allocations to these sectors, there will be a greater increase in the welfare packages for the workforce of these sectors and there will be a reduction in the brain-drain thereby saving the country the huge financial loss annually.

5.2 Recommendations

Consequent on the findings of this research, we thus, proffer the following recommendations

(a) The government of Nigeria is advices to intensify her investments in the areas of education and health so as to improve on the quality of education and health care facilities and as such, the quality of the human resources that could be instrumental to the achievement of desired economic growth and development.

(b) There is an urgent need for appropriate authorities to shift their current emphasis from the development of building only structures, to the building of people's capacities through the restoration and uplifting of our educational standards by implementing the 25 prevent recommended annual budgets to education by UNESCO.

(c) The Government should embark on a general upgrade of the health sector. There is need for a sustained development of infrastructural facilities in this sector. World class public hospitals, equipment's etc should be provided to cushion the effect of seeking medical services abroad, on the economy. A corresponding percentage of budgetary allocation recommended by the world health organization should be committed to the health sector.

(d) The Nigerian government should continually provide the enabling environment required to guarantee macroeconomic stability, consistency and continuity in policy implementation and the creation of a positive international image that can encourage increased investment in human capital not only by the government, but also by individuals and private bodies.

(e) The reforms of the federal government of Nigeria relating to the education and health sectors of the economy as provided in the NEEDS document, should be sustained by the government with great commitment and will.

(f) A specialized institution should be created by the federal government to ensure that all the budgetary allocations to both the education and health sectors of the economy are totally invested in the provision of quality education and health care services to her citizens as such is instrumental to the quality of human

capital resources produced.

5.3 Contribution to Knowledge

This study, unlike several other studies in literature, has been able to isolate the capital and recurrent expenditures on education and health (as proxies of human capital investment), so as to analyze and examine their individual impacts on the economic growth of Nigeria.

Through the results of this research also, the researchers have been able to establish that the capital expenditure on health has over the years studied, been insufficient to support the desired economic growth in Nigeria. This is premised on the contribution of this proxies to economic growth which turned out to be non-significant.

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YEAR	CEE(₦M)**	CEH(₦M)**	REE(₦M)*	REH(₦M)*	GDP(₦M)*
1981	440.9	128.4	165.4	84.5	15258004.3
1982	488.4	130.2	187.9	95.4	14985078.3
1983	346.6	136	162.2	82.8	13849725.2
1984	144.9	51.1	198.9	101.6	13779255.5
1985	180.7	56.2	258.6	132	14953913.0
1986	442	81.2	262.7	134.1	15237987.3
1987	139.1	69.5	225	41.3	15263929.1
1988	281.8	183.2	1458.8	422.8	16215370.9
1989	221.9	126	3011.8	575.3	17294675.9
1990	331.7	257	2402.8	500.7	19305633.2
1991	289.1	137.6	1256.3	618.2	19199060.3
1992	384.1	188	291.3	150.2	19620190.3
1993	1563	352.9	8882.37	3871.6	19927993.2
1994	2405.7	961	7382.7	2094	19979123.4
1995	3307.4	1725.2	9746.4	3320.7	20353202.2
1996	3215.6	1659.5	11496.2	3023.7	21177920.9
1997	3808	2623.8	14853.5	3891.1	21789097.8
1998	12793	7123.8	1389.5	4742.3	22332866.9
1999	8516.6	7386.8	43610.7	16638.8	22449409.7
2000	23342.6	6569.2	57956.6	15218.1	23688280.3
2001	19860	20128	39882.6	24522.3	25267542.0
2002	9215	12608	80530.9	40621.4	28957710.2
2003	14680.2	6431	64782.2	33268	31709447.4
2004	21550	26410	76527.7	34198.5	35020549.1
2005	27440.8	21652.6	82797.1	55663	37474949.2
2006	35791.8	38039.8	119018	62253.6	39995504.5
2007	48293.5	51171	150779.3	81909.4	42922407.9
2008	48800	46800	163977.5	98219.3	46012515.3
2009	43400	52500	137156.6	90202.6	49856099.1
2010	87900	35000	170770.6	99119.9	54612264.2
2011	35400	39500	335837.9	231803.5	57511041.8
2012	46718	40666.2	348400	197900	59929893.0
2013	49471.9	43382.4	390424.9	179986.9	63218721.7
2014	40800	40700	343755	195976.8	67152785.8
2015	30400	30300	325190	257700	69023929.9
2016	25300	23200	339282.4	200824	67931235.9
2017	55400	53800	403957.1	245188	68490980.3
2018	72800	70700	465301.1	296442.8	69799941.9
2019	94200	90700	593330	388370	71387826.7