International Journal of Entrepreneurship and Business Innovation
ISSN: 2689-9493
Volume 3, Issue 1, 2020 (pp. 19-38)
www.abjournals.org

GOVERNMENT HUMAN CAPITAL DEVELOPMENT AND ECONOMIC GROWTH IN NIGERIA

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ABSTRACT: *The study examined the effect of government human capital development on economic growth of Nigeria. The variables of human capital development employed in the study are government health expenditure, government education expenditure, literacy rate, life expenditure and control for oil revenue, while gross domestic product is the proxy for economic growth and the dependent variable. The data were obtained from CBN Statistical bulletin and World development Indicator covering 1986 to 2018. The Augmented Dickey Fuller test for stationary and Autoregressive Distributive Lag was used for data analyses. The results showed that government human capital development has a significant long run effect on economic growth of Nigeria. The coefficient of the long run equation revealed that government education expenditure and life expectancy have a negative relationship with economic growth, while government health expenditure, literacy rate, oil revenue and trend have positive relationship with economic growth. Only government education expenditure does not have a statistically significant long run effect on economic growth in Nigeria. More so, the coefficient of short run relationship showed that government education expenditure and life expectancy have a negative and statistically significant effect on growth while government health expenditure, literacy rate, oil revenue as well as trend showed positive and significant short run effects on economic growth. The study thus concluded that government human capital development is a veritable means to enhancing economic growth in Nigeria. It was thus recommended that government should address the agitations of the education sector to strengthen the quality of education, increase its capital budget on health sector as well as redirect from theory based to hands-on and value-based learning in Nigeria.*

KEYWORDS: Human Capital Development, Economic Growth, Education, Health, Oil Revenue, Nigeria.

INTRODUCTION

Humans has been described by Hadir and Lahrech (2015) as the most valued asset of nation, both in the developing and developed economies. For economies to achieve the all-important economic development, it most manage its assets efficiently and effectively. One way to economic development is ensuring adequate investment in human Capital. Human Capital can be described as the collective skills, knowledge, and intangible assets of individuals that can be used to create economic value. Since human capital involves the process of training, knowledge acquisition (education), initiatives and others which are all geared towards skill acquisition, is also a tool for enhancing competitive advantage (Schultz, 1993). Hence, Ogujiuba (2013) asserts that no country has achieved sustained economic development

without substantial investment in human capital. Human capital is an important factor for converting all resources to benefit mankind, and a driving force, facilitating economic transition towards higher growth path.

For Nigeria, the level of human capital development is still low. According to the United Nations Human Development Report, Nigeria is ranked 157 on the Human development Index as at 2017 with 0.5320. The low index however, is the fact that many developing countries have still not awaken to the fact that human capital can be used as a major drive to facilitate an improved economy. The low level of government spending on human capital is the main reason for the numerous challenges ranging from low quality of educational delivery which consequently result to poorly equipped graduates to poor infrastructures in healthcare (Ragan & Lipsey, 2005). Like, Nigeria most developing countries are described by their low levels of literacy, low income, poor health care system, gender inequality, and low standard of living (Todaro & Smith, 2011). Further with low and often inadequate spending by government on health care and education, requisite infrastructure necessary for improved human capital development in developing countries is extremely low. This low level of human capital development hinders the productivity level of individuals and results in a range of socio-economic challenges which include poverty and unemployment in society (Ogunleye, Owolabi, Sanyaolu & Lawal, 2017).

The level of human development in Nigeria as a developing economy has being un-encouraging as both the education and health sector has consistently found reasons to embark on industrial strike. They clamour for improved facilities which they claim the government has underfunded. He low ranking of Nigeria as the 157th with 0.0320 human development index connotes poor manpower for industrial and technological output. As studies has consistently pointed out that human capital development remains a sure means to improving economic growth, it becomes imperative to understand the effect of human capital development on economic growth of Nigeria.

There has being disagreement from empirical studies on the nature and direction of human capital development effects on economic growth. This calls for further investigation to enhance the knowledge on the effect of human capital variables on growth in Nigeria. The study therefore investigated the effect of government human development efforts on economic growth of Nigeria. The specific objectives are:

1. To examine the effect of government education expenditure on Gross Domestic Product.
2. To assess the effect of government health expenditure on Gross Domestic Product.
3. To investigate the effect of life expectancy on Gross Domestic Product.
4. To determine the effect of literacy rate on Gross Domestic Product.
5. To examine the effect of government oil revenue on Gross Domestic Product.

International Journal of Entrepreneurship and Business Innovation
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CONCEPTUAL REVIEW

Human Capital Development

Human capital refers to the acquired and useful abilities of all the inhabitants or members of the society (Folloni & Vittadini, 2010). Human capital entails the skills, knowledge and attitudes that are utilised in the production process (Alani & Isola (2009). According to Ogunleye, Owolabi, Sanyaolu, and Lawal (2017), **"**Human Capital can be described as the collective skills, knowledge, and intangible assets of individuals that can be used to create economic value". In broad perspective, human capital components in man are the skills, knowledge, capabilities, attitudes and the experiences which are developed through education, health, on-the job training and other means. Schultz (1961) as cited Ehimare, Ogaga-Oghene, Obarisiagbon and Okorie (2014) has identified five means of human capital formation to include: i) Investment in health facilities and services; broadly conceived to include all expenditures that affect the life expectancy, strength and stamina, and the vigour and vitality of the people; ii) On-the-job training, including old-typed apprenticeships organized by firms; iii) Formally organized education at the elementary, secondary and higher levels; iv) Study programmes for adults that are organized by firms, including extension programmes notably in farm; and v) Migration of individuals and families to adjust to changing job opportunities.

Following from the above, human capital development has the capacity to enlarge people's choices and opportunities, improve healthy living through acquired skills and knowledge and eventually enhance growth in the nation's gross domestic product through increased productivity (Lyakurwa, 2007). Human capital development refers to the process of acquiring and increasing the number of persons who have the skills, education and experience that are critical for economic growth and development of a country (Okojie, 1995). It is a continuum, a continuing process from childhood to old age, and a must for any society or enterprise that wishes to survive under the complex challenges of a dynamic world.

Yesufu (2000), in agreement with this view, opines that "the essence of human resources development becomes one of ensuring that the workforce is continuously adapted for, and upgraded to meet, the new challenges of its total environment". This implies that those already on the job require retraining, reorientation or adaptation to meet the new challenges. This special human capacity can be acquired and developed through education, training, health promotion, as well as investment in all social services that influence man's productive capacities (Adamu, 2003).

As derived from the above, human capital development involves the process of training, knowledge acquisition (education), initiatives and others which are all geared towards skill acquisition, hence it is a tool for enhancing the competitive advantage (Schultz, 1993). Thus, human capacity can be acquired and developed through education, training, health promotion, as well as investment in all social services that influence man's productive capacities (Adamu, 2003). From the above, two major indices of human capital can be identified – education/training and health.

In human capital development, education and health are essential. Education is concerned with the cultivation of "the whole person" including intellectual, character and psychomotor development. It entails the level of training and retraining acquired to enrich knowledge and skills needed to production. Education is the human resources of any nation, rather than its

physical capital and material resources, which ultimately determine the character and pace of its economic and social development. Education occupies an important place in most plans for economic and social development. Whichever way one looks at it, the education sector is important in human development as a supplier of the trained manpower and it is a prerequisite for the accomplishment of other development goals. Also, it is the main sector through whose national identity goals and aspirations are given meaning and reality among the people. This can be measured by the literacy rate of the citizenry.

Thus, human capital development through schooling is often associated with access to big jobs and higher incomes. This helps to explain the phenomenon of the Kuznets inverse "U" curve hypothesis (Gylfason & Zoega, 2003). The higher the incomes of the educated class and the more educated persons we have, the higher would be tax revenues which could be used for pro-poor growth projects and programmes.

Health could be seen as physical and mental wellbeing of people which is measured using indicators such as life expectancy, adult mortality, child mortality rate, adult survival rate and so on. Health in recent times has been considered to be very crucial in terms of how it affects productivity as well as other means of human capital formation. According to Bloom and Canning (2008), "health is a direct source of human welfare and also an instrument for raising income levels." Thus, the level of productivity and growth in an economy will be greatly hampered by ill-health or prevalence of diseases in such an economy (Dauda, 2011).

Government Expenditure on Human Capital Development

The term "government expenditure" refers to the value of goods and services provided through the public sector (Okoro, 2013). Oriakhi (2004) refers to government expenditure as the expenses which government incurs for the maintenance of the government and the society in general. Government expenditure can be grouped into consumption expenditure and government investment expenditure. Government consumption expenditure is made up of government acquisition of goods and services for current use, to directly satisfy individual and collective needs of the members of the community. Government consumption expenditure is measured by government recurrent expenditure less expenditure on health and education (Kweka & Morissey, 2000). However, the government acquisition of goods and services intended to create future benefits such as infrastructure investment or research spending, is classified as government investment expenditure (Gross Fixed Capital Formation, GFCF). That is, government total capital/development expenditure (Kweka & Morrissey, 2000).

The Central Bank of Nigeria functional classification of government expenditure, education and health are the major social and community services of the Nigerian government.

Economic Growth

Hardwick, Khan and Langmead (1994), defined economic growth as an increase in a country's productive capacity, identifiable by a sustained rise in real national income. In the view of Ogbulu and Torbira (2012), economic growth is a "sustained rise in the output of goods, services and employment opportunities with the sole aim of improving the economic and financial welfare of the citizens". This implies that the increase in the countries productive capacity has to be sustained over a period, say five years to ten years.

Economic growth in a country is proxied by Gross Domestic Product (GDP). Gross Domestic Product (GDP) is "the total market value of all final goods and services produced in an economy within a given period" (Gbosi & Omoke, 2004).

THEORETICAL FRAMEWORK

Two opposing propositions emerge that explains effect of government spending on economic growth. Growth models have been classified in the literature into two broad categories: those built on the basis of the neoclassical theory (Solow, 1956; Swan, 1956), and those known as endogenous growth models (Romer 1986, 1990 and Lucas, 1988).

The Neo-Classical Theory

Within the neoclassical framework, government policy has no role in determining the long-run economic growth rate, since this is determined by the exogenous population growth and technological progress rates. This theory of growth has long been based on the Solow (1956) "growth accounting" approach, also termed as neo-classical growth theory, which has two important predictions about growth in the long run. These predictions are that economic growth occurs as a result of exogenous technological change, and that income per capita of countries will converge. Since it is presumed that all determinants of growth are exogenous, it is obvious that government policy cannot affect growth rates, except temporarily during the transition of economies to their steady state. Consequently, the role of government in growth process was usually not investigated in standard neo-classical growth models.

The Keynesian (Endogenous) Growth Theory

On the other hand, in the endogenous growth framework, the engine of growth is human capital, knowledge, or technology. Accumulation of any of these three variables takes place according to a conscious decision by private agents in the economy. This allows fiscal policy to have an impact on the long-run growth rate through either some taxes or some types of public expenditure being able to affect decisions by private firms about investing in human capital, knowledge or research and development. In this regard, it is important to mention that public goods play a crucial role as they can bring about changes in the long-run growth rate through different channels.

Furthermore, this theory posits that both transition and steady state growth rates are endogenous, implying that also long-run economic growth rates are endogenous. There are several factors that should be important for determining long run growth, although in all endogenous growth models, government can influence growth, either directly or indirectly (see Brons, de Groot and Nijkamp, 1999). As a result, long-term growth rates can differ across nations, and there is no necessity that convergence in income per capita should occur. More significantly, as Dar and Amir (2002) report, a major implication of endogenous growth models is that government policy can have wide-ranging implications for a country's long-run growth performance. Namely, the three main fiscal instruments, being taxation, expenditure, and the aggregate budgetary balance, affect long-term growth through their effects on the efficiency of resource use, the rate of factor accumulation and the pace of technological progress.

EMPIRICAL STUDIES

Dauda (2011) examined the effect of health component of human capital on economic growth of Nigeria between 1970 and 2009. The study employed Total Health Expenditure, Life Expectancy and Infant Mortality as proxies for health capital, Total Expenditure on Education as proxy for education capital, Labour Force and Gross Physical Capital Formation were the independent variables while Real Gross Domestic Product as proxy for economic growth was the dependent variable. The results from cointegration and error correction models revealed that presence of long run relationship. It posited that health expenditure and life expectancy had a significant positive effect on growth while infant mortality had a significant negative coefficient on growth. More so, gross fixed capital formation, education expenditure and labour force were all significant and positive. The ECM revealed that human capital development has short run effect on growth at 40% adjustment speed and 97% explanatory powers.

Ogunleye, Owolabi, Sanyaolu, and Lawal (2017) used the ordinary least square regression analysis to examine the effect of human capital development on economic growth of Nigeria within a time frame covering 1981 to 2015. The study represented economic growth as proxy by the gross domestic product. The results showed that human capital development indicators including secondary school enrolment, tertiary school enrolment, total government expenditure on health and total government expenditure on education had a significant positive effect on economic growth of Nigeria while life expectancy and primary school enrolment was negative and insignificant on economic growth of Nigeria.

With a regression model, Isola and Alani (2012) carried out a study examine the contribution of different measures of human capital development (Adult literacy rate, Life Expectancy, Growth rate of labour, Growth rate of capital and Structural Adjustment Programme) to economic growth in Nigeria between 1980 and 2010. Results of R2 showed that education and health components of human capital development are crucial to economic growth in Nigeria. However, only literary rate was found to be significant and positive on growth in Nigeria; life expectancy, growth rate of labour, and Structural Adjustment Programme had an insignificant positive effect while Growth rate of capital has a negative but insignificant effect on growth in Nigeria.

Ogunniyi (2017) examined the impact of human capital formation on economic growth in Nigeria within a 34-year time period spanning 1981 to 2014. The study employed Gross Domestic Product at constant prices as proxy for economic growth while Total government expenditures on education, Total government expenditures on health, Gross fixed capital Formation, Life Expectancy are for human capital development. The ARDL bound estimation techniques were used to test for long run and short run dynamic relationship between human capital formation and economic growth in Nigeria. The results show that a long run dynamic relationship exists between human capital formation and economic growth in Nigeria.

Ogujiuba, (2013) examines empirically, the relationship between human capital development and economic growth in Nigeria, using Secondary School Times series data spanning 1970-2010, applying Error correction model analytical technique. The findings show that investment in human capital in the form of education and capacity building at the primary and Secondary School levels, impact significantly on economic growth, while capital expenditure was in significant to the growth process.

Idenyi, Eze and Ogbonna (2016) examined the effect of human capital development on the growth of Nigeria economy. Using co integration techniques, the study revealed that there is significant long-run relationship between human capital development and economic growth in Nigeria such that 1% increase in the government expenditure on education (TEDU), on the average led to 23.8% increase in GDP while 1% increase in the government expenditure on health (THEA) caused 37.6% decrease in GDP.

Adeyemi and Ogunsola (2016) examined the impact of human capital development on economic growth in Nigeria using time series data spanning from 1980 to 2013. The study employed ARDL Co-integration analysis to estimate the relationship among the variables used in the study. The study established long-run co-integration among the variables. The findings from the study revealed that there is positive long-run relationship among secondary school enrolment, public expenditure on education, life expectancy rate, gross capital formation and economic growth but it is statistically insignificant. The results also showed that there is negative long-run relationship among primary, tertiary school enrolment, public expenditure on health and economic growth.

Sulaiman, Bala, Tijani, Waziri and Maji (2015) investigated the impact of human capital and technology on economic growth in Nigeria. They employed annual time series data for the period of 35 years (1975-2010) and applied autoregressive distributed lag approach to cointegration to examine the relationship between human capital, technology, and economic growth. Two proxies of human capital (secondary and tertiary school enrollments) were used in two separate models. Their result revealed that all the variables in the two separate models were cointegrated. Furthermore, the results of the two estimated models showed that human capital in form of secondary and tertiary school enrollments have had significant positive impact on economic growth. More so, technology also shows significant positive impact on economic growth. In a nutshell, both human capital and technology are important determinants of growth in Nigeria. Therefore, improvement of the educational sector and more funding for research and development (R&D) to encourage innovations are needed to facilitate Nigeria's sustained economic growth.

Ekesiobi, Dimnwobi, Ifebi and Ibekilo (2016) examined public sector education investment and manufacturing output in Nigeria. The study employed Augmented Dickey Fuller (ADF) unit root test and Ordinary Least Square (OLS) technique to analyze the relationship between public educational spending, primary school enrolment rate, per capita income, exchange rate, foreign direct investment and manufacturing output growth. The study revealed that public education spending has a positive but insignificant effect on manufacturing output growth in Nigeria. They recommended among other things, that government should target education spending in ways that favor manufacturing industry growth.

Summary of Review and Gap in Knowledge

The majority of the reviewed empirical studies posited that human capital development have a long run effect on economic growth in Nigeria but there is a disagreement on the nature/direction of the effect. There is a disagreement on whether health and education expenditure have a negative or positive effect on growth. As well, none of the studies reviewed has controlled the effect of human capital development using oil revenue since Nigeria is largely a mono-economy based on oil proceeds. The present study aimed to fill the gap in knowledge.

METHODOLOGY

Sources of Data

The study employed secondary data covering thirty-two years period spanning 1986 to 2018. The data were obtained from the CBN Statistical Bulletin, 2018 and World Development Indicator, 2018. The period covered reflect the era of market-based regulation in Nigeria.

Model Specification

The model for the study derives from the augmented Solow model. Gregory Mankiw, David Romer and David Weil proposed the augmented Solow model which include human capital as an additional explanatory variable to physical capital and labour (Nafziger, 2006). The justification for the inclusion of human capital is also found in the works of the 1979 Nobel Prize co-winner, Theodore Schultz (1961) when he argues that a society should invest in its citizens through expenditures on education, training, research and health that enhance their productive capacity. The model is therefore specified thus:

$Y = AK\alpha\ (HL)1 - \alpha$

When $\beta = 1-\alpha$; (2) becomes

$Y= AK\alpha\ (hL)\ \beta$; when expanded

$Y=f\ (A, K, hL)$ where;

Y= Output

K= Capital

H= human capital

L= Labour

In econometric form

$Y= AK\alpha\ (hL)\ \beta\ U$

U= Error term

The model is not linear so in order to transform it to a linear model we introduce log forms which would transform the model into;

$\text{Log } Y= \alpha 0 + \alpha \log K + \beta \log h\ (L) + V$

Where, $\log \alpha 0 = \log H$

$\beta = \log h\ L$

In order to bring to model to respond to the tenets of the present study, we remodified it in lined with the work of Ehimare, Ogaga-Oghene, Obarisiagbon and Okorie (2014). Thus, the present study is restricted to government expenditure on human capital as well as human capital development indices. Thus, the study was adapted to include government expenditure

on education (EDU) and government expenditure on Health (HTH), life expectancy and literacy rate, and captured the effect of oil since Nigeria has for so long being a mono-economy based on oil revenue.

$GDP = \beta_0 + \beta_1 EDU + \beta_2 HTH + \beta_3 LE + \beta_4 LR + \beta_5 OIL\ \mu$ eq1

Where:

GDP = Gross Domestic Product as a proxy for economic growth

EDU = Government expenditure on education

HTH = Government expenditure on health

LE = Life expectancy

LR = Literacy rate represented by gross school enrolment in Nigeria

OIL = Government oil revenue

b0, b1, b2, b3 are parameters

Uit = Error term

For estimation purposes, we can re-specify equation 1 into a log-linear functional form.

$LnGDP = \beta_0 + \beta_1 LnEDU + \beta_2 LnHTH + \beta_3 LnLE + \beta_4 LR + \beta_5 LnOIL\ \mu$ eq2

Economic Criteria

It is predicted that $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 > 0$

This means that all the parameters of human capital development in the model have a positive relationship with the economic growth. A unit change in either of the independent variables will bring about a proportionate change in the economic growth, *ceteris paribus*.

Method of Data Analyses

The multiple regression technique was used in the study. The estimated regression results are based on the Autoregressive Distributive Lag (ARDL) cointegration approach developed by Pesaran and Shin (1999) and Pesaran, Shin and Smith (2001). The ARDL model is preferred when the variables are integrated in both 1(0) and 1(1). Unit root normally occurs among time series data, thus, the study conducted unit root tests. There exists a unit root (non-stationarity) in most macroeconomic time series (Nelson & Plosser, 1982), and a possible long-run relationship between the economic variables can be undermined by their non-stationary time-series paths (Elder & Kennedy, 2001). Therefore, it is necessary to analyze whether the series are stationary or not, whenever time series data are involved.

The stationarity analysis was done with the Augumented Dickey Fuller (Dickey & Fuller 1979). Basically, the idea is to ascertain the order of integration of the variables as to whether they are stationary I(0) or non-stationary; and, therefore, the number of times each variable has to be differenced to arrive at stationarity.

International Journal of Entrepreneurship and Business Innovation
ISSN: 2689-9493
Volume 3, Issue 1, 2020 (pp. 19-38)

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DATA ANALYSES AND INTERPRETATION

Stationarity Test Result

The variables used for data analyses were subjected to Augmented Dicker Fuller (ADF) Tests, to determine whether they are stationary series or non-stationary series. The variables were tested for stationarity at "intercept only" and "intercept and trend" presented on Table 1.

Table 1: ADF Test of Stationarity

Variables	At Level		First Difference		Order of Integration
	t-Statistic	Prob	t-Statistic	Prob	
(Intercept only)					
LnGDP	-3.5265	0.0139	-	-	1(0)
LnEDU	-1.8967	0.3294	-6.2443	0.0000	1(1)
LnHTH	-1.8885	0.3329	-8.9884	0.0000	1(1)
LnLE	4.4756	1.0000	0.6243	0.9881	Ns
LR	0.5564	0.9860	-6.2980	0.0000	1(0)
LnOIL	-2.8964	0.0572	-5.4327	0.0001	1(1)
(Intercept and Trend)					
LnGDP	0.3351	0.9980	-4.0819	0.0164	1(1)
LnEDU	-2.6210	0.2742	-6.7861	0.0000	1(1)
LnHTH	-1.4490	0.8246	-4.1632	0.0144	1(1)
LnLE	2.1869	1.0000	-3.6949	0.0409	1(1)
LR	-1.7366	0.7104	-7.0123	0.0000	1(0)
LnOIL	-1.4112	0.8375	-5.9299	0.0002	1(1)

**5% level of significance, **1% level of significance, ns not statistically significant at 1(0), 1(1) and 1(2) respectively*

The results showed LnGDP is stationary at level 1(0) at "intercept only" and stationary at first difference at "intercept and trend". LnEDU, LnHTH, and LnOIL are stationary at first difference 1(1), at both "intercept only" and "intercept and trend". LR is stationary at level 1(0) at both "intercept only" and "intercept and trend". However, LnLE is not stationary at level, 1(0), first difference 1(1) and second difference 1(2) at the "intercept only" but stationary at first difference at "intercept and trend". This shows that the variables are better used at "intercept and trend". This implies that time trend is can have effect on government human capital development in Nigeria. Thus, trends were included in the regression analyses computed.

Lag Selection

For the purposes of running the regression analyses, the lag length for the model is determined. Regression analyses involving time series requires that the lagged values of the dependent variable be included as independent variables in the model: this is often called vector autoregression (VAR) (Liew, 2004). Liew (2004) however, posited that Akaike information criterion (AIC) and Final prediction error (FPI) are the most suitable for determining lag length when the sample is less than 60. To determine the lag length of the regression analyses, both AIC and FPI are considered. From the results on Table 2, the

selected lag length is three (3) years. Thus, the Autoregressive Distributive Lag (ARDL) analysis is based on a maximum lag interval of 3.

Table 2: Results of Lag Length Selection Criteria

Endogenous variables: LNGDP LNEDU LNHTH LNLE LR LNOIL
Exogenous variables: C
Sample: 1986 2018

Lag	LogL	LR	FPE	AIC	SC	HQ
0	45.29309	NA	2.68e-09	-2.709868	-2.426979	-2.621271
1	207.1948	245.6440*	4.82e-13	-11.39275	-9.412524*	-10.77257
2	247.1822	44.12402	5.21e-13	-11.66774	-7.990184	-10.51597
3	305.5167	40.23068	3.48e-13*	-13.20805*	-7.833161	-11.52470*

** indicates lag order selected by the criterion*
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

ARDL (Bounds) Test for Cointegration

The bound test is shown in Table 3. The result compared the F-statistics with the critical bound values. The F-statistics is 7.9555. The result showed that the F-statistic is greater than the lower and upper bounds of the critical values at 0.05 level of significance. This means that there is a cointegration or long run relationship between government human capital development and economic growth in Nigeria.

Table 3: Result of the Bound test of long run relationship between government human capital development and economic growth in Nigeria.

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	7.955481	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.75	3.79
5%	3.12	4.25
1%	3.93	5.23

Nature of ARDL Long Run relationship and Speed of Correction to Equilibrium

Haven found presence of long run relationship between government human capital development and economic growth from result of the Bound Test, further analyses presented in Table 4 aimed to explain the nature of the long run relationship. The results showed that the error correction term [CointEq(-1)] is rightly signed. The coefficient of the error term is -0.8728 with probability value of 0.0008. Since the p.value is less than 0.05, it connotes that the error term is statistically significance. This indicate the changes in economic growth trend will eventually return on a growing normal trend over time. The coefficient indicates about 87% of the deviations in growth of the economy due to macroeconomic instability can be corrected within a year. This implies that government human capital development can be used to stabilise economic growth in Nigeria. This suggests that government human capital development efforts have significant policy adjustment effect on economic growth of Nigeria.

Table 4: Model of the long run relationship between government human capital development and economic growth.

Dependent Variable: LNGDP
Sample: 1986 2018

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEDU	-0.317487	0.151628	-2.093859	0.0696
LNHTH	0.450435	0.176742	2.548538	0.0343
LNLE	-26.622755	3.641748	-7.310433	0.0001
LR	6.549025	1.440680	4.545788	0.0019
LNOIL	0.155179	0.061014	2.543346	0.0345
C	105.306935	13.763404	7.651228	0.0001
@TREND	0.200428	0.024217	8.276437	0.0000
Cointegration Form				
CointEq(-1)	-0.872861	0.166511	-5.242054	0.0008

LnGDP = -0.32LnEDU + 0.45LnHTH -26.62LnLE + 6.55LR + 0.16LnOIL + 105.31 + 0.20TREND

The resulting long run equation shows that nature of the long run relationship government human capital development and economic growth in Nigeria. From the results on Table 4, it can be seen that government education expenditure (-0.32LnEDU), and life expectancy (-26.62LnLE) have a negative relationship with economic growth (LnGDP). Government health expenditure (0.45LnHTH), literacy rate (6.55LR), oil revenue (0.16LnOIL) and trend (0.20TREND) have positive relationship with economic growth (LnGDP).

The probability values (Prob) is used to dete4rmine the significance of the coefficient results. Any p.value less than 0.05 indicate statistical significance while ones above 0.05 indicate insignificance. From the results, the coefficients for LnHTH, LnLE, LR, LnOIL and TREND have p.values less than 0.05. Thus, the coefficients are statistically significant. However, the coefficient for LnEDU is above 0.05 indicating that government education expenditure has no significant effect on economic growth in Nigeria.

Short run relationship between government human capital development and economic growth in Nigeria.

Table 5: Result of the short run model of the relationship between government human capital development and economic growth in Nigeria.

Dependent Variable: LNGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNGDP(-1)	0.432450	0.198199	2.181898	0.0607
LNGDP(-2)	0.062984	0.206252	0.305376	0.7679
LNGDP(-3)	-0.368295	0.162653	-2.264300	0.0534
LNEDU	-0.016327	0.067040	-0.243541	0.8137
LNEDU(-1)	-0.260795	0.068329	-3.816744	0.0051
LNHTH	0.015724	0.063262	0.248556	0.8100
LNHTH(-1)	0.255732	0.066003	3.874567	0.0047
LNHTH(-2)	0.121711	0.029610	4.110524	0.0034
LNLE	1.176533	1.568397	0.750150	0.4746
LNLE(-1)	-218.7207	42.69224	-5.123196	0.0009
LNLE(-2)	415.8689	85.26389	4.877433	0.0012
LNLE(-3)	-221.5627	46.64221	-4.750261	0.0014
LR	1.741616	0.463142	3.760436	0.0055
LR(-1)	2.245529	0.531707	4.223246	0.0029
LR(-2)	0.947079	0.374810	2.526827	0.0354
LR(-3)	0.782164	0.409283	1.911057	0.0924
LNOIL	0.109972	0.032808	3.352013	0.0101
LNOIL(-1)	0.019925	0.035956	4.554134	0.0046
LNOIL(-2)	0.045403	0.034784	3.305271	0.0081
C	91.91830	15.72982	5.843569	0.0004
@TREND	0.174945	0.044536	3.928194	0.0044
Adjusted R-squared	0.999469	Durbin-Watson stat		2.932016
F-statistic	2634.998			
Prob(F-statistic)	0.000000			

The short run effect of government human capital development on economic growth is examined using the result on Table 5. The adjusted coefficient of determination is 0.9994 indicating about 99% explanatory power. This suggests that about 99% of changes in economic growth rate in Nigeria is accounted for by government human capital development. This suggests that human capital is a vital component for economic wellbeing in Nigeria.

The F-statistics being 2634.998 confirmed this assertion with a significant probability value of 0.0000. This in the overall connotes that human capital development is a panacea to short run economic growth challenges in Nigeria. The Durbin Watson value of 2.9320 supported the reliability of the model from which the results were obtained. Further diagnostic tests are carried out subsequently.

The coefficient of short run relationship showed that GDP does not have a significant effect in the model at all the intervals, indicating that GDP is not an endogenous variable in the model. However, LnEDU is negative (-0.2607) and statistically significant at one-year lag period. LnHTH is both positive and statistically significant at both one-year lag (0.121711) and two-year lag (1.176533). This indicate the government health expenditure has a positive short run positive effect on economic growth of Nigeria. The result of the LnLE reveal that life expectancy has negative and significant effect at one year and three years lags but significantly positive at two years lag. The literacy rate in Nigeria showed a positive and significant effects at level (same year) (1.7416) and after one (2.2455) and two years (0.9470) lags. Similarly, oil revenue (LnOIL) showed positive and significant short run effects on economic growth all the short run periods of same year, one year and two years lags, respectively. However, the time trends (0.1749, p. 0.0044) over the years have a positive effect on economic growth in Nigeria.

Diagnostic Tests

The diagnostics are tested to determine the reliability of the model estimations and empirical findings on this study. Following diagnostics including multicolinearity, normality, serial correlation, heteroskedascity, and regression specification error (RESET).

Multicolinearity Test

Multicollinearity occurs when the independent variables have high correlation coefficient among themselves. Presence of high multicollinearity, causes the confidence intervals of the coefficients tend to become very wide and the statistics tend to be very small, making the hypothesis testing to be misguided (Ranjit, 2006). Presence of multicolinearity is tested using the Correlation Matrix. A correlation above 0.08 indicate high colinearity. Multiple colinearities suggests presence of multicolineatrity.

Table 6: Pearson Correlation result

	LNGDP	LNEDU	LNHTH	LNLE	LR	LNOIL
LnGDP	1.000000					
LnEDU	0.978939	1.000000				
LnHTH	0.980713	**0.988368**	1.000000			
LnLE	0.848560	0.781592	**0.810853**	1.000000		
LR	0.795401	0.725344	0.743894	**0.960119**	1.000000	
LnOIL	0.964444	**0.962990**	**0.956194**	0.719265	0.653217	1.000000

The result on Table 6 indicate that five (5) very strong correlations among the independent variables. These occurs between LnHTH and LnEDU (0.9883), LnOIL and LnEDU (0.9629), LnHTH and LnLE (0.8108), LnHTH and LnOIL (0.9561) and LnLE and LR (0.9601). These

indicate that there is no presence of multicolinearity of the model. The results from the model will likely overstate the coefficients of the regression and coefficient of determination. This implies that the values reported as the coefficients of the regression as well as the Adjusted R2 may be higher than normal.

Serial Correlation Test

This test investigates whether there is a correlation between one time period and another over time in the time series used for the analyses. The presence of correlation of time periods will lead to serial correlation which will have huge effect on the reliability of model estimation. It may lead to high significant value, inefficient estimation, exaggerated goodness of fit and false coefficient of regression sign (positive or negative).

The presence of serial correlation is tested using the Breusch-Godfrey Serial Correlation LM Test. The null hypothesis is no presence of serial correlation. The decision rule is to reject the null hypothesis if the p.value is less than 0.05 level of significance. From result in Table 7, the p.values of the models are greater than 0.05, revealed that the models are not serially corrected at 5% level of significance.

Table 7: Breusch-Godfrey Serial Correlation result of the models

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.439764	Prob. F(2,13)	0.6534
Obs*R-squared	1.837694	Prob. Chi-Square(2)	0.3990

The results of the F-statistic are 0.4397 with probability value of 0.6534. Since the p.value is greater than 0.05, we cannot reject the null hypothesis of no serial correlation. The study thus concludes that there is no serial correlation (of time series) in the model. This confirm that the nature of the relationship (negative or positive) as found in the estimation from the ARDL are correct and true of the model characteristics. As well, the significance values are correct as estimated. This implies that the result of the test of hypothesis from the ARDL gives correct position of the Nigerian economy.

Heteroskedasticity Test

The study also tested for heteroskedasticity in linear regression analysis. Presence of heteroskedasticity is implies that the coefficients estimated from the regression analyses will be a biased one. Presence of heteroskedasticity means that there is an unequal error variance in the model from the data observations. The null hypothesis is that the residuals are homoscedastic and the alternate hypotheses is that the residuals are heteroscedastic. The decision rule is to reject the null hypothesis if the p.value is less than 0.05 level of significance. From result in Table 8, the p.values of the models are greater than 0.05, revealed that the models do not have homoscedastic at 5% level of significance.

Table 8: Test of heteroscedastic of the model

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.512466	Prob. F(13,15)	0.2200
Obs*R-squared	16.45026	Prob. Chi-Square(13)	0.2257
Scaled explained SS	2.557774	Prob. Chi-Square(13)	0.9991

The F-statistic of the Breusch-Pagan-Godfrey result is 1.51246 with probability value of 0.2200. Since the probability value is greater than 0.05, we cannot reject the null hypothesis that the residuals are homoscedastic. Thus, we conclude that there is no heteroscedastic in the model. This confirms that the result obtained from the estimated model is not a biased value.

Normality Test

The presence of normality of the variables in the model is examined. Lack of normal distribution implies that the results cannot be used to make future predictions about the economy. Jarque-Bera is a test statistic for testing whether the series is normally distributed. The null hypothesis is that the variable is normally distributed. Decision rule is to reject when p.value is less than 0.05 level of significance.

The result is the normal distribution of the residuals forms the model. The Jarque-Bera statistics 1.1147 with probability value of 0.5727. Since the p.value is greater than 0.05, we cannot reject the null hypothesis that the residuals are normally distributed. Thus, the study conclude that the residuals have normal distribution. This implies that the regression result can be used for prediction of future effect of government human capital development on economic growth of Nigeria.

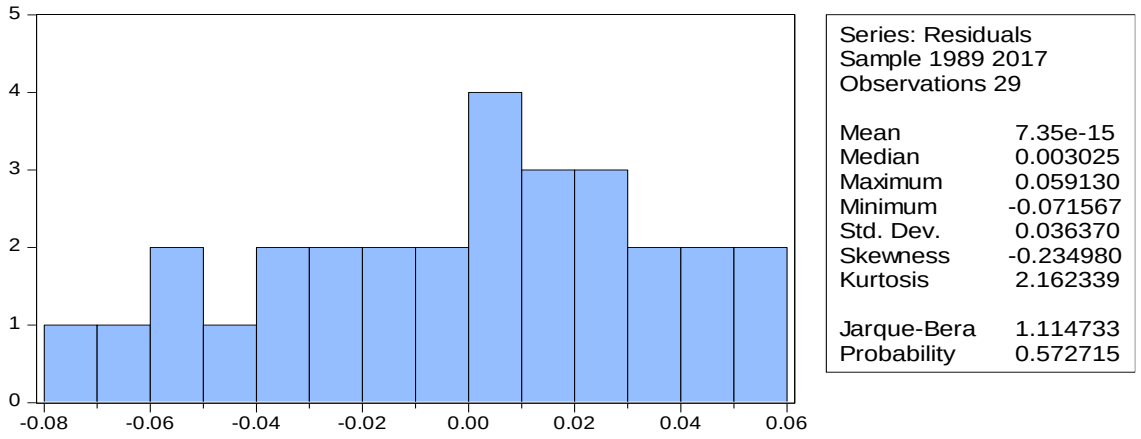

Figure 1: Graphical presentation of normality of the distributions from the model estimated.

Regression Specification Error Test (RESET Test)

The traditional OLS as well as the advanced ARDL regression employed in this study are based on the assumption of linear relationships. Thus, presence of nonlinear relationship will produce unreliable regression results. The *Ramsey Reset test* is employed to identify any existence of any significant nonlinear relationships in the developed linear regression model.

Table 9: Ramsey RESET Test

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	3.932200	14	0.0015
F-statistic	15.46220	(1, 14)	0.0015

Table 9 showed an F-statistics and the corresponding p.values of the Ramsey RESET Tests for as 15.46220 and 0.0015, respectively. Since, the p.values are less than 0.05 level, we reject the null hypotheses of non-linear relationships in the models. This implies that the models are well specified and is good for the estimation of the effect government human capital development on economic growth of Nigeria. The results from this study is thus expected to be reliable.

DISCUSSION OF FINDINGS

The study has shown that government human capital development has a significant long run effect on economic growth of Nigeria. Specifically, the study showed that government health expenditure, literacy rate, oil revenue and trend have both long run and short run positive effect on economic growth in Nigeria. The results imply that an increase in government expenditure on heath, literacy rate and oil revenue will bring about improvement in economy. As the government spends more on health sector, economic growth improves. This implies that quality of health through improved health sector will improve productivity. Likewise, a growing literacy rate improves the knowledge-based and thus enhance productivity. This is true to the role of the recent vogue where knowledge drives the economy. Technological know-how which is the key driving technological and information-based economy of today. Nigeria being largely oil driven mono-economy has thrived on oil production and this has improved the economic growth in Nigeria. This implies that a fall in oil revenue is a danger to Nigerian economy.

However, the study found that government education expenditure has a have effect on growth but only statistically significant in the short run. This implies that government expenditure in education has often produced a negative effect on the economy of Nigeria. This suggests that budgets for education is wrongly perceived. Nigerian education sector has not produced a viable manpower for the labour and productivity in Nigeria. This explains the reason for capital flight for better health abroad, the use of foreign engineering on road construction and other technologically based process in Nigeria.

More so, the life expectancy in Nigeria has produced a negative effect on growth. This implies that increasing longevity has adverse effect on the economy. This explains that the productivity of labour force reduces with age. As the staff in an establishment ages, his/her productivity will tend to reduce thus affecting the economic growth in Nigeria.

CONCLUSION AND RECOMMENDATIONS

This study has shown that government human capital development is a veritable means to enhancing economic growth in Nigeria. Human capital development through education has not significant impacted on economic growth in Nigeria. The labour force is adversely affected by an aging labour force in Nigeria. Human capital thus remains one crucial factor to fashioning a prosperous nation. The study thus recommended as follows:

1. As government expenditure on education was found to have negative effect on human capital development, it is recommended that government should address the agitations of the education sector to strengthen the quality of education in Nigeria. This will enhance the teaching and learning environment and thus will go the long way promoting the economy.

2. It is equally recommended that the nature of education in Nigeria should be redirected from theory based to hands-on and value-based learning.

3. Following that government heath expenditure has positive effect on growth, it is recommended that government should increase its capital budget on health sector. This will go a long way to equipping our health sector so that capital flight in the name of foreign medical treatment is reduced.

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