Public Sector Investments and Human Capital Development in Nigeria: 1981 – 2016

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Abstract
This study examined public sector investments and human capital development in Nigeria from 1981 to 2015. The study aimed at identifying the relationship between public sector capital investment in Administrations (ADM), Economic Services (ECS), Social and Community Service (SCMS) and Transfers (TRS) on human capital development. Times series data on ADM, ECS, SCMS, TRS and Human Development Index (HDI) collected from secondary sources via the Central Bank of Nigeria Statistical bulletin and World Bank Development Indicators were used in the study. The Johansen co-integration, analysis, Vector Error Correction (VECM) and Pairwise Granger causality analysis were employed in the data analysis. The Johansen cointegration result indicated the existence of long-run relationship between public sector investment variables and human capital development in Nigeria. In the same vein, the vector Error Correction Model (ECM) estimate equation is properly signed with a negative coefficient of -0.134169 and insignificant t–statistic probability value of 0.2272 at 5% level of significance. Thus, causality could not be established between public sector investments and human capital development. Consequent upon this, the variant influence analysis (R Student, DFFITS and COVRATIO) test or stability diagnostic analysis was employed to detect structural breaks. The study revealed that between 1991 up to 1993, 2000 up to 2006 and 2008 up to 2016 shows the presence of some structural changes in the system. This could be associated with changes in the economy say as a result of political instability, policy inconsistencies, high inflation rates, falling value of the naira among others. The study therefore recommended that government and stakeholders in the public sector should come up with policies to address the problems of economic imbalances. Addressing policy inconsistency and political instability through effective legislations and political will to enforce work ethics in public sector (especially in Ministries, Departments and Agencies, MDAs) will go a long way in ensuring that public sector investments impact positively and significantly on human capital development in Nigeria.

Keywords: *Public Sector, Investment, Human Capital Development, Structural Breaks*

1.0 Introduction

There is no doubt that investment affects the general performance of an economy due to its key role in propelling economic development. Investment is majorly sub-divided into public and private investments. The remarkable record of high and sustained development of most economically advanced countries today is attributable to accumulation of physical and human capital through investments such as in human, good development policies that are investment friendly in form of maintaining stable macroeconomic fundamentals, reliable

legal and regulatory framework amongst others. This stems from the realization that countries that direct their resources to carefully chosen development drivers and put in place enabling policies especially aimed at stimulating investments achieve higher growth leading to economic development. To this end, the economy of every nation is structured into private and public sectors. The Private sector refers to that part of the economy that is in private hands, which could be private individuals or corporate individuals whose activities are under the control and direction of non-governmental unit. In this sector, private and corporate individuals own and control the means and factors of production. The public sector on the other hand refers to areas of activities in an economy that are covered by the budget and revenue expenditure of government. In other words, the public sector is that sector where the government dominates by controlling and owning available means of production. According to Nnamocha (2002), this sector in Nigeria consists of the Federal, State, Local governments and other agencies of government. Investment in the public sector is also known as public expenditure. This is because public expenditure is an important instrument for government to control an economy. According to Okoro (2013), it plays an important role in the functioning of an economy whether developed or underdeveloped.

In the Nigerian economy, public sector investment (public expenditure) is broadly categorized into recurrent and capital expenditure. The former are government expenses on administration such as wages, salaries, interest on loans, maintenance etc., whereas expenses on capital projects like roads, airports, health, education, telecommunication, electricity generation etc constitutes the capital expenditure component (Obinna, 2003). Furthermore, in Nigeria, public sector expenditure (be it recurrent or capital) is classified into expenditure on administration, economic service, social and community service and transfers. Most importantly, public sector capital investments in Nigeria are vital macroeconomic policy tool used by government to achieve specific macroeconomic goals like increasing life expectancy, improvement in the standard of living, achieving high and qualitative education, counter undesirable trends (such as unemployment), poverty etc amongst her citizenry, all geared towards the attainment of economic development. Thus, public sector investment (government expenditure) on infrastructure, health, education, telecommunication, power generation etc reduces production costs, increases private sector investment and profitability of firms, and fostering economic growth. They are expenditures of government on the acquisition of things of permanent nature. It usually involves large sums of money and also forms the basis of the physical development of a nation (Cooray, 2009, Nwaeze 2010).

However, it is worthy of note that physical development of a nation cannot be attained, if human development which is an integral part is not given the desired attention. According to the Organization for Economic Cooperation and Development (2001) cited in Mba, Ogbuabor and Ikpegbu (2013) human development is concerned with knowledge, skills competitiveness and attributes embedded in an individual that facilitates the creation of personal, social and economic wellbeing. Some of the personal, social and economic wellbeing indicators are contained in composite indices like human development index (composite index of Gross Domestic per capita income, health and education), physical quality of life index (life expectancy and infant mortality) Human poverty index etc. Hence, Mba, et al (2013) noted that in order to achieve positive economic growth (or development) human development should be considered as an integral and important factor. It is in the light of the foregoing, that government in both developed and developing country like Nigeria invest by allocating huge sums of money to various sectors or segment of the economy.

In Nigeria, The role of public sector investment on human capital development in Nigeria has been of growing concern, despite efforts made by government aimed at improving the index via several policies of increased expenditure among others. Public sector investment (expenditure) has continued to rise from available statistics. For instance, government recurrent expenditure rose from ₦4.85 billion in 1981 to ₦36.22 billion in 1990; N461.60 billion in 2000; ₦3109.44 billion in 2010 and ₦3831.98 billion in 2015; while capital expenditure rose from ₦6.57 billion in 1981 to ₦24.05 billion in 1990; ₦239.45 billion in 2010; ₦883.87 billion in 2010 and ₦1108.39 billion in 2013. (CBN, 2015).

However, despite the rising trend in government expenditure in Nigeria, it is paradoxical and disheartening to note that a major macroeconomic indicator like human development has overtime shown a gloomy picture and in a pitiable state. Despite her enviable human and material resources, the country and its people are still classified among the very poor with no fewer than 54% of Nigerians living below the poverty level (Okunmadewa 2001, Akinyele 2005, HDI report 2010). It is described as a country with a complex socio-political history that has impacted adversely on the population through worsening income redistribution and increased poverty (Salamatu, 2008).

A further re-examination of the Nigerian economy shows that the rapid growth in government expenditure has not translated into human development. According to Ese, Matthew, Oluwatoyin, Fasina and Fagbeminiyi (2014), levels of unemployment, poverty rate, income inequality, health and literacy have grown worse in some cases. Furthermore, they noted that the level of income measured by the Gini coefficient index increased from 38.7 in 1986 to 48.8 in 2012. Also, the depth of poverty and its incidence measured by the poverty gap at $1.25 a day increased from 21.9% in 1986 to 33.7% in 2010. In their views, although there are marginal improvements in some human development indicators such as life expectancy at birth and infant mortality rate, the general productivity level of the citizens is still very low.

Again, the debate on the impact of public sector investment on human capital development remains inconclusive given conflicting results of current studies. In a study by Ese *et al* (2014), the work revealed that public investment has mixed result on human capital development in Nigeria. While, Richardson (2014) found a positive functional relationship between public sector investment and human capital development in Nigeria. Similarly, amongst the several studies on public sector investments and human development, none of these studies has empirically and specifically examined the impact of a unit shock of these components of public sector investment on human capital development and their contributions thereof. The question that readily calls to mind is what is the impact of any shock arising from the components of public sector investment on human capital development? The study is designed to fill the gap arising from the above question and other related issues bordering on the relationship between public sector investments and human capital development in Nigeria. Similarly, the disconnection between public sector investment and human capital development in Nigeria motivated the need for this study. Therefore, main objective of this study is to investigate the impact of public sector investments on human capital development in Nigeria.

2.0 Review of Related Literature

Public sector investment is a form of investment that is not profit driven. It is investment undertaken by the government at all levels for the social and economic good of the citizens of a country, state or region. Such investments include building of roads,

irrigation projects, public parks, electricity installation etc (Okereke, 2007). Public investment which also means public sector investment primarily entails public or government expenditures. Public expenditure is an important instrument for government to control an economy. It plays an important role in the functioning of an economy whether developed, underdeveloped or developing. Public sector investment according to Okoro (2013) was born out of revenue allocation which refers to the redistribution of fiscal capacity between the various levels of government or the disposition of responsibilities between tiers of government. Broadly speaking, public sector investment (expenditure) affects aggregate resources used together with monetary and exchange rate. Thus, public expenditure refers to the value of goods and services provided through the public sector.

According to Nnamocha (2002), government expenditure in the Nigerian context includes all expenditures on goods and services, transfers and capital expenditure by the Nigerian government. However, it excludes inter-governmental transfers. This limits government expenditure then to government expenditure on goods and services, and transfers to the non-government sector of the economy. It is the totality of the final public sector expenditure for whatever purposes. Equally, public expenditure in Nigeria can be broadly categorized into recurrent and capital expenditure. The former are government expenses on administration such as wages, salaries, interest on loans, maintenance etc., whereas the latter are expenses on projects like roads, airports, health education, telecommunication, electricity generation etc. In other words, capital expenditure are permanent investments whose benefits last for a long period of time, usually beyond one accounting year or period while recurrent expenditures are routine expenditures whose benefit are used up entirely within one accounting period. Capital expenditure no doubt, is an important aspect of public sector investment that transforms and engenders development of a nation. Public sector investment began to be more prominent in the management of the economy following the word of Meynard Keynes. Thus, in Nigeria, governments over the years embark on diverse macroeconomic policies options to direct and redirect the economy on the path of growth and development. Similarly, it is a truism that the latter cannot be achieved without adequate investment in human capital development.

According to Nwinee and Torbira (2012) Public sector investment comprises the summation of federal, states and local government spending as well as those of their agencies and financial transfers to the parastatals at the three tiers of governments. The main purpose of public sector investment is to enhance the socio-economic wellbeing of the citizens by way of improving the standard and quality of their living; such as the provision of quality education, health care services, proper housing, social security and amenities and execution of economic development programmes in other to create job opportunities. Public sector investment in the area of human capital development such as health, education, etc will no doubt reduce poverty and increase the standard of living.

Okojie (2015) in Kairo, Mang, Okeke, and Aondo (2017) observed that human capital refers to the abilities and skills of human resources of a country, while 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. In this regard, the concept of human development connotes investment in education, health and other factors that would increase productivity when increased. 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 (Yusuf, 2000). 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).

Human resources constitute the ultimate basis for the wealth of nations. Capital and natural resources are passive factors of production; human beings are the active agents who accumulate capital, exploit natural resources, build social, economic and political organization, and carry forward national development. Clearly, a country which is unable to develop the skills and knowledge of its people and utilize them effectively in the national economy will be unable to develop anything else. Take for instance education which occupies an important place in most plans for economic and social development. Whichever way one may view it, the education sector is vital in human development as a supplier of trained manpower and it is a prerequisite for the accomplishment of other goals. Also, it is the main sector through whose national identity goals and aspirations are given meaning and reality among the people (Harbinson, 2003).

Economic literatures have revealed that the absence of adequate investment in human development in any country hampers the growth and development of such country. This Jhingan (2005) noted, that economic growth or development cannot be guaranteed without investment in human development. Jhingan saw human development as education or schooling, training and health care delivery. These human resource development are capable of generating increased productivity, income, standard of living, improve health and fitness, good habits in individuals, reduced poverty among others. Hence, Adebayo (2009) in Mba et al (2013) observed that it 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. Adebiyi (2003) supporting the assertion noted that there can be no meaningful economic growth without adequate human and natural resources in any country. Human capital is so important that in the Khartoum declaration of 1988, it was asserted that "….the human dimension is the sine qua non of economic recovery……..no Structural Adjustment Programme (SAP) or economic recovery programme should be formulated or can be implemented without having at its heart detailed social and human priorities. There can be no real structural adjustment or economic recovery in the absence of the human imperative.

According to Richardson (2014), human capital development is broadly viewed as a process of expanding people's choice and opportunities to improve living standard as well as the welfare of the citizens. These choices according UNDP (2001) are long and healthy life, acquire knowledge and be educated and have access to resources needed for a decent level of living as a nation develops. In essence, as the public sector invests in human development, the latter would improve in terms of income level, longer life, improved standard of living, better education, reduced poverty rates to mention but a few. Therefore, public sector investments in human development will be seen to result into meaningful economic development.

Human Capital Development in Nigeria

The trend now is that human capital development is measured in terms of composite indices of development which takes account of different aspects of development. As earlier pointed out, several such indices have been developed and include –physical quality of life index (PQLI), Human Development Index (HDI), Human Poverty Index (HPI), Coefficient of Variation, Theil Index, Kuznets Hypothesis, Gini-Coefficient etc. Measuring human development index is a concept that is complex with many facets. This therefore means that

any index on human development incorporates a range of indicators to address the complexities. However, the new acceptable and widely used approach of human development is the Human Development Index (HDI). The index captures health, education and standard of living with many sub-variables such as life expectancy, adult literacy rate, gross enrolment ratio, and Gross Domestic Product Per capita income. According to Kairo et al ((2017), considering that the HDI includes quality aspects, the approach of HDI focuses on all of individuals' life quality and economic situation.

In Nigeria, statistics have shown that key human capital indicators are not only poor when compared to some other developed and developing economies in the world, but are deteriorating in some cases. In a study by UNDP (2013) and Ese et al (2014), a comparison between Nigeria and selected countries that have attained the 20th position in the list of top economies in the world since 2009, shows that as at 2010, net primary school enrolment in Belgium, Poland, Saudi Arabia and Sweden range between 93 and 99%. Nigeria's rate of 57.6% in 2010 was actually a fall from its 2008 value of 58.8%. At, 10,545,105, Nigeria is one of the countries with the highest number of children out of primary school in the world (UNDP 2013 Ese et al 2014). A more worrisome development is that the situation is getting worse. The report revealed that the level increased from 9,686,822 in 2009 t0 10,288,599 in 2010. The reverse of this trend is however the case in other countries (Belgium, Poland and Sweden). Though a slight improvement was noticed in Health indicators in Nigeria, infant mortality rate (per 1,000 live births) dropped from 87.7 in 2008 to 77.8 in 2012). This rate was said to be outrageous when compared to statistics from other countries. Life expectancy was observed to be increasing gradually, but there is still a wide difference between the level in Nigeria and other countries. A number of country were said to have already achieved a high level of human capital needed for sustainable social and economic development. Also revealed by the report was that, as social variables, government in many advanced countries in the world invest heavily in education and health. The level of total and public sector investment in health in Nigeria and other countries showed that health expenditure per capita in Nigeria is less than $100. In 2011, health expenditure per capita in Nigeria was $79, while Belgium and Poland recorded $4962 and $5330 respectively.

According to UNDP report (2016) as cited in Oladeinde (2017) Nigeria ranked 152 among the 188 UN member states in the Human Development Index (HDI). According to the report, Nigeria retained its 2015 status with a computation of 0.527 which was two 0.2 percent above 2014 computation of 0.525.

Nigeria's HDI value for 2016 positioning it at 152 of 188 countries puts the country on Low Human Development (LHD). The country is followed closely by Cameroon in number 153 and Zimbabwe in 154 positions. The report placed Nigeria below neighbouring Ghana and Zambia positioned at 139, Gabon, 109, and Equatorial Guinea, 135. The 2016 Human Development Report focuses on those communities that have been left behind, despite development progress over the last 25 years (Ifeanyi, 2017)

The report, however, showed a positive outlook for the country as Nigeria's HDI increased from 0.466 to 0.527, a 13.1 per cent increase in the last 10 years under review between 2005 and 2015. This represents a three-point increase over what the nation had between 2005 and 2014, when Nigeria HDI's value increased from 0.467 to 0.514, an increase of 10.1 per cent. Breakdown of the report shows that Kenya was placed at 145 positions on the list of countries ranked low, with Central Africa Republic taking the last position at 188 in sub-Saharan Africa. On the global front, Norway tops the table as the

number one country in the HDI, closely followed by Switzerland and Australia which came joint second. Similarly, Germany was placed on the fourth position while Denmark placed on the fifth position.

Theoretical Framework

Although, there are many theories relating to public sector investment (expenditure) such as the Keynesian theory, the Solow's theory, the endogenous growth theory, Wagner's theory, Peacock Wiseman theory and Musgrave theory. This work shall be based on the Musgrave theory of public expenditure (investments). The theory posits that at low levels of per capita income, demand for public services tends to be very low because income is devoted to satisfying primary needs and when per capita income starts to rise above these levels of low income, the demand for services supplied by the public sector such as health, education and transport starts to rise, thereby forcing government to increase expenditure on them (Musgrave 1969). He was of the opinion that at high levels of per capita income, typical of developed economies, the rate of public sector growth tends to fall as the more basic wants are being satisfied. According to Kairo et al (2017), this theory specifically related government expenditure and human development by spending on health and education which are core to human capital development.

According to Anand and Kanbur (1993), the most effective means of human development flows through government budgetary expenditure, central or local. The impact of such expenditure largely depends on its nature, sector and component. Following this, government must analyse and identify priority sectors that have the highest potential for human development enhancement. For instance, as education and health improve and become more broadly based, low income people are better able to seek out economic opportunities (Richardson 2014). Therefore, the benefits of a sustained growth process are expected to trickle down to the people in form of longer life, more jobs and other numerous economic and non-economic opportunities. Consequent upon this, access of the people to basic amenities such as portable water, health care facilities, quality education, affordable and decent housing and sustainable environment are fundamental to an enhanced quality of life which is a manifestation of human development. In view of the critical role of human development in the growth process and economic development of a nation, government is saddled with needed responsibility to invest on some sectors to promote human development. According to UNDP (2006), the major sectors are education, health, agriculture, rural development, energy, housing, environmental protection, portable water, transport and communication.

Empirical Review

The study, public sector investment and human capital development is a recurring issue in economic literature. In Nigeria, the focus has been on recurrent and capital expenditure on different sectors or on economic growth. Considering the concept of investment (commitment of resources with the hope of realizing benefits accruable over a long period of time), not much emphasis has been laid on the capital components of these investments (expenditure) specifically on human capital development in Nigeria. This is in recognition of the fact that economic development of any nation is dependent on its human capital development.

Richardson (2014) analyzed the effects of sectoral public spending on human development in Nigeria using a panel data from 20 states for the period 1999 - 2012. For robustness of the analysis, total recurrent and capital public spending on education, health,

agriculture, rural development, energy, housing, environmental protection and portable water resources were employed as predictors of human development. The OLS statistical technique employed showed there is a positive functional relationship between education, health, agriculture, rural development, energy, housing, environmental protection and portable water resources expenditure and human development; an indication that public sector investments in these sectors fosters human development. The study revealed, that the contributions of education, health, agriculture, rural development and portable water expenditures in improving human development was greater than that of energy, housing and environmental protection. Also, a further analysis of recurrent and capital expenditures revealed that recurrent and capital expenditure has both positive and negative effects on human development across states under the period of investigation. The relative capital expenditure in improving human development was greater than that of recurrent expenditure.

Kairo, Mang, Okeke and Aondo (2017) empirically studied the relationship between government expenditure and human capital development in Nigeria from 1990 – 2014 using the Auto-Regressive Distributed Lagged Model and Impulse Response Function. The bound test was used to determine the existence of long run relationship between government expenditure and human development index. The results demonstrated that both in the long run and short run, government spending has remained positive but to a very large extent insignificant to human capital development in Nigeria. This was said to be the reason why the per capita income has remained low in the world ranking.

Ese, Matthew, Oluwatoyin, Fasina and Fagbeminiyi (2014) in their study of public investment in human capital and outcomes in Nigeria analyzed the extent to which human capital development responds to the smart initiative by the Nigerian government in its drive towards achieving Nigeria's vision 20:2020. The study adopted a comparative approach. Human capital in Nigeria was compared with those of Belgium, Poland, Saudi Arabia and Sweden that have been in contention for the 20th largest economy since 2009. The result revealed that the huge investment in education and health in 2011 and 2012 has produced mixed results in human capital development.

Loto (2011) studied the effects of government expenditures on security, health, education, transport, communication and agriculture in Nigeria using error correction test. He opined that expenditures on agriculture and education has negative as well as non-significant impact on the economy, while expenditures on health was positive and significant but that of transport, security and communication were though positive but non-significant.

Amassoma, Nwosa and Ajisafe (2011) used the error correction model to study the impact of government expenditure disaggregated into agriculture, education, health, transport and communication on the Nigerian economy with data from 1970 to 2010. Their study revealed that only agriculture expenditure had a significant impact on the economy. Others had insignificant influence on economic growth.

Oluwatobi and Ogunrinola (2011) in their study of the impact of capital and recurrent expenditure on education and health (human capital) and their effect on economic growth in Nigeria using error correction (ECM) from 1970 - 2006 discovered that there is a positive relationship between recurrent expenditure on human capital and level of real output but a negative relationship between capital expenditure and level of real output.

Ogujiuba and Adeniyi (2004) examined the impact of government education expenditure on economic growth. Their result showed a statistically significant positive relationship between economic growth and recurrent expenditure on education, while capital expenditure was wrongly signed and not significant in its contributions.

Chude and Chude (2013) studied the effects of public expenditure in education on economic growth in Nigeria over a period from 1977 to 2012, with particular focus on disaggregated and sectoral expenditures analysis using Error Correction Model (ECM). The study used ex-post facto research design and applied time series econometrics technique to examine the long and short run effects of public expenditure on economic growth in Nigeria. The results indicated that total expenditure on education is highly and statistically significant and have positive relationship on economic growth in Nigeria in the long run. The result has an important implication in terms of policy and budget implementation in Nigeria. The study concluded that economic growth is clearly impacted by factors both exogenous and endogenous to public expenditure in Nigeria.

Usman, Mobolaji, Kilishi, Yaru and Yakubu (2011) examined and analyzed the impact of the composition of public expenditure on economic growth in Nigeria. The study made use of aggregate production function based on Barro (1990) and Roma (1986). The econometric method used is vector error correction (VEC) model. The result shows that government expenditure on administration, education, transport and communication have negative impact on economic growth. However, expenditure on health and other services and foreign direct investment expenditures have positive impact on economic growth.

Ihejirika and Anyanwu (2015) in their study investigated Public sector capital expenditure and Economic Development in Nigeria from 1960 – 2013 using the Johanssen cointegration analysis, error correction model and Wald coefficient test to analyze the data. From the Johansson cointegration analysis, both the Trace test and Max-eigenvalue test indicates that the five variables system of equations were cointegrated at the 0.05 level of significance. The error correction model shows that long-run causality flows from the predictor variables to economic development. However, only Institutional and Transfers capital expenditures affect economic development in the short-run albeit positively and negatively respectively.

Chakraborthy (2003) explored the relationship between health and education spending and human development in panel data involving 14 developed and developing countries. The result revealed that capital expenditure has a positive impact on human development.

Shantayanan, Vinaya and Zon (2004) used data from 15 developing countries for 6 years to show that an increase in the share of current expenditure has positive and statistically significant growth effect on human development. However, the relationship between capital component of expenditure and human development was negative.

Reinikka and Collier (2001) used data from a series of household surveys in Uganda from 1992-1999 and found that education, rural development and agriculture have a major positive impact on human productivity and improving rural poverty, which are connected to human development.

3.0 Methodology

The Study adopted the quasi experimental research design. The quasi-experimental design allows for the evaluation of the effect of independent variables on a dependent variable. It involves the survey of existing data. The design was adopted because it seeks to explore the impact of the proxies for private sector investments on human capital development

The data for this work were collected from secondary sources. The data were obtained from the Central Bank of Nigeria statistical bulletin and World Bank Development Indicator published by World Bank from the period 1981 to 2015. These data contained information on public sector investments on administration, economic services, social and community service, transfers and Human Development Index (HDI) with respect to Nigeria.

The researcher used the Johansen co-integration test to test for long-run relationship between the variables. To investigate the short run dynamics between the variables when the variables in the model are co-integrated, the Vector Error Correction Mechanism (VECM) and ordinary least squares (OLS) multiple regression were equally employed. In other words, the VECM was used to correct the short term-analysis of co-integration test, if the short term analysis shows the existence of a spurious regression.

Model Specification

Model specification enables empirical exploration of economic phenomenon which is strictly guided by theoretical consideration. The relationship between the dependent variable Y and a set of k independent variables x_1, x_2…….x_n can be expressed as:

$Y_t = b_o + b_1x_1 + b_2x_2 ..... + b_nx_n + ……..e_t$ ……..2

Where:

Y= dependent variable

b_o = the intercept

b_1……b_n = slope or the parameters of the model to be estimated.

The model for this research is modeled as shown below:

HDI = f(ECS, , TRS, ADM, SCMS)…….3

The above functional relationship in its estimated form becomes:

$HDI = \alpha_0 + \alpha_1ECS_t + \alpha_2TRS_t + \alpha_3ADM_t + \alpha_4SCMS_t + e_t$ ……..4

Where:

HDI = Human Development Index

ECS = Public sector investments in Economic Services

TRS = Public sector investments in Transfers

ADM = Public sector investments in Administration

SCMS = Public sector investments in Social and Community service

t = time t

$\alpha_1 - \alpha_4$ = Parameters to be estimated or slope

α_0 = Intercept.

4.0 Analysis and Results

Stationarity Tests (Unit Root)

The detailed e-views unit root test for each of the variables included in the model can be seen on under the Appendix (**A1 to A5)**. However, the summary of the results of the said stationarity test conducted with the Augmented Dickey Fuller (ADF) unit root tests for the time series are presented on the table below.

Table 4.1 Augmented Dickey Fuller Unit Root Test Results

Variable	ADF t-statistic at 1st difference	Mackinnon critical values 5%	10%	Order of integration I (d)
HDI	**-9.249901**	**-2.954021**	**-2.615817**	**I (1)**
ADM	**-6.122993**	**-2.954021**	**-2.615817**	**I (1)**
ECS	**-7.575702**	**-2.954021**	**-2.615817**	**I (1)**
SCMS	**-6.656634**	**-2.954021**	**-2.615817**	**I (1)**
TRS	**-8.761140**	**-2.954021**	**-2.615817**	**I (1)**

Source: e-views 9.0 output

The unit root tests showed that at first difference, the value of the ADF test statistic with a maximum lag length = 1 for each of the variables are in absolute terms greater than the MacKinnon statistic at 5% and 10% level of significance. This therefore confirms that the variables are integrated at order one I(1) which further qualifies the research model for cointegration and error correction model analyses.

(Long Run Analysis)

Table 4.2 Johansen Co-integration Test

Date: 11/10/17 Time: 12:52
Sample (adjusted): 1983 2015
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: HDI1 ADMIN1 ECONOMIC1 SOCIA_COMM1 TRANSFERS1
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.618730	75.38557	69.81889	0.0168
At most 1	0.548631	43.56542	47.85613	0.1194
At most 2	0.314239	17.31488	29.79707	0.6168
At most 3	0.137085	4.866411	15.49471	0.8228
At most 4	2.75E-05	0.000907	3.841466	0.9766

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

Table 4.3

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.618730	31.82015	33.87687	0.0863
At most 1	0.548631	26.25054	27.58434	0.0733
At most 2	0.314239	12.44847	21.13162	0.5041
At most 3	0.137085	4.865504	14.26460	0.7587

At most 4	2.75E-05	0.000907	3.841466	0.9766

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: e-views 9.0

From the above table, under the first null hypothesis of none cointegration equation (CE), the trace statistics has value greater than the critical value which indicates rejection of the null, while the Max-Eigen test statistics have values lower than the critical values for all the tests. However, given the trace statistics, which established the existence of only one (1) cointegrating equation at 5% level of significance, it is revealed that there is a long-run relationship among the variables considered to necessitate for analysis of Error Correction Mechanism. Consequent upon this, the vector error correction mechanism was applied to determine causality among the cointegrated variables and speed of adjustments.

Vector Error Correction Estimates

The Error Correction Model (ECM) was used to estimate the long-run causality model between public sector variables and human capital development measured by human development index. In other words, it was applied to ascertain whether public sector investments cause human development.

The ECM estimates (see Appendix B) revealed that the error correction term for human development equation is properly signed with a negative coefficient of -0.134169 and a t-statistic of -1.23687. This implies that about (approximately) 13.42% of disequilibrium in the long run is corrected every year by changes in public sector investments. Furthermore, in order to ascertain and/or establish whether the t-statistics of -1.23687 is significant and confirm causality between human development index and public sector investment variables (i.e the predictor variables), the systems equation for HDI was extracted and estimated using OLS (Ordinary Least Squares) regression analysis.

Long-Run Causality

The estimated HDI system equation and the results (long-run causality test) are shown below.

Table 4.4 System Equation Results

Dependent Variable: D(HDI1)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 11/10/17 Time: 13:05
Sample (adjusted): 1983 2015
Included observations: 33 after adjustments
D(HDI1) = C(1)*(HDI1(-1) - 2.31439166451*ADMIN1(-1) - 0.466998900242
*ECONOMIC1(-1) + 2.8373806329*SOCIA_COMM1(-1) -
1.20387100682*TRANSFERS1(-1) - 0.0429657321771) + C(2)
*D(HDI1(-1)) + C(3)*D(ADMIN1(-1)) + C(4)*D(ECONOMIC1(-1)) + C(5)
*D(SOCIA_COMM1(-1)) + C(6)*D(TRANSFERS1(-1)) + C(7)

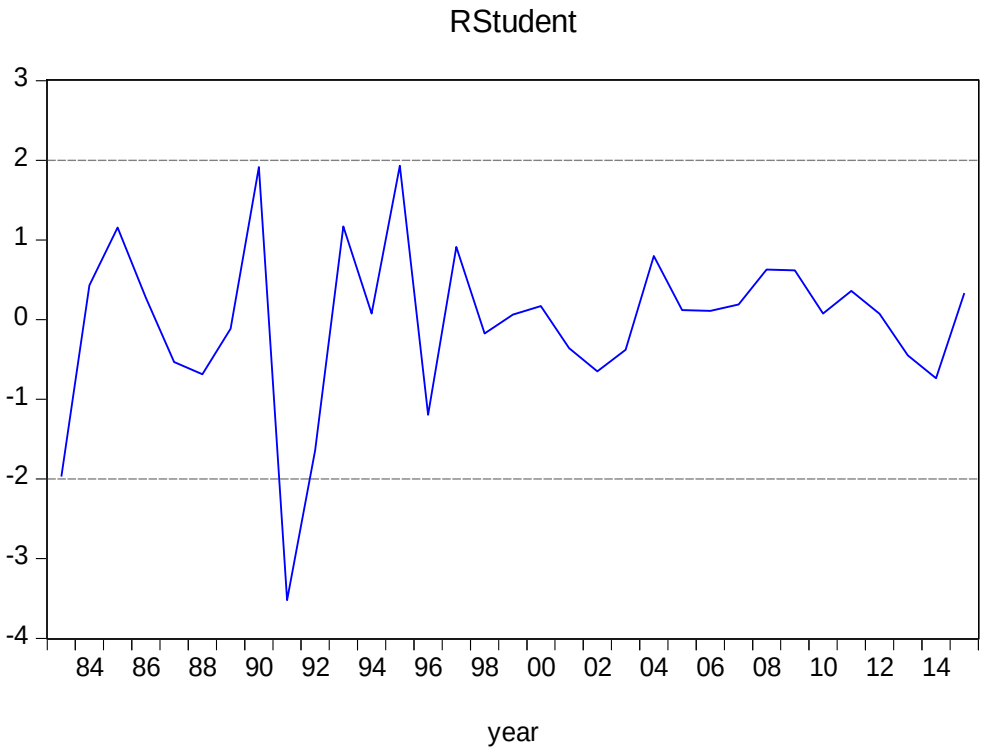
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.134169	0.108475	-1.236869	0.2272
C(2)	-0.394756	0.171162	-2.306332	0.0293
C(3)	0.038478	0.495216	0.077700	0.9387
C(4)	-0.034032	0.276918	-0.122895	0.9031
C(5)	0.158106	0.293378	0.538916	0.5945
C(6)	-0.074938	0.136770	-0.547915	0.5884
C(7)	0.105403	0.096249	1.095113	0.2835

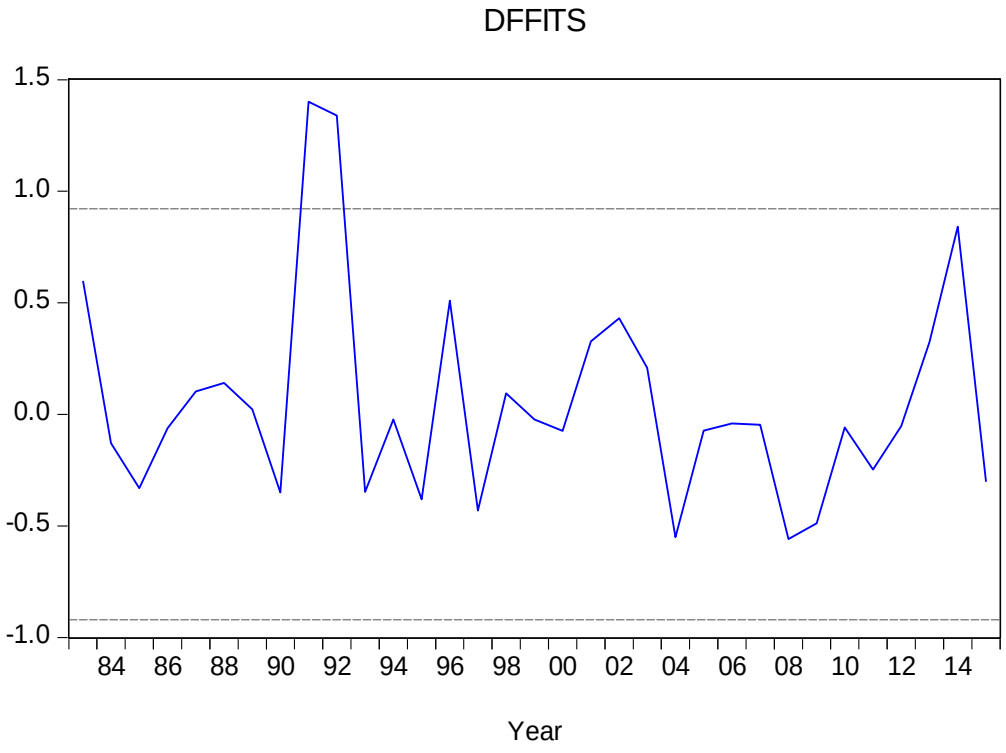
R-squared	0.250412	Mean dependent var	0.087620
Adjusted R-squared	0.077430	S.D. dependent var	0.553374
S.E. of regression	0.531519	Akaike info criterion	1.759674
Sum squared resid	7.345314	Schwarz criterion	2.077115
Log likelihood	-22.03463	Hannan-Quinn criter.	1.866484
F-statistic	1.447617	Durbin-Watson stat	2.258598
Prob(F-statistic)	0.234977		

Source: e-views 9.0

From table 4.4 above, C(1) is the coefficient of the co-integrated model for HDI and represents the speed of adjustment towards long run equilibrium. With a t-statistic probability value greater than 5% (0.2272) which is insignificant, the study indicates that public sector investment do not significantly granger cause human development. This outcome was further probed or investigated by checking if there were structural breaks in the system series using influence statistics (R-Student, Covratio and Dffits). However, C (2) is the coefficient of the cointegrated human development index and show that there is lon-grun relationship when the second cointegrating equation is used. This implies HDI along with other measures of public sector investments granger causes human development in the long run.

Influence Statistics





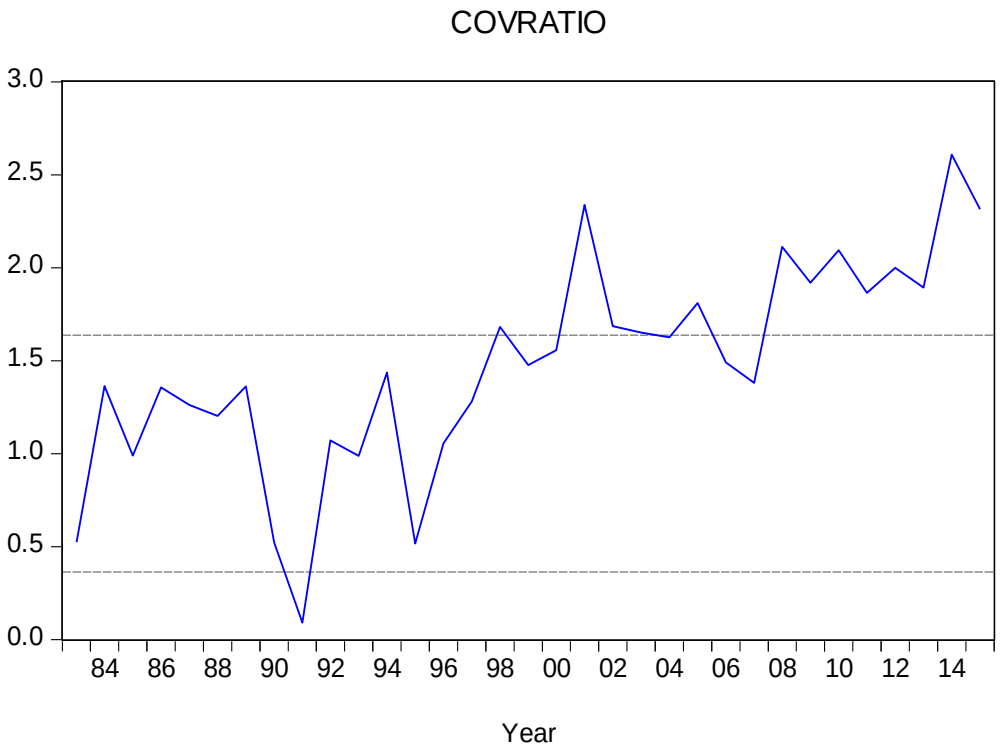


Figure 4.1 Plots of R Student, DFFITS and Covariance Ratios of HDI Equation 1981-2015.

From the above figures, further investigation using three variants of influence statistics (R Student, DFFITS and COVRATIO) obviously indicates that between 1991 up to 1993, 2000 up to 2006 and 2008 up to 2016 shows the presence of some structural changes in the system. This can be associated with changes in the economy say as a result of political instability, policy inconsistencies, high inflation rates, falling value of the naira etc. (fig 4.1 are variants of influence statistics mostly used to identify outliers in the system).

Granger Causality results

Table 4.5 Granger Causality results

Pairwise Granger Causality Tests
Date: 11/10/17 Time: 13:19
Sample: 1981 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
ADMIN1 does not Granger Cause HDI1	33	1.48644	0.2435
HDI1 does not Granger Cause ADMIN1		1.08828	0.3506
ECONOMIC1 does not Granger Cause HDI1	33	2.64153	0.0889
HDI1 does not Granger Cause ECONOMIC1		2.66183	0.0874
SOCIA_COMM1 does not Granger Cause HDI1	33	0.97300	0.3904
HDI1 does not Granger Cause SOCIA_COMM1		1.20970	0.3134
TRANSFERS1 does not Granger Cause HDI1	33	0.48543	0.6205
HDI1 does not Granger Cause TRANSFERS1		1.81689	0.1812

Source: e-views 9.0.

To further validate the above results, the pairwise granger causality results revealed there was neither bi-direction nor uni-directional relationship among the variables. That is neither public sector investments granger causes human development nor human development granger cause public sector investments.

Interpretation of Results

In order to achieve the objectives of the study, provide answers to the research questions and test the formulated hypotheses of the research, data were collected from the Central Bank of Nigeria statistical bulletin and World Bank Development Indicators published by World Bank on public sector investment variables and human development in Nigeria measured by Human Development Index. The Augmented Dickey Fuller (ADF) unit root was used to examine the order of integration of the variables in the analysis. The result of the unit root revealed that the variables were stationary at first difference (that is order I(1)) at 5% and 10% level of significance. This therefore qualifies the research model for cointegration and error correction model analyses employed.

The study subjected the variables among which are Human Development Index (HDI) Public sector investments on Administration (ADM), Economic services (ECS), Social and Community Service (SCMS), and Transfers (TRS) to the Johansen co-integration analysis. The test results using the Trace statistics revealed one (1) co-integrating equation at 5% level of significance. Hence, it was confirmed that there is the existence of long-run relationship between public sector investments and Human development in Nigeria within the period under review.

Using the Vector Error Correction Model, the study found that the error correction term for human development index (HDI) equation is properly signed with a negative coefficient of -0.134169 and insignificant t-statistic of -1.23687 (0.2272) at 5% level of significance. This implies that about (approximately) 13.42% of disequilibrium between public sector investment and human development is corrected every year by changes in public sector investments. This speed of adjustment of the model is considered to be weak as shown by the insignificant error correction term. Further investigations found that structural changes or breaks in the economy (political instability, policy inconsistencies, high rate of inflation, falling value of the naira vis-à-vis other exchange rates etc.) may have contributed to the distortion and disrupted causality from public sector investments to human capital development. These structural breaks were identified through the variants of influence statistics (R STUDENT, DFFITS and COVRATIO)

The findings herein conforms with the studies of Kairo et al (2017), Oluwatobi and Ogunriniola (2011) and Chude and Chude (2013), Ihejirika and Anyanwu (2015) who found long run relationship between public sector investments and economic development, but in terms of significant impact, it is contrary to the findings of Shantayanan, Vinaya and Zon (2004), Chakraborthy (2003) whose studies revealed that capital expenditure has a positive impact on human capital development.

5.0 Conclusion

The work majorly investigated the impact of public sector investments on human capital development in Nigeria. This was prompted by the need to examine the extent to which the rising public sector investments impacts on human capital development in Nigeria. There is no gain saying the fact that economic theory expects public sector investment to drive human capital development. Therefore, based on the Johansen co-integration test, the study

concluded that there is a long-run relationship between public sector investments and human capital development in Nigeria. Similarly, the VECM causality revealed that public sector investment insignificantly granger causes human capital development.

Recommendations

The following recommendations were made based on the findings of the research:

1. Government and stakeholders in the public sector should come up with policies to address the problems of economic imbalances. Addressing policy inconsistency and political instability through effective legislations and good political will to enforce work ethics in public sector (especially in ministries and MDAs) will go a long way in ensuring that public sector investments impact positively and significantly on human capital development.

2. The public sector needs to invest more resources on human capital development if the desired goal of being one of the fastest growing economies is to be attained. The manner in which public sector investments expenditures in relation to human capital development are implemented/executed should be revisited. Policies geared towards attaining the desired internationally acceptable human development standard should be made to accommodate changes inherent in the economy.

3. Integrity issues (corruption) must be put in check and transparency encouraged within the public sector. In situations where **disbursed** investment expenditures on human capital development is less than the **budgeted**, increases on the latter will have little or no impact on human capital development. Government anti-graft war should be intensified and not selective.

4. Public sector investment process should be made more participatory such that all levels of management/employees will be involved. It helps in boosting the morale of the workforce and makes them more accountable within the sector.

References

Akinyele, O. (2005) Poverty, Malnutrition and the Public Health Dilemma of Disease. University of Ibadan Postgraduate School of Inter-disciplinary.

Amassoma D, Nwosa P and Ajisafe R (2011) Components of Government Spending and Growth in Nigeria: An Error Correction Model. *Journal of Economics and Sustainable Development.* Vol. 2. No. 4.

Anand S and Kabur R (1993) Public Policy and Basic Needs Provision. Iteration and Achievement in Developing Countries In Richardson, K. E. (2014) Analyzing the Effects of Sectoral Spending on Human Development In Nigeria: Evidence from Panel Data. *IOSR Journal of Humanities and Social Science* Vol. 19, Issue 9 Pp 1-13.

CBN (20150 Central Bank of Nigeria Statistical Bulletin, Vol. 26

Chakraborty, L (2003) Public Expenditure and Human Development: An Empirical Investigation Paper presented at *International Conference on Inequality, Poverty and Human Well Being,* Helsinki, 30 – 31 May.

Chude, N. P. and Chude D. I (2013) Impact of Government Expenditure on Economic Growth In Nigeria. *International Journal of Business and Management Research.* Vol. 1. No. 14, Pp 64 -71 Dec.

Cooray, A (2009) Government Expenditure, Governance and Economic Growth. Comparative Economic Studies. Vol. 51. No. 3.

Ese U et al (2014) Toward Nigeria's Vision 20:20: Public Investment in Human Capital and Outcomes. *Journal of Economics and Sustainable Development.* Vol. 5 No. 4 Pp 179-185

Ifeanyi, o (2017)UNDP ranks Nigeria 152nd in human development index. Punch Online

Ihejirika, Peters O. and Godson Anyanwu (2015) Public Sector Capital Expenditure and Economic Development Nexus in Nigeria. *ARC Journal of Sustainable Development.* Vol. 1 Issue 1 Pp 59 – 70 Oct.

Kairo C. I, Mang N J, Okeke A , and Aondo D. C. (2017) Government Expenditure and Human Capital Development in Nigeria: An Auto-Regressive Distributed Lagged Model Approach (ARDL) *International Journal of Advanced Studies in Economics and Public Sector Management.* Vol. 5 No. 1 Pp. 143-158.

Loto, M. A. (2011) Impact of Government Sectoral Expenditure on Economic Growth in Nigeria *Journal of Economics and International Finance* Vol. 3 No. 11. Pp 646 -652.

Mba, Mba, Ogbuabor and Ikpegbu (2013) Human Capital Development and Economic Growth In Nigeria. *Journal of Economics and Sustainable Development.* Vol. 4 No. 18. P. 48

Musgrave, R.(1969) Theory of Public Finance: A Study of Public Economy, Kogashi. McGraw Hill.

Nnamocha, P. N. (2002) Public Finance for a Developing Economy: The Nigerian Application. Owerri. Bon Publishers

Nwaeze, C. (2010) Public Financial Management Theory and Practice. Aba. Reconciliation Publishers Ltd.

Nwinee, B. F. and Torbira L. L. (2012) Public Finance Management in Nigeria. PorthHarcourt. University of PortHarcourt Press.

Oluwatobi S. O and Ogunrinola I. O. (2011) Government Expenditure on Human Capital Development: Implications for Economic Growth in Nigeria. *Journal of Sustainable Development.* Vol. 4. No. 3. Pp 72 – 80.

Okereke, E. S. (2007) Dimensions of Project Evaluation Okigwe. Alvan Global Publications.

Okoro, A. S. (2013) Government Spending and Economic Growth in Nigeria (1980 – 2011). *Global Journal of Management and Business Research, Economics and Commerce, Volume 13, Issue 5, Version 1.0*

Obinna O. E. (2003) Public Finance. Nsukka. Ap and P Press Limited.

Oladeinde Olawoyin **(2017)** Nigeria ranked 152 of 188 countries in Human Development Index. Premium times

Richardson, K. E. (2014) Analyzing the Effects of Sectoral Spending on Human Development In Nigeria: Evidence from Panel Data. *IOSR Journal of Humanities and Social Science* Vol. 19, Issue 9 Pp 1-13.

UNDP (2006) Energizing Human Development. A Review of Energy-Human Development Nexus. *Human Development Strategy Paper*.

Usman A., Mobolaji H. I., Kilishi, A.A., Yaru M. A, and Yakubu T. A (2011) Public Expenditure and Economic Growth in Nigeria. *Asian Economic and Financial Review* 1(3) Pp 104 -113.