European Journal of Business and Management
ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online)
Vol.10, No.6, 2018

Public Sector Human and Material Capital Investments in Nigeria's Economic Growth Process: Evidence and Insights

IKECHUKWU.S. NNAMDI [1*] AKINPELUMI.F. OMOTAYO[2] PASCHAL ONUGHA [3 4]
snnamdi95@gmail.com tayofranklin1@yahoo.com vncpaschal@gmail.com
* - Department of Finance and Banking, University Of Port Harcourt, Port Harcourt, Nigeria.
[4] - Department of Management, University of Port Harcourt, Port Harcourt, Nigeria. vncpaschal@gmail.com

*E-mail of the corresponding author: snnamdi95@gmail.com

ABSTRACT
Motivated by the need to ascertain the nature of predictive relationships between government capital expenditures (human and material) and economic growth in Nigeria, this study employs secondary data sourced from Central Bank of Nigeria's Statistical Bulletin over the period 1981 to 2016 (36 years). Statistical techniques employed include Stationarity, Multiple Regression (OLS), Johansen's Co-integration, Error Correction and Granger Causality tests to evaluate the nature of short and long-run relationships that prevail, as well as the extent to which the variables of study do promote themselves in the growth process. Both the short-run (multiple regression) and long run (Error Correction) analyses confirm significant sensitivities and long run relationships between Nigeria's GDP and public sector material and human capital investments. However, the Granger Causality results provide substantial evidence to assert the prevalence of a significant disconnect between government's material and human capital expenditures and economic growth as they all fail to promote one another. Accordingly, the study concludes that governments' planned expenditures are not in-tandem with the nation's economic growth in Nigeria. Consequently, the study recommends that to achieve a greater level of coherence in Nigeria's government expenditures, the following measures need to be taken; (i) Successive administrations must incorporate all previous and uncompleted projects by previous regimes in their current plans for execution in order to minimize large scale prevalence of white elephant projects (uncompleted and abandoned projects) by successive regimes. (ii) Policy summersaults and inconsistencies must hence forth, be avoided by successive governments in Nigeria (iii) Strict adherence to budgetary and fiscal discipline as well as consistency of timing of commencement of annual budget implementations must prevail to avert further wastes in values of public funds and programmes.

Keywords: Human Capital Investment, Material Capital Investment, Public Sector, Economic Growth.

1. INTRODUCTION

The nature, essence, dimensions and influence of capital expenditures on corporate and national economic performances have generated significant debates at academic and policy levels over the years. Generally, classical and Neo-classical economic theories assume that savings and investment growth process of nations and the resulting capital accumulation all tend to be gradual. Consequently, they induce a gradual economic growth trend. In this vein, the lead study of Nurske (1953) contends that nations should not apportion the whole of their periodic outputs to immediate consumption. Rather, they should endeavor to save and subsequently allocate such saved resources to the production of capital goods which include tools and instruments, machineries and transport facilities as well as plant and equipment in order to facilitate extensive production of consumable outputs for the comfort of their future generations. Particularly, the study views capital formation as involving only the accumulation of material/physical capital and goods.

Later studies including Bowman (1961), Kuznets (1961, 1971) as well as Schultz (1962) offer a more comprehensive view of capital formation and contend that an appropriate definition of capital formation investments should incorporate both material and human capital aspects. To these Scholars therefore, capital formation embraces investments in material or physical capital, as well as those other investments or public expenditures on development of intangible goods including high standards of education, health, scientific tradition, research, and recreation. Other public expenditures include those outlays towards elevating the morale of the populace. The contention of these scholars is that investments in human capital substantially improve the lives and living standards of the entire citizenry. In this perspective, Usman *et al.,* (2011) observe that one of the most important macroeconomic objectives in Nigeria is the achievement of accelerated economic growth with consequent reduction in poverty. In order to achieve this laudable objective, certain key variables that can substantially influence national economic growth need to be properly identified. In furtherance of this observation, Oluwatobi and Ogunriola (2011) assert that of all possible influential variables on economic growth

and increased productivity, human and material capital investments remain outstanding. To this end, effective investments in human and material capital components would for all intents and purposes, constitute the vital parts of any sustainable economic growth and productivity policies. In the same vein, Shaheen *et al.,* (2013) note that human and material capital investments which produce better skilled, learned, informed and creative workforce, would significantly contribute to minimization of waste of resources in the economy. In this vein, Usman et al (2011) argue that it partly, explains the need for state intervention in provision of public facilities to ensure improved conditions for future generations. Nigeria is still one of the less developed economies in the world. Consequently, given Nigeria's present level of economic, technological and human skills development, it may be appropriate to assert that the country needs significant quantum of material and human capital investment expenditures in order to improve on her present level of output and efficiency of production. Other areas craving for urgent improvement would include technological capacities, basic social and economic services, health, education, agricultural techniques, infrastructural facilities like roads, railways, telecommunications, disaster controls and management, power etc.

However, there seems to be no consensus in literature even on empirical basis, as to any set of defined, definite and universally accepted set of relative influences of classified government's human and material capital investment expenditures on economic growth of nations, whether in developed or less developed economies. The trend of results even when a study's explanatory variables are significantly decomposed or disaggregated as adopted in Usman *et al.,* (2011), tends to be conflicting or at best, country specific. Further, there is a relative dearth of current literature especially in Nigeria as evidenced by Nurudeen and Abdullahi (2010), Oluwatobi and Ogunrinola (2011) as well as Usman *et al.,* (2011). These studies employ secondary data that ended in 2008 and 2009 respectively thereby, necessitating a review in order to ascertain the extent to which new evidences prevail as to the relative influences of these capital expenditure components as well as the level to which they valuably support, promote and reinforce themselves in Nigeria's economic growth process. The fundamental need for an urgent revisit in the light of current data which remains duly informed by recent socio-economic developments within the Nigerian polity and economy constitutes therefore, the core problem of this study and consequently informs its objectives.

This study covers the period 1981 to 2016 (36 years) and is basically limited to Nigeria although available literature from the international community are significantly incorporated. On the whole, it is hoped that the results will assist fiscal policy managers with verifiable information on the empirical relevance of public sector material and human capital expenditures in Nigeria, especially as they relate to the nation's economic growth. Further, the results are hoped to be of valuable assistance to the government for any possible moderation of public sector capital investment expenditures, programmes and policies when necessary.

While an overview has been provided above, the rest of this study is rendered in four parts. Section 2 offers the theoretical framework and literature review while section 3 deals with the materials and methods. Section 4 addresses presentation of the results, while section 5 concludes the study with discussions, conclusions and recommendations.

2. THEORETICAL FRAMEWORK AND REVIEW OF PREVIOUS STUDIES.

This section is subdivided as follows for clarity:

2.1 Theoretical framework

The theoretical foundations for this study are presented in the following sub-sections;

2.1.1 The Balanced Growth Theory.

Formalized through the studies of Nurske (1953), the Balanced Growth Theory advocates that investors in developing economies need to conduct large scale investments simultaneously in diversified number of sectors and/or industries in order to achieve the benefits of enlarged market size, increased productivity, enhanced purchasing power, increased domestic demands, and ultimately, provide fertile grounds for private sector participation in economic growth. However, this theory is limited by the fact that only governments may have the capacity to initiate such massive investments because of the associated risks. This reasoning invariably, excludes private sector participation in such lumpy investment programmes as observed by Ray (2010).

2.1.2 The Theory of the Big Push:

Rosenstein-Rodan (1943) contends that less developed economies are not significantly developing and would likely find it difficult to achieve the take-off stage of development. The theory contends that for the take-off

stage of national economic development to be achieved, there is required, a minimum critical quantum of investment which must be lumped in at a point in time for this take off stage to be achieved. Likened to the minimum ground speed which an aeroplane must achieve as well as the minimum up-thrust the plane must exert for it to be lifted off the tarmac, the theory contends that attempts to either save and invest resources gradually or bit-by-bit basis will never allow for achievement of this up-thrust as the forces of depreciation and obsolence, will continually deplete the value of the partly accumulated investable resources. However, critics including Ellis (1958) and viner (1956) are quick to observe that the indivisibility characteristic of investment programmes does constitute a significant limitation to this theory and its application.

2.1.3 Theoretical Bases for Investment in Human Capital:

A significant number of scholars have paid serious attention to the influence of human capital investments on economic growth of nations. In this wise, Meier (1976) observes that at academic and policy levels over the years, greater emphasis has been on increased investments in physical/material capital relative to human capital investments. However it has become apparent in recent periods, that similar priorities must be accorded to investments in human capital. The study further observes that statistics have evidenced that material and human investments contribute to obvious improvements in outputs and their compositions. However, the contributions of human capital investments to these changes in output have not in any way, remained lower than those of material capital investments. In this wise, Myint (1954; 1962) observes that the undeveloped nature of human capital resources is fundamental in explaining the economic backwardness of less developed economies. In related developments, Lewis (1962) as well as Musgrave (1966) attribute significant level of importance to education as a prerequisite for jumpstarting and accelerating the development of backward economies, while acknowledging the wide range of externalities associated with investment in human education. Equally of importance are the contributions of investment in social infrastructure as elucidated by Myint (1963) as well as the relevance of the contrubutions of investments in human resources to national economic growth evidenced in the work of Harbison (1962).

2.2 Review of Previous Studies

Barro (1991) executes a cross section study of a sample of 98 countries over the period 1960 to 1985. Employing average annual growth rates of real per capita GDP as well as the ratio of real government expenditure to real GDP, the study concludes that the empirical relationship between the sampled countries' economic growths and government consumption is negative and significant. Jong-Wha (1995) provides further evidence on the relationship between government capital goods import expenditure and economic growth. Evidences from the study generally suggest a significant relationship between government expenditure and economic output. In addition, the study finds that the composition of investment and the volume of capital accumulation significantly contribute to economic growth.

Landau (1986) finds that increased share of government expenditure relative to GDP reduces economic growth. In this perspective, the findings are consistent with pro-market perspective reasoning which contends that increased government expenditure has the potential to reduce overall economic growth of nations in the long-run. Kelly (1997) explores the effects of public expenditures on national economic growth among 73 countries over the period, 1970-1989. The results provide substantial evidence to suggest that the contributions of public investments and social expenditures to economic growth, are rather significant. Alexiou (2007) studies the effects of public expenditure on Greek economy and finds that disaggregated government expenditures provide stronger explanations for the estimation of empirical relationships between government expenditures and growth of the Greek economy. Further, Aschauer (2000) documents a positively significant relationship between government expenditure and economic growth in a sample of selected countries. Bose *et al.,* (2007) evaluate the growth effects of sectoral public expenditures for a sample of 30 developing countries on employment of panel data covering the period of 1970-1990. The findings show that public capital expenditures positively correlate with economic growth. However, at sectoral level, government expenditure on education remains the only outlay which remains significant throughout the analysis.

Haque and Kim (2003) examine the effects of public investments on economic growth using 15 developing countries through employment of dynamic panel data technique. The results show that public investments in transportation have significant effects on economic growth. Egert et al., (2009) examine the effects of infrastructural investment on economic growth. Cross-country regression was adopted. The results confirm that investments in telecommunications and energy generation do have valuable effects in economic growth. Similarly, Romp and De-Haan (2005) survey empirical literature and conclude that with respect to majority of contributions, public expenditures induce economic growth. In an earlier study, Landua (1986) incorporates human and physical capital, political and international conditions as well as a 3-year lag in government

spending. Government spending was purposely disaggregated to include investments, transfers, education, defense and other government consumption. The outcome shows that government consumption has a significant but negative influence on growth. On the other hand, spending on education relates positively to economic growth but not statistically valuable or material.

Ram (1986) employs production functions approach to the evaluation of the effects of public expenditures on the private and public sectors of the economy. Spanning across 115 countries, public expenditure was found to exert valuable externalities on the growth of the economies sampled. Singh and Weber (1997) investigate the link between economic growth and public expenditures in Switzerland over the period 1950-1994. Classified public expenditures embracing social welfare, justice, education, transport, national defence and health were regressed over Swiss GDP. The results provide valuable evidence to conclude that public fiscal spending does materially influence Swiss GDP. On particular basis, education and health are found to exhibit permanent effects on economic growth, while the rest of social welfare, justice, transport and national defence are statistically not material. On the whole, while expenditures on education positively and significantly relate with GDP, health expenditures are found to present negative but significant relationships with Swiss GDP.

Within the Nigerian environment, contributions to the subject have continued to increase. In this direction, Iheanacho (2016) examines the prevailing short and long run relationships between public fiscal spending and Nigeria's economic growth through the application of Johansen's Co-integration and Error Correction estimations. The study derives two components of government's fiscal spending from gross capital formation through Cobb-Douglas function. The results display a concerted evidence of insignificant long-run relationship between government spending and GDP. However, the short-run estimates provide evidence that government's recurrent expenditures constitute the key drivers of Nigeria's economy.

Nurudeen and Abdullahi (2010) observe that despite Nigerian government's rising expenditure profile, the level of poverty is still on the increase. Employing a disaggregated approach to government fiscal spending, the results indicate that government's capital expenses, recurrent expenses and expenditure on education all relate negatively to Nigeria's GDP. On the other hand, expenditure on transport, communications and health relate positively to GDP. The study recommends increased fiscal spending in those sectors that promote Nigeria's GDP while minimizing expenditures in those sectors that show negative or insignificant relationships with Nigeria's GDP. Usman and Agbede (2015) examine state expenditures and economic growth in Nigeria over the period 1970-2010. The long run results reveal positive and significant relationship between the set of capital and recurrent government expenditures and Nigeria's GDP. On the other hand, the short-run results provide evidence to assert that Nigeria's GDP has positive and significant relationship with recurrent expenses while displaying negative but significant relationship with capital expenses. The employed Granger Causality results provide significant evidence of uni-directional causalities between Nigeria's GDP and each of current and capital expenditures with Causality flowing from GDP to each of the capital and recurrent expenditures. The study recommends that improved and sustained economic growth should be stimulated in Nigeria by ensuring equal allocation of state investable financial resources to both capital and recurrent expenditures.

Ogiogio (1995) finds significant long-run relationship between government expenditure and economic growth in Nigeria. The study further concludes that recurrent expenditure exerts relatively stronger influence on Nigeria's economic growth than capital expenditure. In another development, Dike-Ogu *et al.,* (2016) evaluate the influence of Nigeria's public expenditure on her economic growth over the period 1970 to 2013. The study employs public expenditure in both aggregated and disaggregated forms and utilizes the stock of money supply as a check variable. Statistical techniques including Augmented Dickey Fuller, Multiple Regression and Error Correction Estimations were employed. The results provide compelling evidence to assert that while aggregated government expenditures do not significantly influence Nigeria's GDP, the disaggregated expenditures do significantly influence it. The study recommends appropriate channeling of investable resources in order to stimulate significant economic growth and price stability in Nigeria, while strengthening the appropriate institutional framework to check corruption, minimize fund diversion and leakages, as well as misappropriation of funds within the fiscal system.

Finally, Egbo, et al., (2016) examine the nature of empirical relationships prevailing between state disaggregated expenditures and economic growth in Nigeria over the period 1970 to 2014 from a growth perspective. Stationarity, Multiple Regression, Johansen's Co-integration, Error Correction and Granger Causality tests were employed. The outcome indicates positive and significant short-run relationships between Nigeria's GDP and fiscal expenditures on administration, social/community services and transfers, while economic services relates negatively but significantly with GDP. The Granger Causality results indicate a valuable unidirectional Causality between Nigeria's GDP and economic services with Causality flowing from GDP to economic services.

Consequently, the study recommends guided channeling of scarce spendable financial resources substantially to economic services in order to achieve a speedy revitalization of the dwindling Nigerian economy.

3. MATERIALS AND METHODS

For clarity of presentation and analysis, this part is further divided into the sub-parts that follow;

3.1 Data and Employed Variables Description:

This study employs published annual data on gross domestic product (GDP), government human capital investment expenditures (GHCE) which encompass all capital expenditures on education, health, social and other community services as they relate to government's capital outlays. On the other hand, government's material capital investment expenditures (GMCE) relate to agriculture, construction, transport, communications, economic services and others. The data were sourced from Central Bank of Nigeria's Statistical Bulletin covering the period 1981-2016 as shown in table 1 below:

Table 1: Government's Capital Investment Expenditures on Education, Health, Social and Community Services, Other Social and Community Services, Aggregate Human Capital Investment Expenditure, Governments Material Capital Expenditures on Agriculture, Construction, Transport and Communication, Other Economic Services, Other Government Capital Expenditure and Aggregate Material Capital Investment Expenditures in Nigeria over the period 1981-2016 (N'B).

Year	GDP (1)	Education (2)	Health (3)	Social and Community Service Capital Expenditure (4)	Other social and community services (5)	Aggregate Human Capital Investment Expenditure 6 = (1 to 5)	Agriculture (7)	Construction (8)	Transport & Communication (9)	Other economic services (10)	other capital Government Expenditure (11)	Aggregate Material Capital Investment Expenditure 12 = (7 to 11)
1981	15,258.0	0.17	0.08	1.30	0.04	**1.59**	0.01	0.10	0.03	0.03	3.6	**3.81**
1982	14,985.1	0.19	0.10	0.97	0.05	**1.30**	0.01	0.11	0.04	0.04	2.5	**2.74**
1983	13,849.7	0.16	0.08	1.03	0.04	**1.32**	0.01	0.09	0.03	0.03	2.3	**2.46**
1984	13,779.3	0.20	0.10	0.24	0.05	**0.59**	0.02	0.12	0.04	0.04	0.7	**0.87**
1985	14,953.9	0.26	0.13	1.15	0.07	**1.61**	0.02	0.15	0.05	0.05	0.9	**1.17**
1986	15,238.0	0.26	0.13	0.66	0.07	**1.12**	0.02	0.15	0.05	0.05	1.1	**1.38**
1987	15,263.9	0.23	0.04	0.62	0.03	**0.92**	0.05	0.41	0.18	0.06	2.2	**2.85**
1988	16,215.4	1.46	0.42	1.73	0.23	**3.84**	0.08	0.69	0.23	0.22	2.1	**3.35**
1989	17,294.7	3.01	0.58	1.84	0.64	**6.07**	0.15	0.49	0.30	0.48	3.9	**5.35**
1990	19,305.6	2.40	0.50	2.10	0.49	**5.49**	0.26	0.63	0.29	0.43	3.5	**5.10**
1991	19,199.1	1.26	0.62	1.49	0.80	**4.17**	0.21	0.41	0.24	0.45	3.1	**4.45**
1992	19,620.2	0.29	0.15	2.13	0.89	**3.47**	0.46	1.14	0.55	0.93	2.3	**5.42**
1993	19,928.0	8.88	3.87	3.58	1.91	**18.24**	1.80	2.32	2.03	1.60	18.3	**26.09**
1994	19,979.1	7.38	2.09	4.99	0.61	**15.08**	1.18	1.14	0.45	1.14	27.1	**31.01**
1995	20,353.2	9.75	3.32	9.22	0.75	**23.04**	1.51	1.70	1.08	1.63	43.1	**49.07**
1996	21,177.9	11.50	3.02	8.66	1.47	**8.66**	1.59	0.93	2.07	0.16	117.8	**117.83**
1997	21,789.1	14.85	3.89	6.90	3.32	**28.96**	2.06	1.81	1.58	0.75	169.6	**175.81**
1998	22,332.9	13.59	4.74	23.37	3.11	**44.81**	2.89	5.63	1.92	1.13	200.9	**212.44**
1999	22,449.4	43.61	16.64	17.25	11.12	**88.62**	59.32	16.64	11.12	0.00	323.6	**410.66**
2000	23,688.3	57.96	15.22	27.97	11.61	**112.75**	6.34	4.99	3.03	14.23	111.5	**140.10**
2001	25,267.5	39.88	24.52	53.34	15.23	**132.97**	7.06	7.20	33.93	4.81	259.8	**312.77**
2002	28,957.7	80.53	40.62	32.47	31.03	**184.65**	9.99	7.45	29.39	6.12	215.3	**268.28**
2003	31,709.4	64.78	33.27	55.74	4.56	**158.34**	7.54	16.95	22.68	48.90	98.0	**194.05**
2004	35,020.5	76.53	34.20	30.03	23.66	**164.42**	11.26	14.90	8.07	24.56	167.7	**226.50**
2005	37,474.9	82.80	55.66	71.36	13.19	**223.01**	16.33	17.92	8.04	22.03	265.0	**329.34**
2006	39,995.5	119.02	62.25	78.68	12.90	**272.85**	17.92	20.06	9.77	31.94	262.2	**341.89**
2007	42,922.4	150.78	81.91	150.90	23.99	**407.57**	32.48	71.36	32.16	43.06	358.4	**537.45**
2008	46,012.5	163.98	98.22	152.17	70.73	**485.10**	65.40	94.46	67.39	86.50	504.3	**818.04**
2009	49,856.1	137.12	90.20	144.93	126.87	**144.93**	22.44	80.63	90.03	230.52	506.0	**506.01**
2010	54,612.3	170.80	99.10	151.77	281.00	**702.67**	28.22	57.09	42.41	435.04	412.2	**974.95**
2011	57,511.0	335.80	231.80	92.85	217.84	**878.29**	41.20	195.90	13.10	60.30	386.4	**696.90**
2012	59,929.9	348.40	197.90	97.40	243.76	**887.46**	33.30	83.30	23.20	90.30	320.9	**551.00**
2013	63,218.7	390.42	179.99	154.71	273.66	**998.77**	39.43	92.19	18.51	141.10	505.8	**797.00**
2014	67,152.8	343.75	195.98	111.29	235.03	**886.06**	36.70	116.30	18.30	95.10	393.4	**659.85**
2015	69,023.9	325.19	257.72	82.98	224.71	**890.60**	41.27	114.60	24.39	95.10	348.7	**624.10**
2016	67,931.2	341.88	202.36	79.63	237.25	**861.12**	36.58	98.67	20.73	101.76	261.3	**519.01**

Source: Central Bank of Nigeria, Statistical Bulletin (2016).

Nigeria's GDP is carried at current prices since it is historical in nature in order to have the same base with aggregated government's material and human capital investment expenditures over the period of study. Consequently, no attempt is made to deflate any of the variables of study for consistency purposes;

3.2 Model Specifications

Since government's Capital outlays in the form of human and material capital investment expenditures theoretically induce some multiplier effects on the economy, the generalized form of the model adopted for this study following Kelly (1997), Usman and Agbede (2016) as well as Dike-ogu *et al.,* (2016) is specified as follows;

GDP = *f*(GHCE; GMCE) (1)

Where;

GDP = Gross Domestic Product

GHCE = Government Human Capital Investment Expenditure.

GMCE = Government's Material Capital Investment Expenditure.

For estimation purposes, equation (I) is re-written as follows;

$GDP_t = \beta_0 + \beta_1 GHCE_t + \beta_2 GMCE_t + \mu_t$ (2)

Where

β_0 = Constant/intercept, β_1 and $\beta_1$are coefficients for GHCE and GMCE respectively while μ_t is the stochastic term.

3.3 Apriori Expectations:

Given that increases in government's human and material capital investment expenditures would theoretically be expected to induce some multiplier effects on Nigeria's economy, it is correspondingly expected that sensitivities of Nigeria's GDP to increases in those capital investment expenditure components will each be greater than zero. Accordingly, we expect that;

$\beta_1 > 0, \beta_2 > 0.$

3.4. Specification of Analytical Tools and Tests.

This study is basically driven by the need to ascertain empirically, the relative influences of government's human and material capital investment expenditures on economic performance in Nigeria. Further the study is also to ascertain the extent to which government human and material capital investment expenditures do promote and/or support economic growth and vice-versa in Nigeria. For clarity, this sub-section is further detailed as follows;

3.4.1 Stationarity Tests:

The stationarity properties or otherwise of the time series data employed would need to be ascertained through unit root tests. This is to ensure that employment of the time-series data will not lead to any spurious estimates. In this vein, according to Brooks (2009), the Augmented Dickey Fuller (ADF) test is deployed. The decision rule is to reject the null hypothesis when the resulting ADF test statistic is on absolute basis, more than all their associated Mackinnon's critical values at 1%, 5% and 10% levels of significance.

3. 4.2 Multiple Regression (Ordinary Least Squares) Test

The multiple regression test captures the short-run estimates of the prediction function. Accordingly, the significance level of the corresponding t-statistic of any of the independent variables is expected to be not less than 0.05 for the null hypothesis of statistical insignificance to be rejected, in accordance with Maddala (2007), Brooks (2009) and Gujarati et al., (2009).

3.4.3 Johansens's Cointegration Test:

Johansen's Co-integration test was utilized to ascertain the level of long-term equilibrium relationship that prevails among the employed set of study variables (Brooks, 2009). The decision rule according to Maddala(2007) is that the value of the Max-Eigen statistics should be higher than the critical value at 0.05 level.

3.4.4 Error Correction Estimates, (ECM).

Brooks (2009) asserts that the ECM tends to evaluate the extent of long-run sensitivities of the explained variable to variations in each of the explanatory variables. Further, it provides information on the speed at which the dependent variable adjusts back to long-run equilibrium following short run distortions in the independent variables.

3.4.5 Granger Causality Tests:

Following the works of Brooks (2009), PairWise-Granger Causality is employed to evaluate the extent to which variations in a given set of independent variables tend to support changes in the dependent variable as well as the extent to which inclusion of the lagged values of the variables can improve the explanation and vice versa in accordance with equations (3) and (4) below:

$$\gamma t = \beta 0 + \sum_{i=k}^{n} \beta i \gamma t - i + \sum_{i=k}^{n} \beta \mu \, Xt - i + \mu t \quad (3)$$

$$Xt = \alpha 0 + \sum_{i=k}^{n} \alpha i \gamma t - i + \sum_{i=k}^{n} \alpha i \, \gamma t - i + Vt \quad (4)$$

4. PRESENTATION OF RESULTS

4.1 Presentation of Stationarity (Unit Root) Test Results:

The results of the stationarity tests for all the study variables are presented in table 2 below:

Table 2: Results of Stationarity (Unit Root) Tests:

Differenced Variable	ADF Test statistic	Mackinnon's Critical Values at 1%, 5% & 10%			Order of Integration	Prob.
		1%	5%	10%		
D(GDP)	-3.958449	-3.639407	-2.951125	-2.614300	I(1)	0.0029
D(GHCE)	-7.361128	-3.639407	-2.951125	-2.614300	I(1)	0.0000
D(GMCE)	-10.33732	-3.639407	-2.951125	-2.614300	I(1)	0.0000

D(GDP), D(GHCE) and D(GMCE) denote the differenced variants of Gross Domestic Product, Government Human Capital Investment Expenditure and Government Material Investment Expenditure respectively.

Source: Extracts from E-Views 10 Output.

Table 2: above offers the stationarity test outcome of the study's time series data. It shows that the absolute values of the ADF test statistics for the study variables are all greater than their respective Mackinnon's critical values at 1%, 5% and 10% levels. All the variables in the study are therefore integrated of order I(1). As such, the time series data are deemed good for employment in subsequent empirical estimations.

4.2 Presentation of the Multiple Regression (OLS) Results

To evaluate the short term relationships that prevail and the extent of variations in the dependent variable attributable to changes in the predictor variables in the short run, the multiple regression test was employed. The results are shown in table 3 below:

Table 3: Results of Multiple Regression (OLS) test:

Dependent Variable: GDP

Method: Least Squares

Date: 08/25/17 Time: 17:36

Sample: 1981 2016

Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17952.00	1166.486	15.38981	0.0000
GHCE	38.87209	5.170677	7.517795	0.0000
GMCE	16.81371	6.035159	2.785960	0.0088

R-squared	0.926385	Mean dependent var	31757.15
Adjusted R-squared	0.921924	S.D. dependent var	18151.71
S.E. of regression	5071.978	Akaike info criterion	19.98050
Sum squared resid	8.49E+08	Schwarz criterion	20.11246
Log likelihood	-356.6491	Hannan-Quinn criter.	20.02656
F-statistic	207.6396	Durbin-Watson stat	2.094601
Prob(F-statistic)	0.000000		

Source: Extracts from E-Views 10 Output.

Table 3 above shows a coefficient of determination (R^2) value of 0.926385. This implies that variations in the study's explanatory variables in the short run, account for 92.64% of the changes in gross domestic product in Nigeria's economy. Consequently 7.36% of the variations is attributed to other variables not captured in the study. The results indicate that in the short run, both government material and human capital investment expenditures in Nigeria are important in explaining the changes in output level in Nigeria. On the whole, Nigeria's GDP is more sensitive to changes in governments human capital investment expenditures (38.87) compared to 16.81 for government's material capital investment expenditures in the short-run. Further, the probability value of 0.000 for the f-statistic depicts a good line of fit, while the Durbin-Watson statistics value of 2.094601 is within acceptable range.

4.3 Presentation of Johansen's Co-integration Test Results:

The output of Johansen's Cointegration test for all the employed time series variables are summarized in table 4 below:

Table 4: Results of Johansen's Unrestricted Cointegration Rank Test:
Test (Maximum Eigen Value):

Obs	Series	Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
23	D(GDP)	None *	0.710742	40.93438	21.13162	0.0000
23	D(GHCE)	At most 1 *	0.470145	20.96001	14.26460	0.0038
23	D(GMCE)	At most 2	0.112922	3.954153	1.841466	0.0667

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

** denotes rejection of the hypothesis at the 0.05 level*

***MacKinnon-Haug-Michelis (1999) p-values*

Source: Extracts from E-Views 10 Output.

Johansen's Cointegration test results shown in table 4 above evidence prevalence of two co-integrating equations. This therefore, confirms the prevalence of a significant long term relationship among the variables under study.

4.4. Presentation of Error Correction Estimates:

To evaluate and correct for the errors existent between the long and short run dynamics in the study, the error correction estimation was executed. The results are shown in table 5 below:

Table 5: Results of Error Correction Estimation:

Dependent Variable: GDP
Method: Least Squares
Date: 08/25/17 Time: 18:00
Sample (adjusted): 1982 2016
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18383.84	1271.995	14.45276	0.0000
GHCE	40.12496	5.483762	7.317049	0.0000
GMCE	14.51687	6.683995	2.171886	0.0376
ECM(-1)	-0.582372	0.200818	2.900000	0.0445

R-squared	0.926656	Mean dependent var	32228.55
Adjusted R-squared	0.919558	S.D. dependent var	18191.76
S.E. of regression	5159.593	Akaike info criterion	20.04231
Sum squared resid	8.25E+08	Schwarz criterion	20.22007
Log likelihood	-346.7405	Hannan-Quinn criter.	20.10367
F-statistic	130.5554	Durbin-Watson stat	1.952896
Prob(F-statistic)	0.000000		

Source: Extracts from E-Views 10 Output.

From Table 5 above, the absolute value of the ECM coefficient stands at 0.582372 with the expected negative sign. This implies that approximately 58.24% of the disequilibrium in gross domestic product (GDP) is offset within the year by changes in government's human and material capital investment expenditures. On the other hand, the coefficient of determination (R^2) of 0.926656 indicates that about 92.67% of the variations in gross domestic product in Nigeria in the long run, is accounted for by variations in the study's explanatory variables. Further, the results show that both material and human capital investment activities executed by the government significantly influence economic growth in the nation at 0.05 level. However, it could be observed that the level of significance for human capital investment expenditures is 0.0000, while that of material capital investment expenditures is 0.0376 (approximately 96.24% confidence level).

4.5 Presentation of Granger Causality Test Results:

The results of the Pair-Wise Granger Causality tests are presented in table 6 below:

Table 6: Results of Pair-wise Granger Causality Tests:

Pairwise Granger Causality Tests
Date: 08/25/17 Time: 17:59
Sample: 1981 2016
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
D(GHCE) does not Granger Cause D(GDP)	33	1.53097	0.2339
D(GDP) does not Granger Cause D(GHCE)		2.10136	0.1412
D(GMCE) does not Granger Cause D(GDP)	33	0.02592	0.9744
D(GDP) does not Granger Cause D(GMCE)		1.01706	0.3746

Source: Extracts from E-Views 10 Output.

The results of pairwise Granger Causality tests presented in table 6 above provide material evidences to conclude the absence of both unidirectional and bidirectional causalities between Nigeria's gross domestic product (economic growth) and each of government's human and material capital investment expenditures. This implies the prevalence of Schumperterian independent hypothesis as both aggregated public human and capital investment expenditures failed to promote Nigeria's economic growth and vice-versa.

5. DISCUSSIONS, CONCLUSIONS AND POLICY RECOMMENDATIONS.

The results of this study provide compelling evidence to assert that irrespective of significant short and long run relationships that prevail between Nigeria's economic growth and each or the set of government's human and material capital expenditures, the Granger-Causality results allude to the fact that changes in Nigeria's economic growth significantly fail to be significantly promoted or supported by government's human and material capital investment expenditures. There is therefore a valuable prevalence of Schumpeterian independent hypothesis whereby growth in Nigeria's economy and public's human and material capital investments move independently. The above results though surprising, might probably have emanated from the prevalence in Nigeria of (i) erratic and inconsistent government policies which have over the years, paved way for frequent government policy somersaults, (ii) government's consistent disregard for consistency in timing and implementation and or execution of approved budgets, (iii) wide scale adoption of periodic/specific government regime policies that have obviated budgetary discipline and led to large-scale abandonment of previous governments' approved projects and policies by succeeding administrations and (iv), complete disconnect between educational and health policies and national economic needs as prevails in Nigeria.

Following from (iv) above, there prevails in Nigeria, a complete disregard for the concept of government as a continuum which ideally, paves way for an automatic incorporation of previous administrations' uncompleted programmes as part of current planned expenditures. Reasonably, the above trend has created a significant window for large-scale abandonment of previous administrations' programmes by succeeding administrations at local, state and federal government levels. In accordance with the above discussions, it is concluded that despite significant short and long run relationships between Nigeria's economic growth and public human and material capital investments, there is still a predominant lack of coordinated investment and economic growth programmes as they appear to remain mutually exclusive.

Accordingly, it is recommended that; (i) There must subsequently and of necessity prevail in Nigeria, strict budgetary and resource allocation programmes that are timed and implemented in a highly co-ordinated manner to minimize wastes in government's fiscal business. (ii) The state should as a matter of urgency, take a comprehensive record of all abandoned projects and ensure that no new projects or programmes are initiated until all the previously approved and partly implemented projects/programmes are fully executed and functional, (iii) Budget timing must be strictly adhered to in Nigeria irrespective of any conflicting interests between the legislature and executives in order to ensure that the economy realizes the greatest value from proper timing and execution of planned government's human and material capital expenditure projects and programmes, and (iv) Policy somersaults and inconsistencies by successive governments in Nigeria must henceforth be avoided, with a policy of zero-tolerance for such developments endorsed by all governments at local, state and federal levels.

REFERENCES

Alexiou, C. (2007). Unraveling the 'Mystery' Between Public Expenditure and Growth: Empirical Evidence from Greece, *International Journal of Economics*, *1*(1), 21-31.

Aschauer, D. A. (2000). Public Capital and Economic Growth: Issues of Quantity, Finance, and Efficiency, *Economic Development and Cultural Change*, *48*(2), 391-406.

Barro, R. J. (1991). Economic Growth in A Cross Section of Countries, *The Quarterly Journal of Economics*, *106*(2), 407-443.

Bose, N., Haque, M. E., & Osborn, D. R. (2007). Public Expenditure and Economic Growth: A Disaggregated Analysis for Developing Countries, *The Manchester School*, *75*(5), 533-556.

Bowman,M. J. (1961). Human Capital: Concepts and Measures, In Money, Growth and Methodology, Essays in Honor of Johan Akerman, Lund, 147-168.

Brooks, C. (2009). *Introductory econometrics for finance*, Cambridge university press. 337-339.

Dike-ogu, C. N., Ohale,L. & Otto,G. (2016). Public Expenditure and Economic Growth in Nigeria, *International Journal of Advanced Academic Research/Social and Management Sciences*, 2(12), 23-40.

Egbo, O., Nwankwo, E., & Okoye, N. F. (2016). Analysis of Government Disaggregated Expenditures and Growth of Nigerian Economy, *Journal of Internet Banking and Commerce*, *1*(1), 1-15.

Égert, B., Kozluk, T. J. & Sutherland, D. (2009). Infrastructure Investment: Links to Growth And The Role Of Public Policies, OECD Economics Department Working Papers, No. 686.

Ellis, H. S. (1958). Accelerated Investment As A Force In Economic Development, *The Quarterly Journal of Economics*, *72*(4), 485-495.

Gujarati, D. N., Porter, D. C, & Gunasekar, S. (2009). Basic econometrics (5th ed.), New Delhi, Tata McGraw-Hill, 689-691.

Haque, M. E., & Kim, D. H. (2003). Public Investment in Transportation and Communication And Growth: A Dynamic Panel Approach, The School of Economics Discussion Paper Series 0324, University of Machester.

Harbison, F. H. (1962). Human Resources Development Planning in Modernizing Economies, *International Labor Review*, *85(5)*, 1-23.

Iheanacho, E. (2016). The Contribution of Government Expenditures in Economic Growth of Nigeria: A Disaggregated Approach, *International Journal of Economics and Management Sciences*, 5(5), 1-8.

Jong-Wha, L.(1995). Capital Goods, Imports and Long-Run Growth, Journal of Development Economics, 48(1), 91-110.

Kelly, T. (1997). Public Expenditures and Growth, *The Journal of Development Studies*, *34*(1), 60-84.

Kuznets, S. (1961). Long-Term Trends in Capital Formation Proportions, *Economic Development and Cultural Change*, *9*(4).

Kuznets, S. (1971). Population, Capital and Growth, New York, W. W. Norton & Coy Inc.

Landau, D. (1986). Government and Economic Growth in the Less Developed Countries: An Empirical Study for 1960-1980, *Economic Development and Cultural Change*, *35*(1), 35-75.

Lewis, W. A. (1962). Education and Economic Development, *Caribbean Quarterly*, *7*(4), 171-184.

Maddala, G. S. (1992). Introduction to Econometrics, New Delhi, Willey-India, 127-192,543-570.

Meier, G. M. (1976). Education: Investment in Human Capital-Note, Leading Issues in Economic Development, New York, Oxford University Press, 519-523.

Musgrave, R. A. (1966). Notes on Education Investment in Developing Nations, *0ECD Study Group on the Economics of Education: Financing Education for Economic Growth, Paris,*31-39.

Myint, H. (1954). An Interpretation of Economic Backwardness, *Oxford Economic Papers*, *6*(2), 132-163.

Myint, H. (1962). The Universities of Southeast Asia and Economic Development, *Pacific Affairs*, *35*(2), 116-127.

Myint, H. (1963). Social Flexibility, Social Discipline and Economic Growth, Paper Presented to UNESCO Expert Working Group on Social Prerequisites to Economic Growth, Kyrenia Cyprus, (April).

Nurkse, R. (1953). Problems of Capital Formation in Developing Countries, *New York: Oxford University Press*, 97-116.

Nurudeen, A., & Abdullahi, U. (2010). Government Expenditure and Economic Growth in Nigeria, 1970-2008: A Disaggregated Analysis, *Business and Economics Journal*, 2010: BEJ-4, Retrieved from http://astonJournal.com/bej.on 2/8/17.

Ogiogio, G. O. (1995). Government Expenditure and Economic Growth in Nigeria, *Journal of Economic Management*, *2*(1), Retreived from http://astonjournals.com/bes10 on 2/8/17.

Oluwatobi, S. O., & Ogunrinola, O. I. (2011). Government Expenditure on Human Capital Development: Implications for Economic Growth in Nigeria, *Journal of Sustainable Development*, *4*(3), 72-80.

Ray, D. (2010). Uneven Growth: A Framework for Research in Development Economics, *The Journal of Economic Perspectives*, *24*(3), 45-60.

Romp, W., & De-Haan, J. (2007). Public Capital and Economic Growth: A Critical Survey, *Perspektiven der Wirtschaftspolitik*, *8*, 6-52.

Rosenstein-Rodan, P. N. (1943). Problems of Industrialization of Eastern and South-Eastern Europe, *The Economic Journal*, *53*(210/211), 202-211.

Schultz, T. W. (1962). Investment in Human Capital in Poor Countries, *Foreign Trade and Human Capital*, (9), 3-12.

Shaheen, S., Ali, M. M., Kauser, A., & Ahmed, F. B. (2013). Measuring the Dynamic Effects of Fiscal Policy Shocks in Pakistan, *Interdisciplinary Journal of Contemporary Research in Business*, *5*(5), 228-240.

Singh, R. J., & Weber, R. (1997). The Composition Of Public Expenditure And Economic Growth: Can Anything Be Learned From Swiss Data?, *Journal of Economics and Statistics*, 133(3), 617-634.

Usman, A. O., & Agbede, E. A. (2015). Government Expenditure and Economic Growth in Nigeria: A Cointegration and Error Correction Modelling, Munich Personal (RePEc) Archive, MPRA Paper No. 69814.

Usman, A., Mobolaji, H. I., Kilishi, A. A., Yaru, M. A., & Yakubu, T. A. (2011). Public Expenditure and Economic Growth in Nigeria, *Asian Economic and Financial Review*, *1*(3), 104-118.

Viner, J. (1956). Stability and Progress: The Poorer Countries' Problem, First *Congress of the International Economic Association* , Rome,(Sept), 6-11.