

# Human Capital Development and Economic Growth: The Nigeria Experience

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## **Abstract**

This study employs the augmented Solow human-capital-growth model to investigate the impact of human capital development on national output, a proxy for economic growth, using quarterly time-series data from 1999-2012. Empirical results show that human capital development, in line with theory, exhibits significant positive impact on output level. This implies that human capital development is indispensable in the achievement of sustainable economic growth in Nigeria, as there is an increase in economic performance for every increase in human capital development. The results further reveal a relatively inelastic relationship between human capital development and output level. Going forward, government and policy makers should make concerted and sincere efforts in building and developing human capacity through adequate educational funding across all levels. This remains the major way of attaining sustainable economic growth and development in any economy.

**Keywords:** Human capital development, economic growth, expenditure on education.

**JEL Classification:** E2, E6, H52, O11.

## **1.0 Introduction**

The concept of 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 of a country's economy (Okojie, 2005). Also, Ejere (2011) posited that human capital refers to the human factor in the production process; and consists of the combined knowledge, skills or competencies and abilities of the workforce. Of all factors of production, only human beings are capable of learning, adapting or changing, innovative and creative. Human capital formation or development, following Harbison (1973), can be seen as the deliberate and continuous process of acquiring requisite knowledge, skills and experiences that

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are applied to produce economic value for driving sustainable national development. The significance and relevance of human capital development in the achievement of meaningful and sustainable economic growth and development have been widely acknowledged in various studies. In the absence of substantial investment in the development of human capital in any country, sustained economic growth and development would only be a mere wish, never a reality. Therefore, the place of human capital development in economic growth cannot be overemphasized. Human capital development is a key prerequisite for a country's socio-economic and political transformation. Among the generally agreed causal factors responsible for the impressive performance of the economy of most of the developed and the newly industrializing countries is an impressive commitment to human capital formation (Adedeji and Bamidele, 2003; World Bank, 1995, Barro, 1991).

Furthermore, It has been stressed that the differences in the level of socio-economic development across nations is attributed not so much to natural resources and endowments and the stock of physical capital but to the quality and quantity of human resources (Dauda, 2010). Oladeji and Adebayo (1996) opined that human resources are a critical variable in the growth process and worthy of development. They are not only means but, more importantly, the ends that must be served to achieve economic progress. In addition, the wealth and prosperity of nations rest ultimately upon the development of people and the effective commitment of their energies and talents. Capital and natural resources are passive agents. The active agents of modernization are human beings, for they alone can accumulate capital, exploit natural resources and build political and social organizations (Sankay, Ismail and Shaari, 2010). Harbinson (1973) aptly summarized the importance of human capital to economic and development by stating that "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 organizations, and carry forward national development. Clearly a country which is unable to develop the skills and knowledge of its people and to utilize them effectively in the national economy will be unable to develop anything else".

## **2.0 Background of the Study**

Nigeria's major objective has been to attain stability, material prosperity, peace and social progress. However, this has been hampered as a result of internal problems. These include inadequate human development, primitive agricultural practices, weak infrastructure, and uninspiring growth of the manufacturing sector, a poor policy and regulatory environment and mismanagement and misuse of resources. In order to ensure the economy delivers on its potentials, the country experimented with two development philosophies-a private sector-led growth in which the private sector served as the "engine house" of the economy and a public sector – driven growth in which the government assumed the "commanding heights" of the economy. The initial low level of private sector development, however, led to public sector dominance of the economy, encouraged by growth in the oil sector (UNDP, 2009) in Dauda (2010).

In time past, prominence had been placed on amassing physical capital to the detriment of human capital in Nigeria's quest for rapid socio-economic progress. However, earlier development plans which virtually ignored the social or human aspects of development did little to accelerate the pace of growth and development in the country. But since 1990, when

the United Nations Development Programme (UNDP) started publishing the Human Development Report year after year, the human development pathway to development has gained currency in many developing countries including Nigeria. Developing Nigeria's human capital is critical especially now that the country is aspiring to be among the 20 leading economies in the world by the year 2020. But this aspiration will be a venture in futility so long as human capital formation is not accorded high priority. Human capital formation is a prerequisite for Nigeria and Nigerians to become competitive in the 21st century globalize economy which is skill and knowledge based. A country's competitiveness in the New International Economic Order (NIEO) is strongly connected to the quality of her human capital. Hence human capital formation is undoubtedly the pivot for any meaningful programme of socio-economic development of Nigeria; and indeed of any country (Ejere, 2011).

The objective of this study is to critically evaluate the effect or impact of human capital development on economic growth in Nigeria, using quarterly data. This would help to better understand and appreciate how human capital development affect economic growth on a quarterly basis since most of the previous studies in Nigeria have basically focused on yearly analysis. At the individual level, this study would enable people to understand and appreciate the relevance of developing human capital in a bid to achieve economic growth. For the government, it would provide a framework for policy formulation and implementation. Quarterly time series data from 1999-2012 sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics and Central Intelligence Agency (CIA) World Factbook would be employed in this study. The rest of the study is outlined as follows – section three reviews various related literature, section four discusses the methodology, section five presents the data analysis and interpretation of findings and section six provides conclusion and recommendations.

### **3.0 Conceptual Literature Review**

Economically, capital is referred to as 'those factors of production used to create goods or services that are not themselves significantly consumed in the production process' while, the human element takes charge of all economic activities such as production, consumption, and transactions necessary to move the products to the consumers (Boldizzoni, 2008). This implies that human capital is a key production element that adds value to the production process. In the 1950's, it was discovered that investment on human capital was the primary way to raise an individuals' wages making it more effective when compared to other production inputs such as land, financial capital, and labor force (Woodhall, 2001).

Human capital as a concept can be traced to the classical school of thought in 1776, then as a scientific theory by Fitzsimons (1999). Schultz (1961) recognized human capital as one of important factors that determine economic growth. He referred to the term *human capital* as the stock of productive knowledge and skills possessed by workers. Human capital can be categorized by 'something akin to property' that is, knowledge and skills embedded in an individual (Beach, 2009). Rastogi (2002) conceptualizes the human capital as 'knowledge, competency, attitude and behavior embedded in an individual'.

Human capital has also been categorised as important in itself but also important is the accumulation process. This perspective stresses on knowledge and skills obtained throughout educational activities (De la Fuente & Ciccone, 2002). The third perspective is closely linked to the production-oriented perspective of human capital (Dae-Borg, 2009). Romer (1990) refers to

the human capital as 'a fundamental source of economic productivity'. Rosen (1999) states human capital as 'an investment that people make in themselves to increase their productivity'. Furthermore, the concept of human capital has also be defined as 'an amalgam of factors such as education, experience, training, intelligence, energy, work habits, trustworthiness, and initiative that affect the value of a worker's marginal product' (Frank and Bemanke, 2007). The shift of the focus by the global economy towards more knowledge-based sectors (such as research and development, pharmaceuticals and ICT-based sectors), has encouraged policy makers to attend more critically to skills and human capital development (OECD, 1996).

The basic human capital theory which is a refinement of the marginal-productivity theory has since been become a dominant means of understanding how wages are determined. The theory was largely shaped by Gary S. Becker, an American student of Theodore Schultz. The human capital theory, views schooling and training as an investment in skills and competences (Becker, 1964). It holds that earnings in the labour market are dependent upon the individual's information and skills set. It is further argued that, based on rational expectations of returns on investment, individuals make decisions on the education and training they receive as a way of augmenting their productivity that is, that investments in human capital depend on the costs of acquiring the skills and the returns that are expected from the investment.

### **3.1 Empirical Literature Review**

Several studies, both in Nigeria and abroad, have been carried out to examine the relevance or importance of human capital development in the achievement of economic growth. There seems to be a consensus from most these studies that the development of human capital engenders economic growth. A review of some of the empirical literature is provided below; Sankay, Ismail and Shaari (2010) investigated the impact of human capital development on economic growth in Nigeria during the period 1970 to 2008. Johansen cointegration technique and vector error correction analysis were used to ascertain this relationship. The basic macroeconomic variables of concern derived from the literature review are: Real gross domestic product (RGDP), real capital expenditure (RCE) on education, real recurrent expenditure (RRE) on education, real capital stock (RCS), total school (SCHE) enrolments and labour force (LF) are used to proxy human capital development. The result indicated that human capital development has a significant impact on Nigeria's economic growth.

Dauda (2010), using the human capital model of endogenous growth developed by Mankiw, Romer and Weil (1992), examined empirically the role of human capital in Nigeria's economic development. The paper employed a variety of analytical tools, including unit root tests, cointegration tests and error correction mechanism (ECM). Empirical results indicate that there is, indeed a long-run relationship among labour force, physical capital investment proxied by real gross domestic capital formation, human capital formation, proxied by enrollment in educational institutions and economic growth in Nigeria. Findings show that there is a feedback mechanism between human capital formation and economic growth in Nigeria. Thus, the policy implication of the findings is that government should place a high priority on human capital development. Efforts should be intensified to increase investment in human capital to achieve the growth which would engender economic development. Most importantly, education should be given prominence in Nigeria's developmental efforts. This would propel the economy to higher levels of productivity.

Amassoma and Nwosa (2011) studies the causal nexus between human capital Investment and economic growth in Nigeria for sustainable development in Africa at large between 1970 and 2009 using a Vector Error Correction (VEC) and Pairwise granger causality methodologies. The findings of the VAR model and pairwise estimate reveal no causality between human capital development and economic growth. The study recommends the need to increase budgetary allocation to the education and health sector and the establishment of sound and well-functioning vocational institute needed to bring about the needed growth in human capital that can stimulate economic growth. Also, the study identified that labour mismatch is an issue that government needs to reckon with in order to accelerate and sustain economic growth. In this regard, policy-makers in conjunction with employers and individuals needs to update information on the real labour market value of different qualifications, in order to help them navigate through the increasingly complex education system and make the optimal kinds of educational investment decisions needed to propel economic growth.

Johnson (2011) evaluates human capital development and economic growth in Nigeria by adopting conceptual analytical framework that employs the theoretical and ordinary least square (OLS) to analyze the relationship using the GDP as proxy for economic growth; total government expenditure on education and health, and the enrolment pattern of tertiary, secondary and primary schools as proxy for human capital. The analysis confirms that there is strong positive relationship between human capital development and economic growth. Following the findings, it was recommended that stakeholders need to evolve a more pragmatic means of developing the human capabilities, since it is seen as an important tool for economic growth in Nigeria. Also proper institutional framework should be put in place to look into the manpower needs of the various sectors and implement policies that will lead to the overall growth of the economy.

Oluwatobi and Ogunrinola (2011) examined the relationship between human capital development efforts of the Government and economic growth in Nigeria. It seeks to find out the impact of government recurrent and capital expenditures on education and health in Nigeria and their effect on economic growth. The data used for the study are from secondary sources while the augmented Solow model was also adopted. The dependent variable in the model is the level of real output while the explanatory variables are government capital and recurrent expenditures on education and health, gross fixed capital formation and the labour force. The result shows that there exists a positive relationship between government recurrent expenditure on human capital development and the level of real output, while capital expenditure is negatively related to the level of real output. The study recommends appropriate channeling of the nation's capital expenditure on education and health to promote economic growth.

Adawo (2011) study used an econometric model to examine the contributions of primary education, secondary education and tertiary education to economic growth of Nigeria. These variables were proxied by school enrolments at various levels. Other variables included physical capital formation, health measured through total expenditure on health. In all primary school input, physical capital formation and health were found to contribute to growth. Secondary school input and tertiary institutions were found to dampen growth. Among others, this paper recommends that there should be adjustment in admission process in favour of core science

and technical oriented course. The paper also recommends that schools should be adequately funded.

Isola and Alani (2012) evaluated the contribution of different measures of human capital development to economic growth in Nigeria. It used data from Nigeria and adopted the growth account model which specifies the growth of GDP as a function of labour and capital. The model also included a measure of policy reforms. Based on the estimated regression and a descriptive statistical analysis of trends of government commitment to human capital development, it was found that though little commitment had been accorded health compare to education, empirical analysis showed that both education and health components of human capital development are crucial to economic growth in Nigeria.

#### **4.0 Methodology**

In order to appropriately capture the effect of human capital development on economic growth in Nigeria, this study will employ the augmented Solow human-capital-growth model adapted from Oluwatobi and Ogunrinola (2011). The augmented Solow human-capital-growth model is an improvement on the Solow growth model. Solow's original model did not explicitly incorporate human capital. To achieve that, Mankiw, Romer, and Weil (1992) came up with the augmented Solow model. The justification for the inclusion of human capital in the model is the fact of non-homogeneity of labour in the production process either within a nation or across different economies due to their possession of different levels of education and skills. This modification facilitates the suitability and hence, the adaptation of this model for the Nigerian context. The basic assumption in this approach is that increase in workers' quality through improved education, improves output. The augmented Solow model is therefore specified as:

$$Y = AK^\alpha (hL)^\beta \quad (1)$$

Where, Y= Output level or economic growth; K=Stock of physical capital; h=Level of Human Capital; L=Labour, measured by number of workers; A=Level of Total Factor Productivity;  $\alpha$  = Elasticity of capital input with respect to output; while  $\beta$  = Elasticity of labour input with respect to output.

Econometrically, the model is specified as follows:

$$Y = AK^\alpha (hL)^\beta U \quad (2)$$

When transformed into a log-linear form, we have,

$$\log Y = \alpha_0 + \alpha_0 \log K + \beta \log hL + W \quad (3)$$

Where  $\alpha_0 = \log A$  and  $W = \log U$

To achieve a robust result in the context of the Nigerian environment, the augmented Solow human-capital-growth model would be modified to take an additional variable. This is, government total expenditure on education, comprising both the recurrent and capital expenditure. This additional variable is necessary because the development of the educational sector is one major way of achieving the human capital development.

The Expanded model is stated as follows:

$$\log Y = \alpha_0 + \alpha_0 \log K + \beta \log hL + \log GTEE + W \quad (4)$$

Output level or economic growth (Y) is proxied by real gross domestic product; stock of physical capital (K) is represented by gross total capital formation total stock of human capital (hL) is a product of secondary school enrollment (h) and total labour force (L) term . Human capital

development is measured by government total expenditure on education, a combination of both capital and recurrent expenditure, that is, GTEE.

## 5.0 Data Analysis and Interpretation

**5.1 Stationarity Test:** A stationary test was carried out in order not to run a spurious regression. The Augmented Dickey-Fuller (ADF) test was used for this analysis since it adjusts for serial correlation. The test was done with the following hypothesis:

Null hypothesis ( $H_0$ ): Variable contains unit root and hence is non-stationary.

Alternative hypothesis ( $H_1$ ): Variable does not contain unit root and hence is stationary.

Decision rule: If the calculated ADF Test statistic is greater than the MacKinnon critical values (both in absolute term) at the chosen level of significance, reject the null hypothesis of non-stationarity and accept the alternative hypothesis of stationarity, otherwise do not the null hypothesis of non-stationarity. The result is summarized in table I below.

**Table I: Adf Test Statistics**

Variable	Adf Test Statistics	5% critical value	Order of integration
Y	-7.604362	-2.917650	Stationary at second difference
K	-9.122017	-2.917650	Stationary at second difference
hL	-4.168758	-2.916566	Stationary at first difference
GTEE	-8.649019	-2.917650	Stationary at second difference

The result from table I reveals that while Y, K and GTEE are all integrated at order 2, hL is integrated at order 1. This result implies that second differencing is sufficient in modeling in this study.

## 5.2 Cointegration Analysis

Economically speaking, two variables will be cointegrated if they have a long-run or an equilibrium relationship between them (Gujarati, 2004:822). The Johansen (1991) likelihood ratio test statistics, the trace and maximal eigenvalue test statistics, were utilized to determine the number of cointegrating vectors. The decision rule is to reject the null hypothesis if the probability (P value) is less than 5% (0.05). Otherwise, we do not reject. The result is summarized in the tables II and III below.

**Table II: Johansen Unrestricted Cointegration Rank Test (Trace)**

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Prob.**
None *	0.801513	154.2887	47.85613	0.0000
At most 1*	0.658300	65.35200	29.79707	0.0000
At most 2	0.100955	6.291777	15.49471	0.6611
At most 3	0.007942	0.438546	3.841466	0.5078

\* denotes rejection of the hypothesis at the 0.05 level

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

**Table III: Johansen Unrestricted Cointegration Rank Test (Maximum Eigenvalue)**

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Prob.**
None *	0.801513	88.93671	27.58434	0.0000
At most 1*	0.658300	59.06022	21.13162	0.0000
At most 2	0.100955	5.853230	14.26460	0.6321
At most 3	0.007942	0.438546	3.841466	0.5078

\* denotes rejection of the hypothesis at the 0.05 level

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

Both the trace statistics (table II) and Eigen value statistics (table III) reveal the rejection of the first and second null hypotheses at 5% level of significance based on our decision rule. This implies that there is two cointegrating equations or vectors among the variables of interest. Therefore, there is a long run relationship between the variables. That is, the linear combination of these variables cancels out the stochastic trend in the series. This will prevent the generation of spurious (i.e., non-meaningful) regression results. Therefore, the estimates of the augmented Solow human-capital-growth model are summarized in table IV below.

**Table: IV: Regression Estimates**

Dependent Variable	Independent Variables	Coefficients	t-statistics	Probability
logY	Constant	1.379980	1.102169	0.2755
	logK	0.199364	6.215968	0.0000*
	loghL	0.340559	5.153704	0.0000*
	logGTEE	0.110632	2.451304	0.0176*
R <sup>2</sup>	0.958838			
F-statistics	403.7667			

Note: \* indicates significance at 5% level

The result of the regression (table IV) shows that gross total capital formation, total stock of human capital and total government expenditure on education (a proxy for human capital development) jointly explained about 95% variations or changes in the output of the economy. Also, they are statistically significant in explaining the level of the economy's output. That is,



they remain indispensable in the achievement on economic growth and development in Nigeria.

Furthermore, in terms of sign, all the independent variables conforms with apriori expectation since they all exhibit a positive relationship with the economy's output or growth level. This means that a greater amount or level of gross total capital formation, total stock of human capital and total government expenditure on education would engender a higher level of output or economic growth in in Nigeria. In addition, the regression result also reveals that the elasticity of economic growth or out level with respect to each of the independent variable is relatively inelastic given as 0.199364, 0.340559 and 0.110632 for gross total capital formation, total stock of human capital and total government expenditure on education respectively.

## **6.0 Conclusion/Recommendations**

Using the augmented Solow human-capital-growth model, this study empirically investigated the impact or effect of human capital development on the Nigeria economy. The Johansen 2 likelihood ratio test statistics, the trace and maximal eigenvalue cointegration test statistics reveals two cointegrating two cointegrating equations or vectors among the variables of interest. The regression estimates shows that all the independent variables - gross total capital formation, total stock of human capital and total government expenditure on education, are statistically significant in the determination of the level of the economy's output. This implies that they cannot be ignored if we must achieve economic growth and development in Nigeria. Furthermore, the result indicates that all the independent variables, in line with theory, exhibit positive relationship with output level. This means that a greater amount of each would engender increase in output level or rise in the growth of the economy. Also, the regression result reveals that all the independent variables are relatively inelastic with respect to their relationship with the dependent variable.

Consequent upon these findings, government and policy makers should as a matter of urgency give high priority to human capital development. Concerted and sincere efforts should be made in building and developing human capacity through adequate educational funding across all levels since it remains the major way of attaining sustainable economic growth and development.

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