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ECONOMIC GROWTH IN DEVELOPING COUNTRIES: THE ROLE OF HUMAN CAPITAL. A TIME BOUND TESTING APPROACH (1985-2018)

[1]Achara Ogochukwu Larry, [1]Akpaetor, Ubong Augustine and [2]Nwankwo, Arinze Henry

[1]Department of Management, Abia State University, Uturu, Nigeria
[1]Department of Business Administration, Akwa Ibom State University
[2]Department of Accounting, Abia State University, Uturu, Nigeria

Abstract: *The study assess the impact and roles of human capital formation on the economic growth in Nigeria from 1985-2018. The study made use of a time series of 35 years. The study empirical analysis investigated the stationary of the stated variables as seen in the model specification. The study also made use of the ARDL bound estimation techniques to ascertain if there exist a long and short run dynamic relationship between the human capital formation and the economic growth in Nigeria. The study therefore recommended that for the country (Nigeria) to achieve its needed economic growth, the economic policymakers should increase not just the amount spend on the educational sector but should also increase on the percentage of its total expenditure accorded to the sector. Moreover, improve personnel development in the health care and ensuring adequate distribution of health facilities within the federation is essentially imperative.*

Keywords: Human capital formation, economic growth, expenditures on health and education and expenditure on life expectancy.

Introduction

The perceptible contribution of human capital in economic growth in an economy cannot be exaggerated. Human capital is the essential resource needed in every sector of an economy in other to facilitate the growth of the country. Unfortunately, for many decades human capital development has been saddled with multifarious challenges that has hampered economic growth in many economies; with less developed economies suffering the effect of poorly developed human capital the most (Chu, Cozzi, and Liao, 2013). In determining the impact of human capital on economic growth in West Africa, specifically Nigeria over a period of 35 years as it relates to their counterparts. Relationship has always exist between human capital and economic development and growth but research studies that examine the factors that affects schooling and human resources as it relates to developing countries are limited. For now, there have not been conventionally acceptable model for human capital determinants even though some researchers have tried to develop human capital equations from the Mincerian earning function. This mostly explains why former studies on human capital determinants do not consistently employ the same set of independent variables (Benhabib & Spiegel, 2014). Popular opinion dating as far back as the human capital revolution in the 1960's and the advocacy of the human capital theory by Schultz (1961) and Becker (1964) has it that human capital is a necessary and sufficient condition for economic growth, hence replacing the previously held opinion that physical capital is the ultimatum for economic growth. Per capita output growth is however an important component of economic welfare (Abramowitz, 1981) which indicates that for economic growth to occur, there ought to be inputs and insputs can only be made by acknowledging and harnessing the prowess of human beings as history has

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repeated itself time again in proving that human beings are the most important and promising source of growth in productivity and economic growth. Given the significance of the human capital accumulation for the countries, it is not surprising that various works have been published dealing with different determinants of human capital. Among others, Altonji and Siow (1987) found that the decision to acquire skills via education involves the interaction of two essential economic factors, both of which may exhibit significant variability over the business cycle: the expected rate of return on human capital investments; and the ability to finance schooling. The expected rate of return depends, among other things, on opportunity cost considerations; on direct educational costs (tuition, fees); and on expectations about future professional employment possibilities and future earnings. The ability to purchase education, on the other hand, is determined by the availability and cost of funds (in the form of family wealth, student—or other type of—loans, student aid, part-time job opportunities and so on). Lack of human capital development has been and is still a burning issue (economically and socially) in Nigeria. Capital and recurrent expenditure on the two facets of human capital (education and health) by the Nigerian government has not been sufficient enough to propel the impact human capital ought to have on the economic growth of the country in the long run due to the government's inability to allocate the necessary funds needed. This is a challenge confronting knowledge and skill development in Nigeria. In cases where there is funding, it is not efficiently allocated and properly implemented. The World Bank (2010) is of the view that government funding for university research is too low to attract partners in the economic and business work environment into R & D agreements. This is unlike the case in Singapore, Korea and other advanced knowledge economies. Losing out on this partnership is constraining Nigeria's potential in breaking into a lucrative and job-creating economy (World Bank, 2010).

One of the major concerns in the Nigeria educational system is the challenge of integrating new knowledge into academic courses and programmes. The system operates on obsolete knowledge, thus finding it difficult to embrace new knowledge and discoveries. This leads to the churning of graduates' who find it difficult to fit into the world of work, since their acquired knowledge and skills are rarely relevant to the needs of employers of labour services. This problem is the result of lack of connection between the academia and the business work environment (World Bank, 2010), which has impeded the nation's capacity to build the critical mass of human capital required to facilitate growth.

Literature Review

Policymakers and experts in the field of human development and economic growth of nations in developing countries as well as international bodies and organizations such as the World Bank most often doubt the notion that the downturn economy often slows down human capital accumulation, most especially among the peasants and the poorer people of these nations thereby transmitting poverty across future generations. This can be seen in most Sub-Saharan African Countries where human development has been poor. This is because, as these families continue to witness a downturn in their finances and are unable to ensure a smooth consumption for the family, the next alternative for most of these families is to cut down on the expenditure on education which translates to a reduction in the human capital development. Thus, human capital (education) emerges as the dependent variable on the economic output. While on the other hand, the economy of the country such as Nigeria which is presently facing a downward slope in their economic fortune will possibly enter into recession which wills then damper employment rate and the wage prospect of the low income group and middle class strata of the population. With this in place, the opportunity cost of attending school (Collages/University) will decrease, *ceteris paribus*, it should lead to higher human capital

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accumulation. In other words, people may choose to attend more or less of schooling, they may be hopeful of or postpone further schooling, or they may disburse more or less effort in school (Schady, 2004).

When we talk about development as seen in develop economics such as the U.S, England, Germany and China, we are looking at development in relation to an increase in income level, rise in productivity, increase in technological advancement, improvement in education and health indicators. All these factors affect economic development in a different way. Therefore, it is important to understand that the development of countries such as Nigeria may not only originates from economic development but also from investments in human capital through education, health, social security and technology (Tuna and Yumuşak, 2002). In recent years, studies such as (2015) have been geared towards the identifying and measuring development indicators and yardsticks. Among these factors, the most important driving force of socio-economic development and the most important element of productivity increase is the level of human capital of the society and the labor force (Yaylalı ve Lebe, 2011).

Concept of Human Capital

Human capital is defined as the sum of the skills and knowledge of the countries labor force. In understanding the concept of human capital development the following factors as stand out as fundamental elements which include knowledge, experience and education. After the closure of the Second World War, most economy transited to an information age and society while the developing economy such as Asia, Nigeria and other Sub-Saharan African Countries continued to dwell in physical capital and natural resources era instead of it to decrease. These tend to make them to put in lesser efforts in developing the human capital, thereby slowing down their development (Koc, 2013).

Education and Health to Developing Economy

Although education is fundamental to enhancing the quality of life and ensuring social and economic progress (UNR, 1996), the development of human capital transcends mere acquisition of intellectual ability through the education system, or the living of healthier life via adequate healthcare; it seeks to improve the productivity of the individual and make him more useful to society (Jhingan, 2005). To further explain the essence of human capital in the society, (Bloom and Malaney, 1998) and (Bhargava et al., 2001) demonstrated that health is an important factor of economic growth since it extends the life expectancy of the labour force using life expectancy at birth as a measure of health status. According to Lyakurwa (2007), human capital development has the capacity to enlarge people's choices and opportunities, improve healthy living through acquired skills and knowledge and eventually enhance growth in the nation's gross domestic product through increased productivity. The main problem associated with the belief that education is good for economic growth is linked with how to maintain an equilibrium position, that is, where there will be no incidence of either shortage or excess supply of educated people. A shortage of educated people might limit growth while excess supply of it might create unemployment and thus limit economic growth (Lee, 1989). In essence, it means that the impact human capital will supposedly have on economic growth will be achieved when there is an equilibrium point in human capital development (in the aspect of education) in order not to create a situation whereby many people are chasing few jobs. This also applies to the health aspect of human capital – if there's an incidence of shortage of healthy people, it would have a negative impact on economic growth because it is only a healthy person that can be productive; if there's an excess supply of healthy people in the society, it would probably lead to overpopulation which will also limit economic growth. A typical scenario of shortage of educated people and healthy people is

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evident in Nigeria and the resultant effect has been low level of growth and development.

It is not really only about human capital improving health and education but also making sure that in the long run, it will positively influence the path to economic growth in the country as well as maintaining a sustainable growth rate. This feedback is crucial to ensure availability of funds for further human development because it is a bilateral relationship (human capital leads to economic growth and economic growth in turn leads to further development of human capital).

Measurement of Human Capital for Economic Development

In measuring human capital as it involves economic development, different variables are put in place and considered in other to ascertain proper developmental indices. Some of these include

1. The measurement of human capital in economic growth

As of late 1980s and the early 1990s, most empirical macro-economists seek to explain the difference in growth rates across the world as it relates to the developed economies and the developing economies. Following the first work as carried out by Barro (1991), hundreds of separate studies which are mostly cross-sectional regressions has seek to pursued the question of what factors really determined the very large observed differences.

This widely different approaches tested different economic and political explanations using the modeling consistently incorporated some measure of human capital. The archetypal development is that growth rates (g) are a direct function of human capital (H), a vector of other factors (X), and a stochastic element (e) as in:

G ¼ rH þ Xb þ e
……
…….(1)

Where r and b are unknown parameters to be estimated

A brief review of the history of human capital modeling helps experts to measure and explain the development of empirical growth analysis. The importance of the knowledge and skills of the workforce has a long history in developmental economics.

This history helps to explain a number of the issues that are pertinent to today's analysis of economic growth. Smith (1979) in his work incorporated these ideas into his work on the Wealth of Nations not withstanding that the ideas of specialization of labor dominated the ideas about human capital. Marshall (1898), however, believed that this concept lacked the necessary empirical usefulness due to the severe measurement issues involved.

2. Improvement in school attainment of developing countries

Understanding the background on human capital and growth gives one the opportunity to assess the position of developing countries and their prospects for the future. To provide the right perspective, the traditional measure of human capital which measure human capital and school attainment. The International development agencies have pursued the expansion of schooling as a primary component of development. Growing out of a 1990 international conference in Jomtien, Thailand, UNESCO and the World Bank began a movement to achieve ''Education for All (EFA)'' A central element of the goals for Education for All is achieving compulsory and universal primary education in all countries. The 2000 conference included a commitment to achieving the specific goals by 2015. The United Nations in 2000 established the Millennium Development Goals (MDG). The second MDG goal was universal primary education, to be achieved by 2015 and consistent with Education for All. To be sure, both the MDG's and the EFA goals recognize that quality is an issue, and both suggest that quality should be monitored. But, the ease of measurement of school completion and the ability to assess progress toward the specific goals imply that

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qualitative issues of schooling receive considerably less attention.

3. Better measures of the human capital deficit in developing countries

International data on skills are most readily available for developed countries, but in recent years their availability in developing countries has expanded dramatically. There are two current sources of assessments: the International Association for the Evaluation of Educational Achievement (IEA) which has produced the TIMSS assessments and related tests; and the Organisation for Economic Cooperation and Development (OECD) which has produced the PISA assessments. At this level of knowledge, students will have a difficult time participating in a modern workforce that includes new technologies, and they will have trouble adjusting to changes in these technologies.

Least Developed Countries and Its Impact of Capital Development and Economic Growth

The impact of human capital development as it affects economic growth and development has been studied intensively in growth theories (Romer, 1986; Lucas, 1988). An implication of this Lucas' hypothesis as it relates on human capital is therefore associated with investment in human and this development is seen to be creative and productive resource (Harbison, 1962). When human is been invested on, he turns to human capital and develops into a very productive input that necessitate economic growth and development.

This is the major reason why all countries of the world are channelling their efforts into adequate human capital harnessing and development and this includes the More Developed Countries (MDCs) and the Less Developed Countries (LDCs) such as Angola, Benin, Burundi and Burkina Faso that are LDCs in Africa (Dellas, H and Koubi, 2018).

The MDCs are seen to be more productive when compared to the LDCs which is believed to be less productive in relation to human capital development. Reasons for these are not far-fetched as the closest and most dominant is the usage of human capital; the former has highly developed human capital while the latter has a low development in terms of human capital.

Models of Human Capital Growth Theories

According to OECD (1998), the human capital consists of knowledge, skills and other qualifications that are embodied in the individuals as it relates to the economic activities of the nation. Experts in developmental economics have investigated the effect of the human capital on economic growth using different developmental models. We would be looking at the two models as it relates to human capital growth. These models can be classified into two groups which is known as the Neoclassical Growth Theory and Endogenous Growth Theory.

Neo-Classical Growth

The Neoclassical growth theory was proposed firstly by Solow (1956), while population growth rate and technological development were later added in growth models as an external variable.

In this case, the function can be expressed as follows. Y= f (K,L,t) ----------(1)

According to Solow, t refers to the change in the function with depending time which is called technical change. The concept of technical change used here can actually be used to represent any change in the production function. Assuming that ''t'' is an exogenous variable this function can be expressed as the Cobb Douglas production function as follows.

$Y=F(K, L) = AK^{a} L^{1-a}$----------(2)

In this function, Y shows the output level, K amount of capital, L amount of labor and A represent technology level.

And $0 < a < 1$

Solow model is based on the assumption of constant return to scale. When the steady state balance is reached, it is seen that economic growth is determined by

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technological development and population growth rate. These variables were considered externally.

Human Capital Theory

This theory shows how education leads to increase in productivity and efficiency of workers by increasing the level of their cognitive skills. Theodore, Schultz, Gory Bucker and Jacob Mincer introduced the notion that people invest in education so as to increase their stock of human capabilities which can be formed by combining innate abilities with investment in human beings (Babalola, 2000).

Examples of such investments include expenditure on education, on-the-job training, health, and nutrition. However, the stock of human capital increases in a period only when gross investment exceeds depreciation with the passage of time, with intense use or lack of use.

The provision of education is seen as a productive investment in human capital, an investment which the proponents of human capital theory considers to be equally or even more equally worthwhile than that in physical capital. Human capital theorists have established that basic literacy enhances the productivity of workers working in low skill occupations. They further state that instruction that demands logical and analytical reasoning that provides technical and specialized knowledge increases the marginal productivity of workers in high skill or profession

The ARDL estimation technique

In order to choose an appropriate time series model, the investigation of the time series data to verify the results of stationarity and cointegration tests is central. This research paper therefore employs the recently developed autoregressive distributed lag (ARDL) bounds testing approach to cointegration developed by Pesaran and Shin (1995). The technique has several advantages over other estimation techniques like Engle and Granger (1987) and Johansen (1991). First, it can be applied regardless of the order of the integration of the regressors (either I(1) and/or I(0)); it is a more statistically significant approach for examining correlation when faced with small data size as other techniques require large data size for validity to hold. It also allows for the variables to have different optimal lags, which is not applicable to other techniques. Furthermore, the technique uses a single reduced form equation for determining both long-run and short-run relationship among variables (Babajide and Lawal, 2016; Babajide et al., 2015; Bahmani-Oskooee and Ng, 2002, 2010; Pesaran and Shin, 1999).

Based on the theoretical framework, the model relating to human capital formation and economic growth is considered to be:

$GDPt = \beta_1 TGEE_t + \beta_2 TGEH_t + \beta_3 GFCF_t + \beta_4 LVEXP_t + \mu$

Where:

GDP = Gross Domestic Product at constant prices

TGEE= Total government expenditures on education

TGEH= Total government expenditures on health

GFCF = Gross fixed capital Formation

LVEXP = Life Expectancy

β_0 – Constant term

β_1 - β_4 = Coefficients

Results and Discussion

The analysis was carried out after various diagnostic tests were done. A summary of the results are presented in Table 1. In most cases, even though, the bounds testing procedure does not require the pre-testing of the variables included in the model for unit roots due to its appropriate regardless of whether the regressors in the model are purely *I*(0), purely *I*(1) or mutually cointegrated, the application of unit root tests in the ARDL is necessary in order to ensure that the regressand is integrated of order one and none of the variables because the computed F-statistics provided by Pesaran et al. (2001) are valid for only variables that are *I*(0) or *I*(1).

The result in Table 1, considering the Augmented Dicky-Fuller test statistics at 1, 5 and 10% critical values, reveals that the Augmented Dickey–Fuller test statistics are greater than critical values at first difference, this

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implies that the data series has a unit root and that they are all stationary at first at 1st differences, It also means that the results shows that the variables specified under the model specification above are integrated of the same order; 1(1). The level of their integrations indicates the number of time the series have to be differenced before their stationarity is induced. The linear combination of the series integrated of the same order are said to be co-integrated.

The result obtained from Table 2 show the estimate of the long run dynamic relationship between gross fixed capital formation, health, education and life expectancy on the economic growth in Nigeria. Given the established linkage among the constructs as shown from above, it can be deduced and compelling that a long-run relationship amongst the variables when regression is normalized in the variables are co-integrated in these models.

The ARDL results of the long-run relationships between the variables show that the estimated coefficients of the long run relationship indicates that there is a long run co-integrating equation which implies that there is a long run relationship between the variables stated in the model specification above.

The result of the estimated coefficients of the long run coefficient indicates that gross fixed capital formation has significant effect on the economic growth in Nigeria at 0.05% probability level (Table 3). Furthermore, total government expenditures on education shows a significant effect on the economic growth in Nigeria, Also, total expenditures on health as seen from above is significant on the economic growth in Nigeria. The estimated coefficient of total government investment on education implies that a decrease in the investment in education will lead to -0.52% decrease on the economic growth in Nigeria. A unit increase in investment in health while holding other explanatory variables constant will lead to 1.09 % increase in the economic growth in Nigeria. Finally, when there is a unit decrease in the life expectancy in Nigeria while other explanatory variables are held constant will lead to -2329.21 decreases in the value of economic growth in Nigeria.

Based on the ARDL bound test result shown from Table 4, and comparing the f-statistics with the Pesaran critical value at 10 %, 5%, 2.5 %, 1% level of the lower bound value of 2.45, 2.86, 3.25 and 3.74 1(0) with and the upper bound 1(1), 3.52, 4.01, 4.49 and 5.06 value of upper bound less than the F-statistics. Following the relevant critical value bounds presented in Table 4, there is therefore the substantial evidence to say that there is a long run relationship between human capital formation and economic in Nigeria. Since the Upper bound tests as shown in the bound test result indicates that it is less than the F- statistics value at 1%.Based on the ARDL result obtained from Table 5

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Table 1: The Presentation and analysis of unit root test result.

Variables	Test for unit root	ADF test stat	Critical values for ADF test stat			Remarks
			1%	5%	10%	
GDP	Levels Results	3.660966	-3.64634	-2.95402	-2.61582	Non Stationary
GFCF	Levels Results	2.378084	-3.64634	-2.95402	-2.61582	Non Stationary
TGEH	Levels Results	-0.78024	-3.64634	-2.95402	-2.61582	Non Stationary
TGEE	Levels Results	-2.65909	-3.64634	-2.95402	-2.61582	Non Stationary
LVEXP	Levels Results	3.220656	-3.64634	-2.95402	-2.61582	Non Stationary
GDP	1st Difference	-3.863831	-3.65373	-2.95711	-2.617434	Stationary
TGEE	1st Difference	-6.865551	-3.65373	2.95711	-2.617434	Stationary
TGEH	1st Difference	-6.018662	-3.65373	-2.95711	-2.617434	Stationary
GFCF	1st Difference	-4.082135	-3.65373	-2.95711	-2.617434	Stationary
LVEXP	1st Difference	-4.163576	-3.661661	-2.960411	-2.61916	Stationary

Source: Author's computation.

Table 2: Result of ARDL cointegrating and long run relationship form

Dependent Variable: GDP
ARDL Cointegrating And Long Run Form
Dependent Variable: GDP
Selected Model: ARDL (2, 0, 0, 0, 2)
Included observations: 32
Cointegrating Form

Variable	Coefficient	Std. error	t-statistic	Prob.
D(GDP(-1))	-0.188189	0.054665	-3.442608	0.0022
D(GFCF)	0.000000	0.000000	17.299883	0.0000
D(TGEE)	-0.002941	0.001396	-2.106426	0.0463
D(TGEH)	0.006201	0.003363	1.843666	0.0782
D(LVEXP)	3127.882288	2993.720555	1.044814	0.3070
D(LVEXP(-1))	7710.804446	4130.322612	1.866877	0.0747
CointEq(-1)	-0.565765	0.046326	-12.212747	0.0000

Cointeq = GDP - (0.0000*GFCF -0.0052*TGEE + 0.0110*TGEH -2329.2076 *LVEXP + 109116.6513)

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Source: Author's Computation.

Table 3: Estimated long run coefficients using the ARDL approach.

Variable	Coefficient	Std. error	t-statistic	Prob.
GFCF	0.000000	0.000000	11.441313	0.0000
TGEE	-0.005198	0.002573	-2.019963	0.0552
TGEH	0.010960	0.005932	1.847761	0.0775
LVEXP	-2329.207621	1587.479512	-1.467236	0.1559
C	109116.651253	73505.769435	1.484464	0.1513

Results shows that total gross fixed capital formation, investment on health, and life expectancy is individually significant in explaining the effect of human capital formation on the economic growth in Nigeria, However, the result of education indicates an insignificant effect on the economic growth in Nigeria.

Table 4. ARDL bounds test for co-integration.

ARDL Bounds Test		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	5.826807	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Table 5: Estimated long run coefficients Ua `1` `e7sing the ARDL approach.

Dependent Variable: GDP
Method: ARDL
Dynamic regressors (1 lag, automatic): GFCF TGEE TGEH LVEXP
Fixed regressors: C
Number of models evaluated: 16

Selected Model: ARDL (1, 1, 0, 0, 1)

Variable	Coefficient	Std. error	t-statistic	Prob.*
GDP(-1)	0.597535	0.117711	5.076302	0.0000
GFCF	4.45E-09	2.87E-10	15.49428	0.0000
GFCF(-1)	-1.51E-09	6.82E-10	-2.214106	0.0362

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TGEE	-0.002083	0.001304	-1.598129	0.1226
TGEH	0.004787	0.003761	1.272875	0.2148
LVEXP	5464.009	2172.956	2.514552	0.0187
LVEXP(-1)	-6023.685	2614.492	-2.303960	0.0298
C	26494.95	33995.87	0.779358	0.4431
R-squared	0.998064	Mean dependent var		16051.85
Adjusted R-squared	0.997522	S.D. dependent var		25365.63
S.E. of regression	1262.720	Akaike info criterion		17.32714
Sum squared resid	39861568	Schwarz criterion		17.68993
Log likelihood	-277.8978	Hannan-Quinn criter.		17.44921
F-statistic	1841.142	Durbin-Watson stat		2.435454
Prob(F-statistic)	0.000000			

*

Note: p-values and any subsequent tests do not account for model selection. The R^2 test is used to explain the total variation of the dependent variable that can be explained by the independent variable. The result shows that the five explanatory variables in the equation explain 99.80% of the systematic variations in the dependent variable that is explained by changes in the independent variables. The Durbin Watson statistic which is used to test the existence serial correlation between the variables, hence, Durbin Watson statistic of 2.44 implies the absence of serial correlation. This is because the closer the DW value is to two, the better the evidence of the absence of serial correlation.

Conclusion And Recommendation

The primary policy implication of this research paper is that, in order to facilitate economic growth, education and training need be to supply not just the quantity of human capital but the quality of human capital. Moreso, efforts must be made at allocating more funds to government expenditure on health in order to improve the quality of life, the material well-being and life expectancy of the people. Inter-alia the conclusion is that human capital development enhances economic growth, and the findings suggest that Nigeria is yet to fully benefit from it in terms of enhanced economic growth; hence, the study makes the following recommendations to improve the growth-enhancing tendencies of human capital development in Nigeria. The government should increase not just the amount of expenditure made on the education sector, but also the percentage of its total expenditure accorded to the sector. More funds should be allocated to vocational education as it helps to provide students with the specific job-related skills that will allow them to move easily into employment. This type of education appears very attractive when there are large youth unemployment problems as is the case in many developing countries. Furthermore, improve personnel development in the health care with an ensuring adequate distribution of health facilities within the federation. The government must ensure the availability of funds to the health sector for improved services. The private sector should also improve its participation in the provision of private schools/health centres. Where these are already available, efforts should be made to make these services more affordable to the general public. In addition to this, teachers/lecturers should be paid higher rates than what they presently earn. This should be done so as to curb the imminent brain drain problem of the country. Better infrastructural facilities should be provided for existing

schools, while new educational in-stitutions/health care centres should be established to provide quality education/health for the populace. The free basic education (UBE) programs established by the federal and state governments should be improved upon, and sustained. Limiting the rise in the cost of health care services and ensuring efficiency in health care services would accelerate the expected growth rate in these sectors. And finally, an enabling environment of macro-economic stability should be provided by the government to encourage investment in human capital by the private sector and the government itself as this is the practice in developed economies.

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