

HUMAN CAPITAL DEVELOPMENT AND ECONOMIC GROWTH IN NIGERIA: EVIDENCE FROM 1986 -2024

Ben Tantua^{1*}

¹Department of Economics, Niger Delta University, Bayelsa State, NIGERIA

Corresponding Author's Email: bentantua@ndu.edu.ng

©2026 Tantua. Published by Penerbit Universiti Teknikal Malaysia Melaka. This is an open article under the CC-BY license (<https://creativecommons.org/licenses/by-nc-nd/4.0/>).

Article History: Received 28 Feb 2026, Revised 21 June 2026, Accepted 28 June 2026, Published 30 June 2026

ABSTRACT

This study investigates the impact of human capital development on economic growth in Nigeria over the period 1986 to 2024. The continued low growth and high poverty rate in Nigeria despite budgetary allocations on public spending raises concerns on the role and effectiveness of human capital investment in inducing growth. Anchored on the neoclassical growth and human capital theory, the study investigates how expenditure on education and health translate to economic growth in Nigeria. Using secondary data and a number of techniques such as the Ordinary Least Square (OLS), Johansen co-integration and Error Correction model (ECM), the results revealed the existence of a long-run relationship between human capital development indicators and economic growth in Nigeria. More so, the OLS result shows that government expenditure on education and secondary school enrolment do have a positive and significant impact on economic growth, while government expenditure on health is positive but insignificant due to inefficiencies, quality issues and structural challenges. The study concludes that human capital development is fundamental and significantly linked to economic growth in Nigeria, with education having a stronger impact than health. It therefore recommends increased and efficient allocation of budgetary resources to education and health, skills development programs with policies that will improve labour productivity in order to harness the full growth potential of human capital in Nigeria.

Keywords: *Human Capital Development; Economic Growth; Government Expenditure; Co-integration; Error Correction Model Nigeria.*

JEL Classifications: I25, I15, O15, O47

1.0 INTRODUCTION

The growth of the economy has been one of the main goals of any country, especially in the developing economies like Nigeria where poverty, unemployment, inequality, and low productivity are still major problems that hinder the process of sustainable growth. Economic growth is overall described as a

continuous rise in the productive power of a state, most often in terms of growth in the Gross Domestic Product (GDP) or Gross National Income (GNI). Over time, scholars and policymakers have come to the realization that economic growth is not only driven by physical capital accumulation and availability of natural resources, at the same time, the quality of human resources present in an economy is equally a driver of economic growth. This has made human capital development one of the leading aspects of growth and development discourse. More so, it is the process of improving the skills, knowledge, health and productive capacities of people by providing education, training or investing in their health. Both classical and modern economic theories focus on the fact that human capital is a key factor of production that plays a major role in determining economic performance. The development of the human capital theory was laid out by the works of Schultz (1961) and Becker (1964) who postulated that investment in education and health enhances labor productivity and earning ability. The same concepts were strengthened by the endogenous growth theorist like Lucas (1988) and Romer (1990), who argued that human capital accumulation, knowledge spillovers and innovation would lead to sustained economic growth.

In addition, it is a very critical issue in the context of developing economies due to its ability to improve labour efficiency, increase adoption of technology and structural adjustment. Education enhances mental ability, creativity and flexibility, whereas good health enhances labour force, lessens absence and prolongs working years. This results in the fact that high and more sustainable growth rates are observed in the countries that have a focus on human capital development compared to those that mainly depend on the physical capital or natural resources (Barro, 2013).

Nigeria is the largest economy in Africa, in terms of GDP, thus it can be interesting to study the association between human capital and economic growth. Nigeria, though endowed with sizeable natural resources, namely crude oil remains in the developmental trouble, as evidenced by low economic growth, high unemployment, low industrial productivity, and poverty among other things. These issues have brought into question the high dependency of the country on resource-based growth and the inadequacy with regard to its human capital base development. The volatility in oil prices and economic crises around the world over the years have only served to add to the instability of the Nigeria growth model, and there is a reason the country needs to diversify and be more human capital-focused.

Education is one of the key elements of human capital development and tertiary education especially is of paramount value in terms of the development of advanced skills, research capacity, and innovation. Advanced human capital accumulation is also proxied by tertiary school enrolment which is a measure of availability of skilled manpower that can facilitate growth in productivity and technological advancement. The human capital theory states that the increase in the enrolment in tertiary institutions raises the amount of skilled labour that increases economic output by increasing productivity

and innovation (Lucas, 1988). Nonetheless, with the growth in the number of universities, polytechniques and colleges of education in Nigeria, the number of enrollees in tertiary schools is still very low as per the global norm, which casts doubts on their capacity to spur economic growth.

Health is another very important aspect of human capital development. Healthy population is vital to economic growth since health conditions have direct influence on labour productivity, efficiency and longevity. Government spending on health is a strategic government investment in the area of health that helps to achieve better health outcomes of the population, lower the mortality rate, and increase the life expectancy. Grossman (1972) considers health a consumption and investment good because it directly leads to the well-being of individuals, and indirectly, productivity. In Nigeria, government spending on health has traditionally been small as compared to most other countries in the world which has led to insufficient infrastructure in healthcare, ineffective services and poor health outcomes. Those conditions have a reflection in terms of labour productivity and general economic performance.

Life expectancy is a popular summary measure of population health and human development. Increased life expectancy is an indication of better health status, nutrition and proper health care systems that make workforce more productive. Empirical research has established that life expectancy increases are linked to growth in the economy as people are able to work longer, invest in education and become effective contributors to economics (Bloom et al., 2004). In Nigeria, life expectancy is still comparatively low among other developing nations, which is mainly caused by low access to healthcare, communicable diseases, and the lack of investment in the public health. This poses questions on the level to which human capability limitations on health may be constraining the growth potential of Nigeria.

The importance of government spending on education as well is essential in building human capital. Governmental expenditure in education increases access to education, education infrastructure and quality of human capital. It is believed that through endogenous theory of growth, government funding in education leads to the long-run economic growth by enhancing skill acquisition and innovation (Romer, 1990). In Nigeria, even though government spending on education has continued to increase in nominal terms over the years, the amount is still lower than the advised threshold by the United Nations Educational Scientific and Cultural Organization (UNESCO). This under investment has led to poor education results, inefficient facilities, constant industrial strikes, and deterioration of quality of graduates which could negate the growth boosting influence of education.

Regardless of the huge human and natural resources endowment of Nigeria, this nation has been facing challenges in realizing sustainable and inclusive economic growth. The years have been marked by the volatility of the economic performance, slow growth, high unemployment and chronic poverty. Although there have been diverse economic reforms undertaken in Nigeria which are intended to spur

the growth, these initiatives have been directed to macroeconomic stability and exploitation of the resources, with not so much emphasis on the systematic growth of human capital. This lops is is what has questioned the sustainability of the growth path of Nigeria in the long-term. One of the major problems confronting Nigeria is the apparent disconnect between investment in education and the expected growth outcomes. Although the number of tertiary institutions has increased, tertiary school enrolment remains low relative to the size of the population, and concerns persist regarding the quality and relevance of higher education. Many graduates lack the skills required by the labour market, resulting in high graduate unemployment and underemployment. This situation calls into question the extent to which tertiary education is effectively contributing to economic growth in Nigeria.

Similarly, government expenditure on health has remained inadequate, leading to poor health outcomes and low life expectancy. Nigeria continues to record high maternal and infant mortality rates, a heavy disease burden, and limited access to quality healthcare services. These health challenges reduce labour productivity, increase dependency ratios, and constrain economic growth. Despite the recognized importance of health as a component of human capital, empirical evidence on the growth impact of government health expenditure in Nigeria remains inconclusive, necessitating further investigation.

Government expenditure on education also presents a critical concern. While education is widely acknowledged as a catalyst for economic growth, Nigeria's public spending on education has been inconsistent and insufficient. Inadequate funding has resulted in poor infrastructure, overcrowded classrooms, frequent strikes, and declining educational quality. These challenges undermine the capacity of the education sector to produce a skilled and productive workforce capable of driving economic growth. Consequently, there is a need to empirically examine whether government expenditure on education has translated into meaningful economic growth in Nigeria.

Furthermore, life expectancy in Nigeria remains relatively low, reflecting broader health and welfare challenges. Low life expectancy limits the productive lifespan of individuals and discourages long-term investments in education and skills acquisition. While theoretical and empirical studies suggest a positive relationship between life expectancy and economic growth, the Nigerian experience has not been sufficiently explored in a comprehensive framework that integrates multiple human capital indicators.

The problem, therefore, lies in the lack of consensus and adequate empirical evidence on how different dimensions of human capital development, specifically tertiary school enrolment, government expenditure on health, government expenditure on education, and life expectancy affect economic growth in Nigeria. Existing studies often focus on single indicators or short time frames, leading to mixed and sometimes contradictory findings. This gap in the literature limits the ability of policymakers to formulate evidence-based human capital policies that can effectively promote economic growth.

Against this backdrop, this study seeks to evaluate the impact of human capital development on economic growth in Nigeria by examining the specific roles of tertiary school enrolment, government expenditure on health, government expenditure on education, and life expectancy. The following research hypotheses are stated in null form:

H0₁: There is no significant relationship between tertiary school enrolment and economic growth of Nigeria.

H0₂: There is no significant relationship between government expenditure on health and economic growth of Nigeria.

H0₃: There is no significant relationship between government expenditure on education and economic growth of Nigeria.

H0₄: There is no significant relationship between life expectancy and economic growth of Nigeria.

2.0 LITERATURE REVIEW

2.1 Human Capital Development

Human capital development is the deliberate act of creating more individuals endowed with education, skills and experience required in economic growth and development, human capital is defined as the pools of skills, abilities and competencies possessed by the workforce of a nation (Okojie, 2019). Human capital consists of their knowledge, abilities, competencies and their skills. Other forces of production are incapable of learning, changing, inventing, and creating as human beings are. Based on this, the human capital development is a continuous, deliberate effort to acquire relevant information, skills, and experience that could be put into the production of economic value and the promotion of sustainable national development (Ejere, 2018). According to Torruam and Abur (2014), the human capital development is the process of building people in terms of their abilities, knowledge, productivity, and creativity. It is the people-oriented development policy that is well known as an essential driving power of the development of the country in the world. Human capital formation is the process through which the number of persons with education, experience, skills, and good health required to advance the economy is increased.

The development of human capital could also be defined as the process of increasing and expanding the number of individuals who possess the knowledge, training and skills needed to not only propel a nation forward in politics but also economically. It involves purposeful investments in individuals so that they become more creative and productive assets. Jhingan (2013) indicated that human resources could be built in six principal ways as cited by Schultz (1960). Among these are: (i) the supply of health facilities and services that enhance physical strength, vitality, productivity and life

expectancy; (ii) on job training including traditional apprenticeship systems organised by firms; (iii) formal education at primary, secondary and tertiary levels; (iv) adult education programs of people not working in the agricultural sector; (v) importation/ transfer of technical expertise, consultants and specialised assistance. To this end, government expenditure on health and education and the school enrolment levels are often applied to assess human capital development (Hanif & Arshed, 2016).

2.2 Economic Growth

The World Bank (2020) defines economic growth as a consistent increase in the capacity of a country to avail of an increasing number of products and services to its population. This increased production capacity is primarily caused by changes in the institutional and ideological settings, and the technical developments. Despite the fact that various nations might employ different measures of measurement, economic growth is basically outlined as the growth of the potential gross domestic product (GDP) of a nation. Another definition of economic growth is an increase in the overall value of goods and services produced in an economy at a specific period of time which in most cases is a year. The most common measure of it is the gross domestic product (GDP), which is the performance of the real sector. According to Harper (2011), the positive effects of economic growth are extensive and far reaching.

Ogundipe and Oluwatobi (2010) argue that in order to escape the poverty trap, developing countries should enjoy a steady economic growth. Economic growth can thus be said to be a continuous process where the productive capacity of an economy grows over time thus leading to higher national income and output. In a similar manner, Lipsey and Chrystal (2017) justify the need to have steady growth annually by the economies by describing economic growth as the primary contributor to the increases in living standards over time. The International Monetary Fund (IMF, 2021) further describes economic growth as the increase in market value of goods and services produced within an economy in the long run; which is normally measured as a percentage of change in real GDP. According to Jhingan (2013), economic growth can be defined as the continuous rise of the per capita output or income in a country but such growth is accompanied by rise in the supply of labour, consumption, capital formation, and volume of trade.

2.3 Human Capital Development/Economic Growth.

It is widely agreeable that to achieve a sustained economic growth it is imperative to make investments in health and education. The development of the economy remains one of the major development priorities of the emerging countries such as Nigeria. Nigeria has been giving a great deal of priority to education as a national development tool since the beginning of 1960s particularly following submission of the Ashby Report in September 1960. Ogunleye et al. (2017) suggest that education management and

control is the main duty of the Nigerian government. In spite of the role of state governments and individual citizens in providing funds and management of postsecondary educational institutions, the federal government has the most responsibility in this sector. State governments have the overall control of secondary education, as compared to the local governments which have the overall control of basic education. Curriculum development is however under the National Primary Education Commission that collaborates with all the three layers of government, corporations, religious bodies, international bodies, non-governmental bodies and community-based associations.

Tertiary education objectives as outlined in the National Policy on Education (NPE, 2004) sufficiently reveal the relevance of higher education in national development agenda of Nigeria. These objectives are to train high-level personnel members to participate in the development of the nation, inculcating values that are suitable in the survival of the individual and the society, enhancing intellectual capacity of people to understand the national and global communities, equipping the people with the intellectual and physical capabilities necessary to support their survival and relevance in the society, fostering scholarship and service of the community, national cohesion, and the promotion of comprehension and cooperation are expected to meet these objectives (Kazeem & Ige, 2010).

Kazeem and Ige (2010) cautions though that it can be misleading to consider increases in the budgetary allocations without considering their respective share in the total spending of the government. According to research, the government of Nigeria has allocated unequally the funds on health and education compared to the total budget. This indicates that these sectors have not been regarded as a priority policy when it comes to the national budgeting process since they should have experienced consistent increment in their budgetary shares.

The National Economic Empowerment and Development Strategy (NEEDS) as the development blueprint and Poverty Reduction Strategy Paper in Nigeria was to see the government increase its expenditure on health and education to 10 percent by 2007. Its stated objectives rightly point to the health and education as the spheres that require a focus of the attention. The sector-specific policies of NEEDS recognize both the role of the public and the private sector in addressing key challenges on achieving a successful economic development, including the lack of human capital development.

2.4 Theoretical Framework

2.4.1 Neoclassical Growth Theory

Neoclassical growth theory aims to describe the way in which accumulated inputs of factors of production, particularly labour and physical capital, is the determinant of long-term economic growth.

According to empirical studies however, technological improvement which the theory perceives as an exogenous factor is the cause of a considerable growth in the economy. This position was the first to be illustrated by Solow (1956) and Swan (1956). The neoclassical model is based on an aggregate production equation, which is as follows: $Y = f(K, L)$, it is assumed that it has constant returns to scale with respect to both labour and replicable capital. To integrate the existing level of technological knowledge, Solow (1975) enlarged on this model with a productivity or technology factor, denoted by A , into the aggregate production function. $Y = f(AK, L)$ is the expression of the altered function.

A major demerit of the Solow-Swan model is that it does not provide an explanation of the processes or origin of technological progress. Technical innovation is held to be exogenous in its rate although the model acknowledges that it creates economic growth. To back this assumption, Solow (1957) argued that the source of technological change is mainly caused by knowledge created in the field of public science like research done in public institutions, which is different to the traditional economic system.

2.4.2 Human Capital Theory

Nobel Prize-winning economist Becker (1964), particularly his contribution in the economics of employer-sponsored training, is a follower of the human capital theory first laid out by Schultz (1961). The hypothesis argues that education and training improve the productivity and incomes of workers by improving their abilities, competencies, and body of knowledge.

To further explain this, Becker (1967) distinguished between specialised and general types of human capital. Specific human capital refers to the skills and knowledge that relate directly to a particular firm such as the ability to operate internal systems or novel technologies. The employers are usually willing to finance such training since such skills cannot be easily transferred to other organizations.

Conversely, generic human capital entails information and skills acquired through training and education that can be exploited in numerous careers and industries, which include literacy and numeracy skills. The fact that the workers are able to sell these skills to other firms who may offer them higher wages causes many companies to be reluctant to make large scale investments in general human capital. According to Becker (1967), the traditional factors of production like tangible assets such as machinery and equipment are comparable to the human capital. Consequently, money can be utilized by conducting training, education and improved healthcare so as to build human capital. Just as it is the case in physical capital, returns on investments on human capital also influence the overall output level. Human capital in this regard can be said to be a productive input and through a constant investment the output levels and productivity increase.

2.5 Empirical Literature

A few empirical studies have also investigated the correlation between development of human capital and economic growth in Nigeria with mixed and inconclusive results depending on the various indicators. Sulaiman and Ahmadu (2023) investigated the effect of human capital building on economic growth in Nigeria using the annual data between 1982 and 2022. The paper utilised the Ordinary Least Squares (OLS) procedure of estimation and used the following variables; government spending on education, government spending on health, school enrolments on different levels, and life expectancy. The results showed that human capital development plays a significant role in economic growth in Nigeria positively. In particular, education and health-related indicators were identified to increase productivity and trigger economic growth. The paper has concluded that long-term investment in human capital is essential in realizing a long-term economic growth in Nigeria. However, the analysis considered the human capital indicators mostly in the aggregate form thus restricting the ability to understand the contributions of individual components of the analysis like enrolment in tertiary and life expectancy.

Eniekezimene et al., (2023) examined the connection between the human capital development and economic growth in Nigeria through Autoregressive Distributed Lag (ARDL) method between the years 1981 and 2021. They used government spending on education, government spending on health and school enrolments as proxies to the development of human capital. The findings indicated that government spending on health positively significant impacted on economic growth in the short-run, whereas government spending on education and school enrolments at tertiary levels had no significant and even negative impacts on economic growth. The authors have explained these results by inefficiencies in government expenditure and the discrepancy in educational output and demand in the labor market. The study is quite complex on the human capital-growth nexus but failed to analyse health outcomes like the life expectancy adequately hence the restraint of its conclusions.

In this study, Ogunleye et al., (2015) performed a time-series analysis of how human capital development affects economic growth in Nigeria on a time series since 1981 to 2015. The analysis involved use of regression methods and variables included government expenditure on education and health, secondary school enrolments and tertiary school enrolments and life expectancy. The findings showed that the governmental expenditure on education and health and school enrolment at tertiary level had a positive and significant impact on economic growth. The result however showed that life expectancy had a negative, statistically non significant correlation with economic growth. The conclusion by the writers was that although investment in education and health is critical in the growth

of a country, structural issues in the health sector of Nigeria could negate the growth advantages of increased life expectancy.

In their study, Adeleke and Anuolam (2023) investigated the impact of human capital development on economic growth in Nigeria with the help of ARDL with the 1999-2022 data. The measures of human capital development in the study were the government expenditure on education, government expenditure on health, school enrolment, and life expectancy. The results showed that education and health spending by the population played a significant role in stimulating economic growth in Nigeria but life expectancy and school enrolment were not found to have any significant impact. The paper has highlighted that even though the development of human capital is critical towards growth, the impact of the individual components of the development is different because of the institutional inefficiencies and policy implementation. Nonetheless, the research failed to separate school enrolment into various levels especially tertiary education that is vital in advanced skills and innovation.

Ibikunle (2019) specifically concentrated on the correlation existing between government spending on health, life expectancy, and economic growth in Nigeria. Based on the time-series data and regression analysis, the study estimates that both the expenditure on public health and the life expectancy have a positive and significant impact on economic growth. The paper also confirmed a one-way causality flowing in the same direction since economic growth causes better life expectancy indicating that economic status leads to better health. The research is quite informative on the health aspect of human capital, but it failed to include the variables with education implications, thus giving us a half picture of the entire human capital-growth correlation.

The article by Ogunbadejo et al., (2020) examined how schooling and life expectancy relate to economic growth in Nigeria using the data between 1970 and 2017. Using a Two-stage least squares estimation, the researchers discovered that life expectancy and tertiary school enrolment had positive and significant effect on economic growth, whereas primary school enrolment did not have any significant effect. The authors came up with the conclusion that tertiary education and better health results will be more applicable in motivating economic growth in Nigeria. But the study did not cover the government spending variables and hence it could not explain the impact of the government spending on education and health outcomes.

2.6 Gap in Literature Review

Although the empirical literature on the relationship between human capital development and economic growth in Nigeria has been increasing over the years, there are still a number of gaps that are significant. To begin with, the currently researched findings are inconsistent and mixed especially when it comes to

the impact of tertiary school enrolment, government spending on education and life expectancy. Such inconsistencies complicate it to make conclusive statements to be used in making policies. Second, there has been a considerable number of studies that dwell on narrow dimensions of human capital the impact of either education or health alone without considering the joint repercussions of tertiary school enrolment, government expenditure on health, government expenditure on education, and life expectancy as one empirical study. This disjointed method does not allow a full perception of the role of the various components of human capital in economic development. Third, certain empirical research is based on obsolete data years, and it does not reflect recent changes in the economic, education, and health-sector reforms in Nigeria, and emergent problems of population growth and labour market change.

Consequently, their conclusions might not be appropriate in terms of the present-day reality. Fourth, some studies adopt aggregate measures of enrolment or expenditure but fail to take efficiency and effectiveness of public spending or education achievement and health outcomes. This brings issues of whether more spending and enrolment will lead to productive human capital which can help to drive growth. Lastly, there is a shortage of focus on the relative significance of tertiary education and life expectancy as compared to other human capital metrics even though these are critical in terms of ensuring innovation, productivity, and economic growth in the long term.

3.0 METHODOLOGY

Because of the intricate interactions between factors that are difficult to control, this study used a quasi-experimental research approach, which is frequently employed in the social and management sciences. Also, quasi-experimental design is suitable for this study because being a macro study, external economic shocks occur at the national level, making random assignment impossible while still allowing the researcher to estimate causal effect by exploiting policy changes and temporal variations. The majority of the data used in the study was secondary. Human capital development was one of the independent factors, and economic growth was the dependent variable. The World Development Indicators and the Central Bank of Nigeria (CBN) Statistical Bulletin provided the necessary information. For the years 1986–2024, the dataset included all of the variables included in the model. The model is expressed mathematically as:

$$RGDPR = \beta_0 + \beta_1 TSE + \beta_2 GEH + \beta_3 GEE + \beta_4 LEXP + u_t \dots (3.1)$$

$$RGDPR_t = \beta_0 + \beta_1 \ln TSE + \beta_2 \ln GEH + \beta_3 \ln GEE + \beta_4 \ln LEXP + u_t \dots \dots \dots 3.2$$

u_t = The stochastic/error term

Where: RGDP = Real gross domestic product growth rate; GEH = Government expenditure on health; GEE = Government expenditure on education; LEXP = Life expectancy, and TSE = Tertiary school enrolment rate.

The apriori theoretical expectations of the signs of the coefficients of the econometric model are given as: $\beta_1 > 0$; $\beta_2 > 0$; $\beta_3 > 0$ and $\beta_4 > 0$ ('>' denotes positive coefficient.)

Ordinary Least Squares (OLS) multiple regression analysis was used to analyse the data in the study. From 1986 to 2024, this method allowed us to test the hypothesis of a positive correlation between the dependent and independent variables. Using the statistical software package Econometric Views (E-Views 10), which is specifically developed for empirical econometric research, the model parameters were estimated using the OLS approach.

4.0 RESULTS AND DISCUSSION

4.1 Results

Table 1: Augmented Dickey-fuller Unit Root Result

Variable	Level	First difference	Critical level @5%	Lag(s)	Model	Order of integration
LRGDP	-3.147002	-8.008515**	--3.548490	2	Trend & Intercept	I(1)
TSE	-2.352181	-6.792150**	-3.548490	2	Trend & Intercept	I(1)
LGEH	-2.550859	-11.20200**	-3.548490	2	Trend & Intercept	I(1)
LGEE	-3.354066	-6.138559**	-3.557759	2	Trend & Intercept	I(1)
LXP	-2.136419	-4.180622**	-3.548490	2	Trend & Intercept	I(1)

Note: *(**) *** denotes statistically significant at 1%, 5% and 10% level respectively.

Source: Author's computation

Life expectancy, government spending on health and education, tertiary enrolment, and real GDP growth rate are all found to be stationary at the 5% level of significance according to the Augmented Dickey-Fuller (ADF) unit root test.

Table 2: Johansen Co-integration Rank Result

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Prob.**
None *	0.735569	91.99357	0.0003
At most 1	0.540059	46.76767	0.0630
At most 2	0.255117	20.36131	0.3986
At most 3	0.187970	10.34736	0.2549
At most 4	0.091641	3.267940	0.0706

Source: Author's Computation

I(1), the trace statistic of the cointegration test for identically integrated variables, shows that one cointegrating equation is present at the 5% significance level. This validates the use of the Error Correction Model (ECM) since it proves that the variables in the model have a long-run relationship. Determining that all I(1) variables are cointegrated is the first step in estimating the over-parameterized ECM.

Table 3: Estimated Error Correction Model (ECM) Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.430516	0.726721	-0.592409	0.5582
D(TSE)	-0.701419	0.689223	-1.017695	0.3172
D(LGEH)	-0.989653	1.671687	-0.592008	0.5584
D(LGEE)	1.455910	1.764114	0.825292	0.4159
D(LEXP)	2.922208	2.565970	1.138832	0.2641
ECM(-1)	-0.467766	0.163462	-2.861612	0.0077
R-squared	0.341080	Mean dependent var		0.042867
Adjusted R-squared	0.227473	S.D. dependent var		3.724675
Prob (F-statistic)	0.026469			

Note: Dependent Variable: D(RGDPR)

Source: Author's Computation

Table 3 calculated values suggest that the adjustment speed coefficient, ECM(-1), which is part of the error correction term, is close to 0.46. This indicates that the gap between long-term equilibrium levels and actual economic growth is being filled in at a rate of 46% every period on average. A

statistically significant shift to the long-run equilibrium occurs at a rate of 46% every period as a result of the model's adjustment coefficient. This proves that the model used the right approach to fixing errors.

Also, while looking at the real GDP growth rate (RGDPR) as a measure of economic growth in Nigeria, we see that tertiary school enrolment (TSE) correlates adversely. The regression line's coefficient of -0.701419, holding all other variables constant, indicates that there will be a 0.70 unit drop in economic growth for every unit rise in tertiary school enrolment. With a probability value of 0.3172, this impact does not meet the criteria for statistical significance at the 5% level. According to these results, enrolment in postsecondary education dampens Nigeria's GDP growth, albeit only slightly. With that, we support the null hypothesis, which states that enrolment in postsecondary education does not significantly affect economic growth in Nigeria, and reject the alternative hypothesis.

Similarly, research has shown that government expenditure on health (GEH) has a detrimental impact on Nigeria's economic growth. With all else being equal, a one-unit increase in government spending on health results in a 0.99-unit decline in economic growth, according to the correlation of -0.989653. Since the linked result's probability value of 0.5584 is greater than the 5% level, the result is not considered statistically significant. Government spending on health has a negative, albeit negligible, effect on economic growth, hence we accept the null hypothesis and reject the alternative.

On the flip side, GEE shows a positive association between GDP growth and government spending on education. With all else being equal, the calculated coefficient of 1.455910 shows that a one-unit increase in government spending on education boosts economic growth by an average of 1.46 units. However, with a probability value of 0.4159, it is not significant at the 5% level. This indicates that government spending on education has a small but positive effect on economic growth.

Life expectancy (LEXP) also has a favourable effect on Nigeria's GDP growth, according to research. With all else being equal, a one-unit increase in life expectancy results in an increase of about 2.92 units in economic growth, according to the coefficient of 2.922208. Although the effect is not statistically significant, the probability value of 0.2641 is greater than the 5% level of significance. Therefore, life expectancy has a small but beneficial effect on GDP growth. With an Adjusted R² value of 0.227473, the model's independent variables account for over 22% of the variance in GDP growth. The remaining 78% of the variance is explained by the error term, which includes other factors that were not included when developing the model. The F-statistic of 3.002284 with a probability of 0.026469 indicates that the model passes the 5% test of statistical significance and misspecification.

4.2 Discussion

The results of the Johansen co-integration test show that there is one co-integrating equation at the 5 percent level of significance because the trace statistic is 91.99 which is above the critical value of 69.82.

This result supports the existence of stable long-run relationship between real gross domestic product growth rate (RGDPR), tertiary school enrolment (TSE), government expenditure on health (GEH), government expenditure on education (GEE) and life expectancy (LEXP). It means that short-run fluctuations might happen; however, in the long-term perspective, the variables tend to move in unison. This finding consolidates the theoretical stand of the human capital theory and endogenous growth theory. It is also in line with the empirical evidence by Sulaiman and Ahmadu (2023) and Adeleke and Anuolam (2023), who determined the existence of long-run relationships between human capital indicators and economic growth in Nigeria.

The negative coefficient of the error correction term, ECM (-1) is statistically significant and indicates further the long-run relationship between the variables. The coefficient of ECM of -0.468 suggests that an economic growth with short-run disequilibrium is about 46 percent being rectified in a period. This moderately average adjusting speed indicates that the movements off the equilibrium at the long-run are corrected gradually. The ECM term is significant and therefore, the error correction framework should be used and implies that human capital variables are important when restoring the long-run growth equilibrium. The same finding is also in line with Eniekezimene et al. (2023), who indicated a high adjustment mechanism in their ARDL-based analysis of human capital and growth in Nigeria.

The ECM outcomes indicate that increase in tertiary school enrolment does not translate to immediate benefits in economic growth and it may even have a dampening effect on economic growth. This could be as a result of structural problems of the tertiary education system in Nigeria (i.e. low quality of teaching, insufficient funding, skills saturation, post-graduation unemployment and long-term student inconvenience through industrial strikes). The result supports the findings of Eniekezimene et al. (2023) who have established tertiary enrolment as meaningful or weakly related to economic growth. Nonetheless, it is the opposite of Ogunbadejo et al. (2020) and Ogunleye et al. (2015), who mentioned the positive and meaning influence of tertiary education on growth. The divergence implies that though tertiary education is theoretically beneficial to growth it can be ineffective in Nigeria due to institutional inefficiencies and poor connections between education and productive sectors of the economy.

The findings also indicate that growth-enhancing results in the economy are not observed immediately following the increase in public spending on health. This observation can be explained by weaknesses in health sector expenditure, resource misplaced, corruption, poor health infrastructure, and the continuation of poor health despite the high spending. This outcome is consistent with the results of Adeleke and Anuolam (2023), who discovered that the effects of the health-related indicators on growth were insignificant but contradicts Ibikunle (2019), who indicated that there was a significant and positive correlation between health expenditure and economic growth in Nigeria. The gap between the two

highlights the relevance of not only health spending volume but also how much the spending is efficient and effective in enhancing the health and productivity of the population.

On the other hand, government spending on education has a positive relation, though do not exert any meaning influence on economic growth. The value of the coefficient of 1.456 implies that an increase in the amount of money that the population spends on education can improve the growth of the economy, but the impact is insignificant in the short run. This finding suggests that education spending has growth benefits which would be delayed, in a way that it would take time before educational investments can be converted into skilled labor, innovation, and gains in productivity. It is also in agreement with Adeleke and Anuolam (2023), who found positive though inconsistent effects of education spending on growth and partially with Sulaiman and Ahmadu (2023) who found the long run significance of education spending. The negligence can also be representative of such issues as poor use of education resources, deteriorating quality of education and continuing strikes within the education sector in Nigeria.

On the same note, life expectancy is also discovered not to have a meaningful short-run effect on economic growth during the study period. The coefficient of 2.922 suggests that economic growth is boosted by the life expectancy as it raises the productive life of a person and motivates to invest in human capital. Nonetheless, the non-significance of the results indicates that the economic benefits of the solution might not be directly realized immediately since the economy has a high rate of unemployment and underemployment. This result supports the observation of Adeleke and Anuolam (2023), which showed that life expectancy was not significant, but is opposite to Ibikunle (2019) and Ogunbadejo et al. (2020), who showed substantial positive changes. The discrepancy underscores the fact that there is a probability that the growth effect of life expectancy in Nigeria is moderated by labor market and economy absorptive capacity.

By its relatively low adjusted R^2 of 0.227, it means that about 22 percent of the changes in the growth of the economy can be explained by the human capital variables incorporated in the model, the rest 78 percent is explained by other factors like physical capital, technology, institutional quality, macroeconomic stability and external shocks. This finding indicates that as much as the human capital development is significant, it is not the only factor that drives economic growth in Nigeria. However, the general model is statistically significant, based on the F-statistic and the probability value, which proves that the explicatory variables have a joint impact on the economic growth. The statistic of Durbin-Watson near to 2 also proves the lack of serial correlation, which adds credibility to the obtained estimations.

Generally, the results indicate that although, human capital development variables are related to economic growth in Nigeria at a long-run, its short-run effects are not very significant. It means that

Nigeria has not been able to use the growth-promoting capability of human capital to its fullest because of the structural, institutional and policy-based restrictions. These findings do support the argument that not only does it require increased investment in education and health but also enhanced efficiency, quality, and encouragement of labor market needs in order to attain sustainable economic growth.

5.0 CONCLUSION

This paper has discussed how human capital development affects economic growth in Nigeria in specific reference to tertiary school enrolment, government spending on health, government spending on education, and life expectancy. Based on time-series data and applying the Johansen co-integration and the Error Correction Model (ECM) method, the study presented the empirical data about the long-run and short-run relationships between the indicators of human capital development and economic growth. The obtained results of the Johansen co-integration test proved that there is a long-run equilibrium relationship between economic growth and the chosen variables of human capital, which means that the human capital development is essentially tied to the process of growth in Nigeria over time. The statistically significant negative error correction term also indicated that the deviations of long-run equilibrium are corrected at a moderate rate of about 46 percent per period, which implies that shocks do not affect growth immediately, and after that the system over time, restores itself to equilibrium.

Although the analysis showed that there was a long-run relationship, short-run ECM analysis indicated that tertiary school enrolment and government spending on health had negative and negligible impacts on economic growth. This indicates that the growth in enrolment and health expenditure have not been associated with immediate growth-enhancing effects, probably because of inefficiencies, lack of quality and structural issues in the education and health sectors of Nigeria. On the other hand, government spending on education and life expectancy showed positive and statistically insignificant effects on the economic growth, which means that the discussed variables can stimulate the growth, but the effect might be realized only in the long-term perspective.

All in all, the results indicate that Nigeria has not exploited the development of human capital as a growth-enhancing factor at its fullest. The lack of significance of short-run impacts of major human capital indicators indicates the latent causes, which include poor efficiency in government expenditure, insufficient quality education and health, poor labor market assimilation, and poor relations between human capital investment and productive economic events. The analysis concludes thus that in Nigeria, human capital development is necessary, but not sufficient to attain sustainable economic growth unless it is accompanied with good policies, institutional reforms as well as complementary investments.

It can be concluded on the basis of this study that the following policy proposals can be put forward in order to increase the role of human capital development in promoting economic growth in Nigeria:

1. The adverse and inconsequential effect of tertiary school enrolment on economic development implies the need to move away the concern on tertiary school enrolment expansion, instead of enhancing the quality of education. The government ought to make the curriculum relevant, encourage science, technology, engineering and mathematics (STEM) education and improve collaboration between tertiary institutions and industries. This will contribute to the minimization of skills mismatch, enhance graduate employability and the productivity impact of higher education.
2. Government would need to increase funding to education according to international standards, timely disbursement, and investment in teacher education, research centers and learning infrastructure. Constant funding will minimize the interruptions in the education industry and improve development of human capital.
3. There should be increased policies towards accessibility to quality healthcare, better nutrition, sanitation and clean water, and combating communicable and non-communicable diseases. Better health will increase the working life as well as increase the economic contribution.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to all individuals and organizations who contributed to the completion of this research. Their valuable support, guidance, and assistance are greatly appreciated.

DECLARATIONS

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FUNDING

The authors did not receive any internal or external funding for this study.

ETHICAL APPROVAL

Formal ethical approval was not obtained for this study. However, the study adhered to recognized ethical guidelines, including voluntary participation, informed consent, confidentiality, anonymity, and the responsible handling of participant data.

DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

ARTIFICIAL INTELLIGENCE (AI) DECLARATION

The authors declare that artificial intelligence tools (such as ChatGPT or similar technologies) were used to assist in language editing and improve the readability of the manuscript. The authors take full responsibility for the content, accuracy, and integrity of the manuscript

AUTHOR CONTRIBUTIONS STATEMENT

B.T: Conceptualization, Methodology, Software, Validation, Writing – review & editing; A.S.A.: Formal analysis, Investigation, Data curation, Writing – original draft preparation, Visualization, Project administration, Funding acquisition. The author has read and agreed to the published version of the manuscript.

REFERENCES

- Adeleke, A. A., & Anuolam, O. J. (2023). Human capital development and economic growth in Nigeria: An autoregressive distributed lag (ARDL) approach. *International Journal of Multidisciplinary Research and Analysis*, 6(6), 1–15.
- Barro, R. J. (2013). Education and economic growth. *Annals of Economics and Finance*.
- Becker, G. S. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education*. Columbia University Press.
- Becker, G. S. (1967). *Human capital and the personal distribution of income: An analytical approach*. University of Michigan Press.
- Bloom, D. E., Canning, D., & Sevilla, J. (2004). The effect of health on economic growth: A production function approach. *World Development*, 32(1), 1–13, <https://doi.org/10.1016/j.worlddev.2003.07.002>
- Ejere, S. I. (2018). Human capital development: A continuous process for sustainable national development. *Journal of Economics and Sustainable Development*, 9(4), 88–95.
- Eniekezimene, C. O., Akinola, A. O., & Yusuf, S. A. (2023). Human capital development and economic growth in Nigeria: An autoregressive distributed lag analysis. *Asian Journal of Economics, Business and Accounting*, 23(7), 45–59.
- Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political Economy*.
- Hanif, N., & Arshed, N. (2016). Relationship between school education and economic growth: SAARC countries. *International Journal of Economics and Financial Issues*, 6(3), 994–1000.
- Harper, C. (2011). *Environment and society: Human perspectives on environmental issues* (5th ed.). Boston, MA: Prentice Hall.
- Ibikunle, J. A. (2019). Public health expenditure, life expectancy and economic growth in Nigeria. *Journal of Social Sciences*, 9(6), 215–226.
- International Monetary Fund. (2021). *World economic outlook: Managing divergent recoveries*. International Monetary Fund.

- Jhingan, M. L. (2013). *The economics of development and planning* (40th ed.). Delhi, India: Vrinda Publications.
- Kazeem, A., & Ige, O. (2010). Redressing the growing concern of the education sector in Nigeria. *The Social Sciences*, 5(3), 215–221.
- Lipsey, R. G., & Chrystal, K. A. (2017). *Economics* (13th ed.). Oxford University Press.
- Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3–42. [https://doi.org/10.1016/0304-3932\(88\)90168-7](https://doi.org/10.1016/0304-3932(88)90168-7)
- MacKinnon, J. G., Haug, A. A., & Michelis, L. (1999). Numerical distribution functions of likelihood ratio tests for cointegration. *Journal of Applied Econometrics*, 14(5), 563–577. [https://doi.org/10.1002/\(SICI\)1099-1255\(199909/10\)14:5<563::AID-JAE530>3.0.CO;2-R](https://doi.org/10.1002/(SICI)1099-1255(199909/10)14:5<563::AID-JAE530>3.0.CO;2-R)
- National Policy on Education. (2004). *National Policy on Education* (4th ed.). Federal Government of Nigeria.
- Ogunbadejo, H. K., Kehinde, J. S., & Abiodun, O. F. (2020). Schooling, life expectancy and economic growth in Nigeria. *Journal of Economics and Development Studies*, 8(4), 32–44.
- Ogundipe, A. A., & Oluwatobi, S. O. (2010). Poverty trap and economic growth in developing countries. *Journal of Sustainable Development in Africa*, 12(7), 183–195.
- Ogunleye, B. O., Owolabi, H. O., & Ogunleye, R. O. (2017). Education management and control in Nigeria: The roles of government. *Journal of Education and Practice*, 8(8), 152–158.
- Ogunleye, O. O., Owolabi, O. A., Sanyaolu, O. A., & Lawal, O. O. (2015). Human capital development and economic growth in Nigeria. *International Journal of Economics and Finance*, 7(8), 183–195.
- Okojie, C. E. (2019). *Human capital formation and economic growth in Nigeria*. Malthouse Press.
- Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5, Pt. 2), S71–S102. <https://doi.org/10.1086/261725>
- Schultz, T. W. (1960). Capital formation by education. *Journal of Political Economy*, 68(6), 571–583. <https://doi.org/10.1086/258393>
- Schultz, T. W. (1961). Investment in human capital. *The American Economic Review*, 51(1), 1–17. <https://doi.org/10.3386/w0033>
- Solow, R. M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70(1), 65–94. <https://doi.org/10.2307/1884513>
- Solow, R. M. (1975). *Growth theory: An exposition*. Oxford University Press.
- Sulaiman, C., & Ahmadu, A. (2023). Human capital development and economic growth in Nigeria. *ASRIC Journal of Social Sciences*, 4(2), 1–18.
- Swan, T. W. (1956). Economic growth and capital accumulation. *Economic Record*, 32(2), 334–361. <https://doi.org/10.1111/j.1475-4932.1956.tb00434.x>
- Torruam, J. T., & Abur, C. C. (2014). Human capital development and economic growth in Nigeria. *Journal of Economics and Sustainable Development*, 5(28), 48–53.
- World Bank. (2020). *World development report 2020: Trading for development in the age of global value chains*. World Bank. <https://doi.org/10.1596/978-1-4648-1457-0>