Gusau Journal of Economics and Development Studies (GUJEDS),
vol 7, no 1 August, 2026 ISSN: 2786-9695 (Print) 3027-1126 (Online)

HUMAN CAPITAL AND ECONOMIC GROWTH NEXUS IN NIGERIA

DOI: https://doi.org/10.57233/gujeds.v7i1.09

Mohammed, Musa Jatto
Department of Economics, Prince Abubakar Audu University, Anyigba. Kogi State, Nigeria
Corresponding Author: *musajnr555@gmail.com*, ***Tel No:*** *08032743509*

Muhammad, Ali
Department of Economics, Prince Abubakar Audu University, Anyigba. Kogi State, Nigeria

Rotimi, Mathew Ekundayo
Department of Economics, Federal University Felele, Lokoja, Kogi State. Nigeria

Abstract *The study investigates the relationship between human capital and economic growth in Nigeria using time-series data covering the period 1986-2021. Specifically, it examines the impact of public expenditure on education and public expenditure on health on economic growth. The Johansen cointegration test and the Vector Error Correction Model (VECM) were employed to estimate the long-run and short-run dynamics among the variables. The findings revealed that public expenditure on education has a significant negative effect on economic growth, while public expenditure on health exerts a significant positive effect on economic growth in Nigeria. Overall, the results suggest that public expenditure plays an important role in influencing economic growth through human capital development. The study therefore concludes that government spending on human capital development significantly affects economic growth. Based on these findings, it recommends that the Nigerian government should increase investment in both the education and health sectors in order to achieve sustainable economic growth. This can be achieved through, among others, adequate budgetary allocations, effective policy implementation, improved monitoring mechanisms, and strengthened policies that encourage private sector participation in human capital development. This suggests need for quality-focused spending, not just quantity*

Keywords Human capital, Public Expenditure, Economic growth, VECM, Nigeria

JEL Classification: E24, F43, J24, O47

1. Introduction

Human capital development has increasingly become a major concern in the pursuit of economic growth and development. Primarily represented by education and health, human capital is widely recognized as a key driver of productivity, innovation, and sustainable development (Gyang, 2011). It reflects the relationship between individuals and the

world of work through the production of goods and services that contribute to political, social, cultural, and economic progress. According to Ahmad and Batul Zayid and Tayyaba (2013), formal education and good health are fundamental components of economic development and societal advancement. Investment in these sectors improves the quality of human capital, enhances productivity, and ultimately raises the standard of living.

Conversely, inadequate investment in education and health often leads to low productivity and poor quality of labour. A nation characterized by a largely unskilled and unhealthy workforce may struggle to improve its Gross Domestic Product (GDP) and overall living standards. Thus, meaningful human capital development requires sustained investment in both education and health sectors. Jhingan (2007) notes that, in a broad sense, investment in human capital involves expenditure on education, health, and social services, while in a narrower sense it refers mainly to education and training. Historically, several developed countries, including the United States, Japan, Denmark, and the former Soviet Union, achieved rapid economic growth through substantial investment in education and workforce development (Miachi, 2006). Evidence from these countries shows a strong relationship between the quality of education provided to the labour force and their level of economic development.

Furthermore, indicators of economic development extend beyond income measures such as GDP or Gross National Income (GNI) per capita. Human development indicators, such as education, health, environmental quality, and personal freedoms, provide a broader understanding of a nation's level of development (Omodero, 2019).

In Nigeria, the education sector has experienced significant expansion since the 1970s. However, this progress has not been consistently sustained due to frequent policy changes, declining foreign earnings, and inadequate funding (UNESCO, 2006). Government expenditure on education has remained below the 26 percent budgetary allocation recommended by UNESCO, with a greater proportion of government spending devoted to recurrent expenditure. Economic challenges, including fluctuations in global oil prices and mismanagement of resources have further reduced funding for social services such as education and health (Akande, 2016). Consequently, Nigeria continues to face a high rate of out-of-school children, declining quality of education and inadequate health facilities.

Education remains central to national development because it produces skilled manpower necessary for economic progress (Jon, 2013). Despite periodic increases in government spending on education, the expansion of educational investment has not consistently translated into proportional economic growth. Also, the findings and conclusion drawn from the studies on the impact of human capital development (especially public investment in education) on economic growth are inconsistent [for instance Erasmus (2023) and Ogbonnaya *et al.* (2017), Michael (2017) and Gylych *et al.* (2016)], with some reporting negative unlike Kazeem et al 2017 who found recurrent positive, this study finds PEE negative. This may be due to post-2015 data + VECM

approach.It is against this backdrop that this study examines the relationship between human capital investment and economic growth in Nigeria, focusing specifically on the effects of public expenditure on education and health on economic growth. Therefore, this study empirically investigates the relationship between human capital and economic growth in Nigeria. It specifically seeks to investigate the impact of educational and health expenditures on economic growth.

2 Literature Review

2.1 Conceptual Issues

This section begins with conceptual clarifications, starting with the concept of human capital and followed by the meaning of economic growth. Human capital is broadly defined as the stock of skills, knowledge, and competencies acquired by individuals through education, training, and work experience, as well as healthy living. According to Becker (1962), investment in education and training constitutes the most critical form of human capital development, as it enhances productivity at both individual and national levels. Similarly, human capital development involves the process of improving the quality and quantity of skilled individuals necessary for economic growth (Okojie, 2014). It reflects the capacity of individuals to have access to healthy living and education that will enhance meaningful contribution to production through innovation, adaptability, and problem-solving abilities. As noted by Ejere (2011), human capital represents the human factor in production, combining knowledge, fitness and skills that drive economic performance.

Economic growth is employed in this study because it provides a measurable and widely accepted indicator of overall economic performance. Economic growth, typically proxied by real GDP and GDP per capita, reflects the expansion of an economy's productive capacity and the improvement in living standards over time (Todaro & Smith, 2014). As the study seeks to examine the impact of human capital on national development, economic growth serves as an appropriate dependent variable through which such effects can be quantified. Furthermore, the consideration for inclusion of economic growth aligns with established theoretical and empirical literature, which identifies human capital-through education, skills, and health, as a key driver of productivity, innovation, and technological progress (Jhingan, 2007). In the Nigerian context, where policy objectives are largely growth-oriented, employing economic growth enables the study to generate relevant policy insights on how investments in human capital can enhance sustainable development and improve economic outcomes.

2.2 Empirical Literature

It is widely established among economists that investment in education and health, key components of human capital, is essential for sustained economic growth. Accordingly, several relevant studies have examined this relationship. Hanushek, Jamison, Jamison & Woessmann (2008), for instance, explored the link between education and economic growth, building on the foundational works of Becker (1962),

Schultz (1961), and Nelson and Phelps (1966). Subsequently, following the introduction of the neoclassical growth model by Solow (1956), numerous theoretical and empirical models have been developed to further explain how education influences growth.

Among the empirical studies conducted is the one by Erasmus (2023) which examined the impact of public expenditure on human capital development in Nigeria using time series data from 1960 to 2023 obtained from the Central Bank of Nigeria Statistical Bulletin. Employing the Ordinary Least Squares (OLS) regression technique. The study found that Nigeria's human capital development index remains relatively low compared to other countries. The results further indicated that, among the variables considered, education expenditure had a negative and significant effect, while public health expenditure exerted a positive and significant influence on the human development index. However, when education and health expenditures were combined, their joint effect was positive but statistically insignificant.

In another study, Madueme *et. al* (2022) examined the impact of economic and social sector expenditures on human capital development in Nigeria from the period of 1981 to 2018, using Autoregressive Distributive Lag Model in the analysis. The results reveal that the lagged values of government economic expenditure, student teacher ratio, external aid and per capita income impact significantly and positively on current level of development in human capital, while, government social expenditure, inflation, current value of student-teacher ratio and lagged value of external aid show a negative relationship with human capital development. The study concludes that resources should be properly channeled (and monitored) to areas of expenditure that would boost human capital development in Nigeria.

Shafuda and De (2020) examined the impacts of government spending on human development indicators like healthcare outcomes, educational achievements and increase in national income in Namibia, using time series data from 1980 to 2015 using Vector auto-regression analysis. The study reveals a significant long-run inverse relationship of government spending on healthcare with fertility rate, infant mortality rate and under-5 mortality rate. The study also revealed a significant long-run positive relationship of government spending on education with literacy rate, net primary and gross tertiary enrolment rate. Whereas, no co-integration between government spending on education and gross enrolment rate at primary and secondary level was found. The results are thus in favour of continuation of expansionary government expenditure policy to achieve faster economic growth in Namibia

Omodero (2019) assessed the impact of government general spending on human development in Nigeria from 2003 to 2017. Using a multiple linear regression model, the study found that government's capital expenditure and inflation have insignificant negative influence on HDI, but government recurrent expenditure has strong and significant positive impact on HDI. The study concluded that resources on recurrent expenses should be reduced while more money should be invested in capital projects for human capital development in Nigeria.

Samuel and Ngozi (2019) investigated government educational expenditure and human capital development in West African countries. The result obtained shows that increase government education and health expenditure have positive and significant impact on primary and secondary school enrolment. The Granger causality result also shows that there is bidirectional causality between government health expenditure and primary as well as secondary school enrolment. Similarly, bidirectional causality between government educational expenditure and secondary school enrolment was found.

Also, Kazeem *et al*. (2017) investigated the impact of education and health expenditures on Nigeria's economic growth, grounded in human capital theory. Using time series data, the study applied cointegration and error correction model (ECM) techniques. Real GDP per capita was the dependent variable, while explanatory variables included government capital and recurrent spending on education and health, enrolment rates (primary, secondary, and tertiary), gross fixed capital formation, and labour force. The findings revealed that recurrent expenditure on human capital positively influenced real output, whereas capital expenditure exhibited a negative relationship with real output.

Ogbonnaya *et al;* (2017) empirically investigated the relationship between government spending on humancapital and human capital development in Nigeria from 1990-2015. Thestudy adopted autoregressive distributed lag methods (ARDL) and findings from the study revealed that in the long and short-run, government spending on health is insignificantly positive on human capital development but with public spending on education is significant.

Michael (2017) investigated the effect of government human capital investment on economic growth in sub-Saharan Africa: Evidence from Nigeria, South Africa and Ghana from 1980-2013. The study indicates that two out of the three human capital proxy variables; government investment on health (GIH), and government investment on education (GIE), show significant positive impact on economic growth only in Nigeria, while literacy ratio (LR) is insignificantly positive in all the countries.

Kairo *et al*. (2017) empirically analyzed the relationship between government expenditure and human capital development in Nigeria using data from 1990 to 2014. The study employed the Autoregressive Distributed Lag (ARDL) model and impulse response function for estimation. The ARDL bounds test confirmed a long-run relationship between government expenditure and the human capital development index. Findings indicated a positive but statistically insignificant relationship in both the short and long run. Consequently, the study recommends that government spending be strategically directed toward human development, particularly through the establishment of specialized, technology-driven schools and the provision of efficient and effective healthcare facilities

Akande (2016) examined the nexus between education and living standards in Nigeria using the Johansen cointegration test and Vector Error Correction Model (VECM). The study employed variables

such as per capita real GDP, government expenditure on education, and health enlightenment, and found a positive relationship. It concluded that public spending on education and health awareness enhances opportunities for growth, improves labour skills, and raises productivity and overall living standards.

Paul and Akindele (2016) analysed the impact of human capital development on Nigeria's economic growth using ARDL cointegration techniques. Their findings indicate a weak but positive long-run relationship among variables such as secondary school enrolment, public education expenditure, life expectancy, gross capital formation, and economic growth, while primary and tertiary enrolment, alongside health expenditure, exhibited negative long-run relationships with growth.

Gylych *et al*. (2016) investigated the effect of education on economic growth in Nigeria from 1970 to 2006 using Ordinary Least Squares (OLS). The study found a statistically significant relationship between economic growth and variables such as education expenditure and school enrolment, although primary school enrolment showed an adverse effect. Another study by Eigbiremolen and Anaduaka (2014) assessed human capital development and economic growth using quarterly data from 1999 to 2012. Their findings revealed a relatively inelastic relationship between human capital and output, recommending increased funding across all educational levels to stimulate growth.

Similarly, Nwaeze *et al.* (2014) examined government expenditure and economic growth in Nigeria (1992–2011) using OLS, finding that public spending positively influences economic growth. They advocated increased investment in productive sectors to boost economic activity. Also, Ohwofasa and Obeh (2012) explored the relationship between government education expenditure and economic growth in Nigeria (1986–2011) using a parsimonious Error Correction Model (PECM). They found a positive long-run relationship and recommended increased capital investment in the education sector.

Babalola (2011) analysed the link between education investment and economic growth (1977–2008) using an error correction and causality framework. The study established both short- and long-run relationships, confirming cointegration between the variables. Also, Oluwatobi and Ogunrinola (2011) investigated human capital development and growth (1981–2010) using an augmented Solow model. The findings revealed that recurrent expenditure on education and health positively influences output, whereas capital expenditure showed a negative relationship. The study emphasized efficient allocation of public funds.

Overall, the literature underscores the critical role of human capital on economic growth and development. It also highlights the role of government policy and implementation capacity in shaping human capital outcomes. While private sector participation contributes to educational provision, equitable access to quality education largely depends on effective

public policies, adequate funding, and efficient implementation frameworks.

2.3 Theoretical Framework

The study is hinged onthe human capital theory as advanced by Theodore Schultz, Garry Becker and Mincer. Thetheorywasdevelopedin1960sduetothereal izationthatthegrowthofphysicalcapital has accounted for only a small part of growth in income. In the words of Schultz (1961), human capital theory rests on the assumption that formaleducation is instrumental and even necessary to improve the production capacity of thepopulation. In short, the theory argued that educated population is a productive population. Thetheory emphasizes on quality of education on labour productivity and efficiency byincreasingthelevelofcognitivestockofecon omicallyproductivehumancapabilitywhichis aproduction innate ability as well as investment in human capital which is more considered to physical capital.

3. Data and Methodology

This paper utilizes secondary time series data spanning 1986 to 2021 and sourced from Central Bank of Nigeria Statistical Bulletin, and World Development Indicator (2021). The variables of interest include; contribution of human capital to gross domestic product (GDP) as proxy for economic growth, public expenditure on education (PEE) and public expenditure on health (PEH).

Model Specification

Based on the literature and convenience, the study adopted Akande (2016) in building the model for this study. The functional form of the model is stated as:

$$lnrgdp = \beta_1 + lnedu_t + lnhth_t + \mu_t \quad \text{.....1}$$

Where $lnrgdp$ is the natural log of per capita real gdp, $lnedu$ is the natural log of per capita government expenditureon education, $lnhth$ is the natural log of per capita government expenditure on health and μ is the error term.

The multiple regression analysis is used and, on this premise, the model for the study is further specified as follows; Gross Domestic Product (GDP) is used as proxy for economic growth in Nigeria while public expenditure on education and public expenditure on health are the explanatory variables. The study utilized the Johansen Cointegration and Vector Error Correction Model (VECM). VECM is a least squares regression technique involving the lag of both the dependent variable and independent variables where there is possibility of dynamic interaction and endogeneity as well as where the variables are stationary at first difference. VECM captures both the short-run dynamics and long-run equilibrium. In structuring the VECM model for the study, the study first formulated the exogenous growth model. The functional expression of the relationship of the variables took the form as shown in equation 2:

$$\ln GDP = f(\ln PEE, \ln PEH) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

The mathematical form of the model is specified as:

$$\ln GDP = \alpha + \ln PEE + \ln PEH = \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\

$$\Delta Y_t = c + \beta_t + \alpha Y_{t-1} + \sum \alpha_i \Delta Y_{t-i} + u_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 5$$

Where Δ is the first difference operator $\alpha = (\rho - 1)$, t is the time, β_t is the trend variables, u_t is the white noise error term. The null hypothesis is that $\alpha = 0$, implying that there is a unit root and time series is not stationary. The alternative hypothesis is that $\alpha < 0$, means that the time series is stationary.

Johanson Co-integration Test

According to Engel-Granger (1987), it was evident that when variables are found to be stationary at most first difference, it implies the existence of a long-run equilibrium relationship between the dependent and independent variables. Thus, to observe the status of the long-run relationship, we employ the Johanson Co-integration test.

The Co-integration test established whether a long-run relationship equilibrium exist among the variable. It is generally accepted that co-integration is established when the likelihood ratio is greater than the mackinnon critical values. The model can be stated mathematically as

$$\Delta X_t = \mu + \alpha_1 \Delta X_{t-1} + \alpha_2 \Delta X_{t-2} + \ldots\ldots + \alpha\rho\text{-}1 \Delta X_{t-\rho} + 1 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 6$$

Vector Error Correction Model (VECM) for Objectives

The Vector Error Corrections Model (VECM) is employed to investigate the impact of human capital on the economic growth of Nigeria following the work of Kazeem *et al.,* (2017) and Akande (2016). The VECM model based on the functional form presented above in equation 1 is presented in equation 7;

$$\Delta \ln GDP_t = \alpha + \sum^{k-1} \beta i \Delta \ln GDP_{t-1} + \sum^{k-1} \varphi_j \Delta \ln PEE_{t-j} + \sum^{k-1} \varphi_m \Delta \ln PEH_{t-m} + \lambda_1 ECT_{t-1} + u_{1t} \quad \ldots\ldots 7$$

$$\Delta \ln PEE_t = a + \sum^{k-1} \beta i \Delta \ln GDP_{t-1} + \sum^{k-1} \varphi_j \Delta \ln PEE_{t-j} + \sum^{k-1} \varphi_m \Delta \ln PEH_{t-m} + \lambda_2 ECT_{t-1} + u_{2t} \quad \ldots\ldots\ldots 8$$

$$\Delta \ln PEE_t = d + \sum^{k-1} \beta i \Delta \ln GDP_{t-1} + \sum^{k-1} \varphi_j \Delta \ln PEE_{t-j} + \sum^{k-1} \varphi_m \Delta \ln PEH_{t-m} + \lambda_3 ECT_{t-1} + u_{3t} \quad \ldots\ldots\ldots 9$$

Where
K-1 = the lag length is reduced by 1
β_1, φ_i, φ_m = short-run dynamic coefficient of the model adjustment to long-run equilibrium

λ_i = speed of adjustment parameter with negative sign

ECT_{t-1} = the error correction term is the lagged value of the residual obtained from cointegrating regression of the dependent

variables on the regressors. Contains long-run information derived from the long-run cointegration relationship
u_{it} = residuals (stochastic error terms often called impulse)

Therefore, the following methodological steps are employed in this study. These include; descriptive statistics, Augmented Dickey Fuller (ADF) test, Johanson co-integration, and Vector error correction model (VECM) impulse response and variance decomposition.

4. Data Analysis

Descriptive Statistic

***Table 1*: Descriptive Statistic Results**

	lnGDP	*lnPEE*	*lnPEH*
Mean	30.03601	3.696321	2.904403
Median	30.38309	4.362960	3.618243
Maximum	32.80193	6.471960	6.048152
Minimum	26.01215	-1.469676	-3.218876
Std. Dev.	2.125820	2.371391	2.653204
Skewness	-0.445116	-0.780812	-0.675278
Kurtosis	1.915264	2.532039	2.287658
Jarque-Bera	2.953744	3.986482	3.497146
Probability	0.22*	0.13*	0.17*
Observations	36	36	36

Source: Researchers' Computation (2025).

Note: * indicates statistical significance at 5%.

Table 1 presents 36 observations for the variables under study, namely Gross Domestic Product (GDP) as a proxy for economic growth, Public Expenditure on Education (PEE), and Public Expenditure on Health (PEH). The descriptive statistics are employed to assess the normality of the variables and examine their magnitudes. The skewness results show that all variables are negatively skewed. Furthermore, the Jarque-Bera statistics suggest that the variables are not normally distributed, as their probability values exceed the 0.05 level of significance. Consequently, given the non-normal distribution of the variables, it becomes necessary to conduct a unit root test to determine their stationarity.

Test of Stationarity

Table 2: **Unit Root Test Results**

Variables	ADF Statistic at level	ADF Statistic at first difference	Critical values of 5% at level	Critical values of 5% at first difference	P-values at level	P-values at first difference	Order of integration
lnGDP	3.314	-4.151	-3.544	-3.553	1.000	0.012**	I(1)
lnPEE	-1.118	-4.847	-3.544	-3.558	0.912	0.003***	I(1)
lnPEH	-1.595	-2.049	-3.544	-3.558	0.774	0.000*	I(1)

Source: Researchers' Computation using Eview 10, (2025).

Note: * indicates significant at five percent level of significance.

This study carried out Augmented Dickey Fuller (ADF) unit root test as showed in Table 2 to determine whether the variables are stationary or not. Obviously, the ADF unit root test results in reveal that all the variables are stationary at first differences which means that GDP, PEE and PEH are integrated at order one I(1). This necessitates the test of cointegration for long run equilibrium existence.

Co-integration Analysis Result

Table3. Cointegration Rank Test

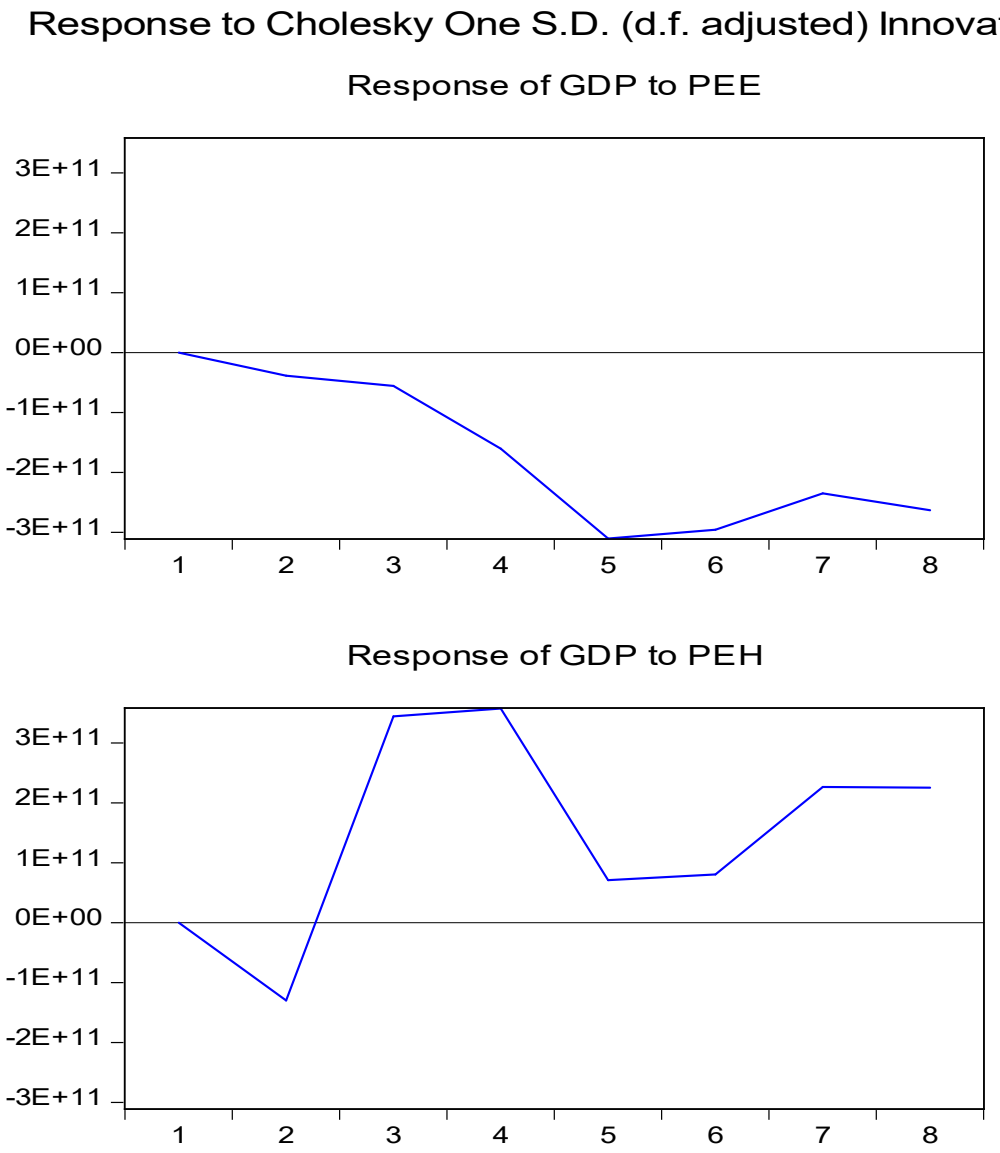
Hypothesized No.ofCE(s)	Eigenvalue	Trace Statistic	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.811766	56.78233	56.78233	25.82321	0.0000
At most1 *	0.716399	42.84630	42.84630	19.38704	0.0000
Atmost 2	0.332288	13.73254	13.73254	12.51798	0.0312

2 **SOURCE:** RESEARCHERS' COMPUTATION USING EVIEW 10, (2025).

From the conintegration test conducted using the trace statistic and Max Eigen Value at 5% critical value. The result of the trace statistics and maximum Eigen values in Table 3 reveals that there are two cointegrating equations. This finding implies that there is long term relationship among public expenditure on education, public expenditure on health and economic growth in Nigeria. This is in linewith Ohwofasa and Obeh (2012), Paul and Akindele (2016) and Kazeem *et al.* (2017). Hence, the estimation of vector error correction model analysis where the impulse response and variance decomposition are areas of interest.

Impulse Response

***Figure 1*: Impulse response shocks**



The impulse response function depicted in Figure 1 indicates response of economic growth to public education expenditure (PEE) in the first and third periods. From the third period onward, the response of economic growth to education expenditure declines steadily until the fifth year, where it stabilizes. Beyond this point, the response begins to recover gradually, showing an increase in the sixth and seventh periods, before stabilizing again in the eighth period, albeit within the negative region. This pattern suggests that education expenditure exerts a more of negative influence on economic growth in both the short run and the long run. The findings imply potential inefficiencies in Nigeria's education policy framework, possibly reflecting inadequate budgetary allocation relative to recommended standards such as those proposed by UNESCO. Consequently, there is a need for the Nigerian government to

increase and more effectively manage investment in the education sector to enhance its contribution to economic growth.

The response of economic growth to public expenditure on health (PEH) is initially negative, with a sharp decline observed by the second year. Thereafter, it begins to rise between the second and third years, maintaining positive stability through the third and fourth years. Although still within the positive range, it declines again in the fifth and sixth years before increasing in the seventh year and remaining stable into the eighth year. This pattern suggests that health investment exerts a negative effect on gross domestic product in the short run, but yields positive impacts over time.

Table 4: **Variance decomposition**

Variance Decomposition of GDP:				
Period	S.E.	GDP	PEE	PEH
1	2.64E+12	100.0000	0.000000	0.000000
2	3.89E+12	99.87897	0.009808	0.111225
3	4.87E+12	99.40911	0.019282	0.571603
4	5.89E+12	99.15248	0.087327	0.760189
5	6.90E+12	99.17127	0.265259	0.563472
Variance Decomposition of PEE:				
Period	S.E.	GDP	PEE	PEH
1	22.80730	13.76265	86.23735	0.000000
2	46.16032	75.23111	23.19417	1.574722
3	50.44803	76.81708	19.41933	3.763586
4	52.36107	77.15521	18.67554	4.169249
5	53.67751	77.15437	18.53925	4.306385
Variance Decomposition of PEH:				
Period	S.E.	GDP	PEE	PEH
1	17.02691	0.531914	45.53692	53.93116
2	30.29213	68.33809	14.40735	17.25456
3	32.05419	69.36963	14.02741	16.60295
4	32.26548	68.79502	13.93836	17.26663
5	33.27954	70.46379	13.12192	16.41429
Cholesky Ordering: GDP PEE PEH				

Source: Researchers' Computation using Eview 10, (2025).

Table 4 reports the variance decomposition results derived from the VECM, showing the proportion of forecast error variance explained by each variable. The estimates capture the contributions of GDP, PEE, and PEH over a five-year horizon, where years one to two represent the short run, and years three to five the long run.

For GDP, the short-run outcome (year one) indicates that 100% of its forecast error variance is explained by its own innovations, implying that other variables exert negligible influence in the immediate period. This suggests that the explanatory variables are largely exogenous with limited short-term predictive power for GDP. In the long run, GDP remains predominantly self-driven, accounting for approximately 99% of its variance, which reflects strong persistence over time. Although the contribution of PEE to GDP increases marginally from about 0.1% to 0.8% and eventually 2.6%. Its overall effect remains weak. Similarly, PEH contributes insignificantly to GDP fluctuations throughout the forecast horizon.

In the case of PEE, it exhibits weak self-predictive capacity relative to GDP in the initial period, and it declines in the explanation of its own variance over time. Over time, GDP exerted more influence on PEE, with relatively insignificant influence of PEH on PEE, indicating that it is largely driven by GDP shocks in the long run.

For PEH, the results show limited self-predictive power, particularly in the short run. Instead, GDP emerges as the dominant predictor, accounting for roughly 70% of the forecast error variance in the long run. While GDP's contribution is initially minimal (about 0.5%), it increases substantially over time, highlighting its strong influence on PEH dynamics. Conversely, the share of PEH's own variance declines across the forecast period further confirming GDP's growing role in explaining variations in PEH.

Discussion of Findings

The study examined the relationship between human capital and economic growth in Nigeria using time series data spanning 1986-2021. Gross Domestic Product (GDP) served as a proxy for economic growth (dependent variable), while public expenditure on education (PEE) and public expenditure on health (PEH) was employed as independent variables. The analysis utilized the Johansen cointegration technique alongside impulse response functions. The findings reveal that expenditure on education exerts a negative and statistically significant impact on economic growth in Nigeria. This outcome is attributed largely to the government's failure to meet UNESCO's recommended budgetary allocation to the education sector. This result aligns with the findings of Erasmus (2023) and Ogbonnaya et al. (2017), who also reported a negative relationship between education expenditure and economic growth due to inadequate funding. However, it contrasts with the studies of Michael (2017) and Gylych *et al.* (2016), which established a positive and significant effect of education expenditure on economic growth.

In contrast, public expenditure on health was found to have a positive and significant impact on economic growth in the long run.

This implies that increased investment in the health sector enhances economic performance in Nigeria. This finding is consistent with prior studies, including Erasmus (2023), Ogbonnaya *et al*. (2017), Michael (2017), and Khalafalla *et al.* (2013), all of which established a positive relationship between health expenditure and economic growth.

Furthermore, the impulse response and variance decomposition results reinforce these outcomes. GDP was found to be strongly self-influencing in both the short and long run. The contribution of PEE to forecasting GDP was insignificant over time, and the influence of PEH on GDP was relative higher over time. GDP increasingly influence PEE and PEH over time indicating a strengthening relationship between economic growth and health expenditure over the forecast horizon.

5. Conclusion and Recommendations

Expenditure on education and health constitutes a critical investment in human capital development for achieving economic growth in Nigeria. Empirical evidence from the study indicates that low investment in education exerts a negative and significant effect on GDP, whereas increased spending on health has a positive and significant impact on economic growth.

The findings further suggest that enhanced investment in both sectorswould significantly stimulate economic growth. Therefore, greater attention to and prioritization of education and health as essential components of human capital development are imperative for improving Nigeria's economic performance. Additionally, increased budgetary allocation to these sectors, in line with recommendations by UNESCO, would foster economic prosperity and align Nigeria with global standards in human capital development.

Based on these findings, the study recommends that the Nigerian government should intensify increase, but with reforms to address inefficiency/leakages investment in education and health through strategic partnerships with the private sector. This can be achieved through effective policy implementation, increased funding, and the strengthening of private sector participation frameworks aimed at ensuring sustainable and realistic growth in human capital development in Nigeria.

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