International Journal of Innovative Research in Education, Technology & Social Strategies
p-ISSN: 2465-7298 | e-ISSN: 2467-8163
Volume 13, Number 1 September, 2026

IJIRETSS

Impact of Human Capital Expenditures and Selected Outcomes on Economic Growth in Nigeria: (1990-2025)

[1]Makachi Chinyere Agatha, [2]Ologunla E. Sunday, & [3]Aigbedion I. Marvelous

Department of Economics, Faculty of Social Sciences
Bingham University Karu, Nigeria

Article DOI: 10.48028/iiprds/ijiretss.v13.i1.12

Abstract

This paper examined the impact of human capital expenditures and selected outcomes on economic growth in Nigeria from 1990 to 2025. The analysis employed the ARDL bounds testing approach to assess cointegration, and ARDL estimation to capture both long-run and short-run impacts. The results showed that Government Expenditure on Education had a negative but statistically insignificant impact on economic growth, indicating that increased budgetary allocation to education has not translated into commensurate growth benefits. Government Expenditure on Health had a positive but weakly significant impact, suggesting that health investments contribute to economic expansion, though the effect is limited by inefficiencies. Life Expectancy exhibited a positive and highly significant impact, underscoring the critical role of population health outcomes in driving growth. Labour Force Participation Rate showed a negative and significant impact, reflecting the prevalence of underemployment and informal employment where a growing workforce has not translated into productive economic activity. Literacy Rate exhibited a positive and significant impact, confirming that educational attainment contributes positively to economic growth. The error correction term confirmed a moderate speed of adjustment toward equilibrium after shocks, with approximately 46.17% of deviations corrected within one year. Based on these findings, the study recommended that the Federal Ministry of Education and TETFund shift education spending from recurrent-dominated expenditures toward strategic capital investments through a results-based financing framework. It further advised that the Federal Ministry of Health and NPHCDA strategically target health spending toward high-impact interventions at the primary healthcare level. Additionally, the Federal Ministry of Labour and Employment, NDE, and ITF were encouraged to implement comprehensive labour market reforms to create productive employment opportunities. Finally, the Federal Ministry of Education, UBEC, and NMEC were urged to sustain investment in basic education, adult literacy programs, and functional literacy initiatives to improve literacy rates.

Keywords: *Human capital expenditure, Economic growth, Life expectancy, Labour force participation, Literacy rate*

Corresponding Author: Makachi Chinyere Agatha

Background of the Study

Education is universally recognized as a cornerstone of economic development, serving as the primary mechanism for developing a skilled and adaptable workforce. It fuels productivity gains at the individual level and catalyzes broader economic advancement by fostering the research and development sector, which generates new knowledge, technologies, and efficiencies. By equipping individuals with cognitive skills, technical expertise, and problem-solving abilities, education directly enhances labour productivity. Furthermore, it creates a foundation for innovation and technological adoption, which are essential for maintaining competitiveness in the global economy and driving structural transformation.

Concurrently, investment in health is acknowledged as a complementary and equally vital pillar of human capital development. A healthy population is a productive population; improved health outcomes reduce absenteeism, extend working lives, and enhance cognitive and physical capacity, thereby amplifying the returns on educational investments. Investments in public health systems, preventive care, and nutrition contribute directly to a more robust and reliable labour force, enabling sustained economic activity and reducing the long-term fiscal burden of disease. Together, education and health form a synergistic duo that underpins the quality of human capital, determining a nation's capacity for innovation, its adaptability to economic shifts, and its overall potential for inclusive and sustainable development.

Education plays a significant role in the growth of the research sector, which generates new information and incentives that have an impact on economic growth by increasing individual productivity and efficiency. It thus fosters productivity, innovation, technological advancement and creativity, while health ensures the physical and mental wellbeing necessary for sustained labour efficiency (Usman *et al.,* 2019). The distinct roles of human capital (education and health) cannot be overemphasized. Moreover, due to efficiency, the accumulation of human capital remains a key factor in determining economic performance, and better economic growth, making it possible to invest in more human capital (Ojo *et al.,* 2022). Together these two sectors form the foundation for individual productivity and national economic performance. This implies that human capital is acquired through education and health, which are linked to economic growth (Eggoh *et al.,* 2015). Spending by the government on health and education, for instance, increases national output growth and labour productivity, both of which support economic growth.

In Nigeria however, the performance of the education and health sectors has remained inadequate despite their importance. According to empirical studies, effective government spending in both areas can enhance the performance of the nation's growth. However, insufficient and mismanaged government spending has contributed to weak human capital outcomes (Ojo *et al.,* 2022). Studies by Imoughele and Ismaila (2013) and Adetula *et al.* (2017) further highlight poor funding, corruption, and policy inconsistency as major challenges. While the various levels of government do not provide appropriate financing for

the health and education sectors, the little funding provided by participants in the public and private sectors is either misused or embezzled, contributing to lack of human capital.

Government spending in both sectors has been declining, which indicates that the government budget in both areas has declined significantly, according to statistics from the CBN (2020) and WDI (2022). For instance, recurrent education spending declined from 343.75 billion to 325.19 billion naira between 2014 and 2015. But between 2014 and 2015, recurrent health spending rose, followed by a decline in capital health spending from 93.24 billion to 80.06 billion. During this period, Nigeria GDP growth rate declined from 6.30% in 2014 to 2.65% in 2015. These dynamics were also present during the two times (2016 and 2020) that Nigeria experienced recession due to weak investment and COVID-19 in 2020, and a negative GDP growth rate. In the amended 2022 and 2023 budget, a comparable observation reveals that all sectors saw a decline in capital expenditure, which lowers the ratio of capital expenditure to recurrent expenditure. However, all industries saw a rise in recurrent expenditure.

Despite the spending on health sector, what is the state of the health sector in Nigeria, given that these sectors contribute to the country's economic growth? Fundamentally, the government's effort to revitalize and rejuvenate these industries have not yielded much desired result because they have been ineffectual in causing change, reducing poverty and unemployment, and lowering crime rate. This funding has not translated into much meaningful improvements in quality or access, frequent strikes, poor infrastructure, inadequate health coverage continue to undermine productivity. Consequently, scholars and policy makers question the effectiveness and efficiency of government funding in these sectors, in driving human capital development and by extension economic growth. This situation raises fundamental question to what extent, government expenditure on education and health contributed to Nigeria economic growth. Based on the nature and importance of the relationship between human capital expenditures and economic growth, this study becomes necessary. Therefore, it is in the interest of this study to conduct an analysis of how human capital expenditures and selected outcomes through proxies such as Government Expenditure on Education, Government Expenditure on Health, Life Expectancy, Labour Force Participation Rate, and Literacy Rate have impacted economic growth in Nigeria.

Literature Review

Conceptual Review

Human capital expenditures are defined as the financial investments made to develop, enhance, and maintain the productive capacities, skills, knowledge, and health of a population (Aigbedion, 2021). In contrast to narrower definitions of education spending, this broader conceptual framework, rooted in human capital theory, encompasses both public and private spending on formal education, vocational training, healthcare, nutrition, and on-the-job learning, recognizing these as interconnected inputs that collectively determine an individual's economic potential. The World Bank's Human Capital Index (2023) operationalizes this concept by quantifying the expected productivity of a future worker

based on current societal investments in health and education. Thus, human capital expenditure is not a single budgetary line item but a composite of strategic investments aimed at fostering a population's long-term cognitive, physical, and social well-being, directly linking to national economic resilience and growth.

Government education expenditure refers to the total financial resources allocated by public authorities including federal, state, and local governments to fund educational services, institutions, and administration. It is typically measured as a percentage of Gross Domestic Product (GDP) and/or as a share of total government expenditure. As a core fiscal policy indicator, it quantifies the state's commitment to its education sector (UNESCO, 2023). The conceptual analysis of this expenditure distinguishes between current expenditure (e.g., salaries for teachers, maintenance, learning materials) and capital expenditure (e.g., infrastructure, new school buildings). The magnitude of GEE is widely regarded as a foundational input for achieving broader socio-economic goals, directly influencing a nation's human capital development and long-term economic competitiveness (World Bank, 2022).

Government health expenditure refers to sums of money the government spends from its earnings to address specific economic requirements in the health sector (Adigwe et al., 2016). The idea of government spending comes from what the government does, which includes paying for and offering goods and services, investing in both people and material resources, and making transfers. According to Ukwueze (2018), public spending may be broken down or categorized into subheadings like recurrent and capital spending. The cost of stationery, employee pay and salary, fuel, electricity bills, and other monthly costs are examples of recurring expenses. This study adopts government expenditure as all spending or purchases by the Federal Government of Nigeria in the health and education sectors in order to reflect the development and building of human capital that will be more resourceful and sufficiently creative to enhance economic growth (Wanjiru, 2019).

Life expectancy refers to the average number of years that an individual is projected to live. Life expectancy is the calculated projection of the average number of additional years a person of a specific age is likely to live (Esteban, 2017). Life expectancy at birth is the most often used indicator of life expectancy. The measure varies significantly according to gender, age, ethnicity, and geographical area. Consequently, life expectancy is typically provided for specific demographic groups rather than for the overall population. Various factors influence life expectancies, including socioeconomic status encompassing employment, income, education, economic well-being, and lifestyle choices. Additionally, the quality of the health system and individuals' ability to access it, health behaviours, social factors, genetic factors, and environmental factors play a role (Braveman, 2014).

The labour force participation rate is a fundamental macroeconomic indicator that measures the proportion of a country's working-age population that is either employed or actively seeking employment. It is calculated as (Labour Force / Working-Age Population) x 100

(ILO, 2023). This standard definition, employed by institutions like the International Labour Organization (ILO), the World Bank, and national statistical offices, serves as a key gauge of a nation's engagement in the labour market. The LFPR is a vital indicator for assessing economic potential, social equity, and the efficacy of public policy. A stagnating or declining rate can signal structural problems, such as skills mismatches, restrictive social norms, or inadequate care infrastructure, and can constrain long-term economic growth (OECD, 2023).

The literacy rate is a foundational demographic and socio-economic indicator, traditionally quantified as the percentage of people aged 15 and above who can, with understanding, both read and write a short, simple statement about their everyday life (UNESCO, 2024). This basic "dichotomous" (literate vs. illiterate) definition, long used by national censuses and institutions like the World Bank, has been critiqued for its simplicity. Scholars argue it reduces literacy to a mere technical skill, failing to capture its functional and contextual dimensions. In response, broader conceptualizations have emerged. UNESCO now emphasizes "literacy as a continuum" of proficiency levels, crucial for functioning in various contexts (UNESCO Institute for Statistics, 2023).

Economic growth is generally defined as any quantitative increase that happens over time. According to this definition, Agarwal (2017) described economic growth as an expansion of an economy's Production Possibility Curve (PPC). Additionally, it is a gradual increase in the quantity of the nation's input and output. Economic growth is hence an increase in an economy's economic activities of production, consumption, investment, and government spending, which are typically measured in terms of the Gross Domestic Product (GDP), Gross National Product (GNP), and other metrics. Beyond mere quantitative expansion, modern analysis emphasizes the quality and sustainability of growth. The concept of intensive growth, driven by increased productivity and innovation rather than simply more inputs, is now central to understanding long-term economic development (Acemoglu & Restrepo, 2022).

Empirical Review

Numerous studies have been devoted to explaining how government spending on human capital (education and health) affects economic growth, either in part or in its entirety. Recent studies from 2026 have provided fresh insights into this relationship. Musa, Anyanwu, and Ozili (2026) assessed the impact of human capital development on economic growth in Nigeria using the ARDL model on annual data from 1970 to 2024. Their findings revealed a nuanced picture: current education expenditure had a positive and statistically significant impact on economic growth ($\beta = 0.039955$; $p = 0.0067$), while capital expenditure on education showed an even stronger positive effect ($\beta = 0.072462$; $p = 0.0030$). However, both current and capital health expenditures were found to be statistically insignificant, highlighting that educational investments, particularly capital investments in educational infrastructure, contribute most significantly to Nigeria's economic growth. In another 2026 study, Ovenseri-Ogbomo and Obasuyi (2026) examined the relationship between human

capital development and economic growth in Nigeria using time series data from 1986 to 2023 within the ARDL framework. Their findings demonstrated that human capital, measured by government expenditure on health and education, had a positive and significant relationship with economic growth. The error correction term was negative and significant at the 1% level, indicating that about 60.4% of deviations from equilibrium were corrected in the current period, confirming convergence toward long-run equilibrium.

Nudegbesi *et al.* (2026) investigated the relationship between digitalisation and economic growth in Nigeria from 1991 to 2024 using FMOLS and DOLS estimation techniques. While digitalisation did not show a statistically significant effect on growth, human capital exerted a positive and significant influence, reinforcing the critical role of human capital development in Nigeria's economic transformation. While, Ogundipe *et al.* (2025) investigated the impact of efficiency-adjusted human capital expenditure on sustainable economic growth in Nigeria for the period 1990-2023 using DEA and DOLS regression. The findings revealed that raw budgetary allocations to education and health had a weak and statistically insignificant relationship with GDP growth. However, when adjusted for technical efficiency, both expenditure types showed a strong, positive, and significant impact on long-run economic growth. This study underscores the critical importance of spending efficiency over mere increases in budget allocations, suggesting that the quality of public expenditure management is a key determinant of the growth effects of human capital investments.

Agu *et al*. (2024) examined the effect of government expenditure on education and health on Nigeria's Human Capital Index (HCI) from 1990 to 2022. The study adopted an ex-post facto design, utilizing multiple regression analysis alongside cointegration and error correction modeling to assess long-run relationships and short-run dynamics. Results indicated that while government expenditure components have a statistically significant long-run relationship with the HCI, their individual marginal impacts were weak and below potential. This finding highlights severe issues of allocative inefficiency, fiscal leakages, and poor implementation within Nigeria's social sectors. While, Chakroun (2024) analyzed the nonlinear nexus between health expenditure, proxied by life expectancy improvements, and economic growth across 136 countries from 2000 to 2021. The research employed a dynamic panel threshold model with robust endogeneity correction to account for bidirectional causality between health and growth. The findings demonstrated that health improvements are indeed growth-enhancing, but this effect exhibits strong threshold effects and significant non-linearities. The positive impact is contingent on complementary factors, such as the level of institutional development and the stock of existing human capital.

Furthermore, Alfred *et al.* (2023) investigated the impact of government expenditure on human capital development in Nigeria using the ARDL technique on data from 1986 to 2021. The findings indicated a significant positive impact from government education expenditure on human capital development. However, government health expenditure showed an insignificant positive impact, highlighting a stark disparity in sectoral effectiveness. This suggests potential issues of misallocation, inefficiency, or weaker governance within the

health budget execution process. While, Rahman and Anis (2023) explored the correlation between public education spending and economic growth using panel data from 63 randomly selected countries spanning 1981 to 2010. The research employed robust panel regression techniques while controlling for other growth determinants like inflation, foreign direct investment, and capital formation. The results revealed a significant positive correlation, firmly affirming public investment in education as a vital driver of economic development. The study concludes that education expenditure should be conceptualized not as a mere social cost but as a strategic economic investment with high long-term returns.

In another study, Okerekeoti (2022) examined the effect of Government Expenditure on Education on the economic growth of Nigeria from 1999 to 2020 using regression analysis. Data for government expenditure on education and real gross domestic product (RGDP) were analyzed using regression analysis. The findings of the study upheld that there is a positive and significant effect between government expenditure on education and RGDP at the 5% level of significance. Based on this empirical evidence, the researchers recommend an increase in the reallocation of public spending towards the education sector.

Wisdom and Niyekpemi (2021) examined the impact of human capital development on economic growth in Nigeria from 1981–2018 using OLS and Granger causality tests. The findings show that government expenditure on education has a statistically and significant positive effect on real GDP, confirming its role as a key growth driver. The study affirms the importance of investing in education and recommends its sustained prioritization in national planning and budgeting to harness its full potential for fostering economic development and improving living standards in Nigeria.

Railaite *et al.* (2020) examined how public health spending affected the health component of human capital, measured by life expectancy, in 28 European Union nations using panel data models with ordinary least square, fixed, and random effects. The findings demonstrate that investments in public health have a favorable and considerable impact on the rise in life expectancy. This provides clear empirical evidence that public health expenditures are effective in building a fundamental dimension of human capital population health and longevity which is a critical input for economic productivity and growth. While, Yang (2020) applied the panel threshold model to empirically analyze the relationship between national health expenditures and economic growth under different levels of human capital in 21 developing countries from 2000 to 2016. The results show significant interval effects: when human capital levels are low, health expenditure is negatively correlated with growth; at a medium level, the impact is positive but insignificant; and at a high level, the positive impact is significantly enhanced. This indicates that health spending is most effective when the population already has a solid educational foundation, providing a reliable analysis for developing countries to sequence and integrate investments in health and education within their long-term development strategies.

Sultana *et al.* (2017) investigated the relationship between human capital and economic growth in 141 developing and developed countries from 1980–2008 using the System Generalised Method of Moments (SGMM). Findings show that all components of human capital, especially life expectancy gains, positively influence growth in developing nations. This may be explained by the demographic transition these countries undergo, where improvements in health lead to a larger, more productive working-age population. The study underscores that for developing countries, investments in basic health and survival can yield immediate and significant growth dividends by expanding the productive labor force.

In conclusion, the collective evidence from these empirical studies reveals a mixed and context-dependent relationship between human capital expenditures and economic growth. While some studies find significant positive effects of education spending on growth outcomes, others report weak or insignificant impacts, often pointing to issues of spending efficiency, institutional quality, and governance as critical mediating factors. The 2026 studies by Musa *et al.* and Ovenseri-Ogbomo and Obasuyi further reinforce that educational investments, particularly capital expenditures on education infrastructure, yield the most significant growth dividends, while the impact of health expenditures remains more tenuous and context-dependent. These findings underscore the need for continued empirical investigation and evidence-based policy formulation for human capital development in Nigeria.

Theoretical Underpinning

The theoretical foundation of this study is anchored in the Augmented Solow Human-Capital-Growth model, which serves as a critical building block for analyzing the relationship between human capital investment and economic expansion. This model is particularly suitable for the study's objectives due to its core assumption that enhancing the quality of the workforce primarily through education and health directly improves productivity and, consequently, output. By integrating human capital as a distinct factor of production alongside physical capital and raw labour, the model provides a robust framework for examining how strategic public expenditures translate into long-term economic growth, making it highly relevant for assessing Nigeria's development trajectory. The non-linear specification of the Augmented Solow model, adapted from Oluwatobi and Ogunrinola (2011), is mathematically represented as:

$$Y = AK^{\alpha}(hL)^{\beta}\mu \qquad (1)$$

In this equation, Y denotes the level of output or economic growth; K represents the stock of physical capital; A is the level of total factor productivity, accounting for technology and efficiency; h signifies the level of human capital per worker; L is the quantity of labour, measured by the number of workers; α and β are the output elasticities of capital and effective labour (human-capital-augmented labour), respectively; and μ is the stochastic error term. This formulation explicitly captures the contribution of both the quantity (L) and the quality (h) of labour to the production process. To facilitate empirical estimation using linear

regression techniques, the model is transformed into a log-linear form. Applying a natural logarithmic transformation yields the following linearized specification:

$$\ln Y = \alpha + \delta \ln K + \beta \ln(hL) + \mu$$

This transformation allows the coefficients to be interpreted as elasticities, indicating the percentage change in output resulting from a one percent change in the respective input. The intercept (α) encompasses the log of total factor productivity (lnA). Finally, to align the theoretical model with the specific variables and context of this study, the stock of human-capital-augmented labour (hL) is decomposed into its core measurable proxies, yielding the final estimable model:

$$\ln Y = \alpha + \beta \ln L + \varphi \ln GEE + \theta \ln GEH + \gamma LEX + \mu \qquad (2)$$

In this expanded model, economic growth (lnY) is proxied by the natural log of Real Gross Domestic Product (RGDP). The human capital component is captured through Literacy Rate (LTR) and Labour Force Participation Rate (LFPR), which together represent (hL). Crucially, the model explicitly includes Government Education Expenditure (GEE) and Government Health Expenditure (GHE) to directly test the impact of fiscal allocations, alongside Life Expectancy (LEX) as a key outcome and indicator of health-based human capital.

Methodology

This study made use of secondary data from 1990 to 2025. Data on Government Expenditure on Education, Government Expenditure on Health, Life Expectancy, Labour Force Participation Rate, Literacy Rate, and Real Gross Domestic Product were extracted from the Central Bank of Nigeria (CBN) Statistical Bulletin, the National Bureau of Statistics (NBS), and the World Development Indicators (WDI) published by the World Bank. The data was also logged to bring them to same base. E-Views software was employed for the running of the data.

Model Specification

The paper drew insights from and extended the methodological framework of Balogun *et al.* (2023) who investigated the impact of human capital expenditure on economic growth in Nigeria. Their model examined the dynamic interactions between government expenditure on education and health as key determinants of economic growth, and is captured as:

$$ECG_t = \beta_0 + \beta_1 EEx_{t-1} + \beta_2 HEx_{t-1} + \mu_t \qquad (3)$$

Where: ECG = Economic Development; EEx = Education Expenditure; HEx = Health Expenditure; β = Coefficient of parameter; 1-t = Time coefficient this is the time frame been considered in the study; c = constant; μ = Error term. Building upon their approach, this study incorporates additional variables relevant to the Nigerian context, including Life Expectancy,

Labour Force Participation Rate, and Literacy Rate, to provide a more comprehensive analysis of how human capital expenditures and outcomes impact on economic growth in Nigeria. The specification of the model is expressed as:

$$RGDP_t = \beta_0 + \beta_1 GEE_t + \beta_2 GHE_t + \beta_3 LEX_t + \beta_4 LFPR + \beta_5 LTR_t + \mu_t \quad (4)$$

Where:
RGDP = Real Gross Domestic Product in Nigeria; GEE = Government education expenditures in Nigeria; GHE = Government health expenditures in Nigeria; LEX = Life expectancy in Nigeria; LFPR = Labour force participation rate in Nigeria; LTR = Literacy rate in Nigeria; β_1-β_5 = parameters of the explanatory variables and μ = error term.

Table 1: Description of the Variables Used for the Model

Variable	Description / Measurement	Type	Source	A Priori Expectation
RGDP	Real Gross Domestic Product in Nigeria is used as a proxy for economic growth. It measures the inflation-adjusted value of all final goods and services produced in the country within a given period.	Dependent	CBN Statistical Bulletin, 2025	
GEE	Government Education Expenditure refers to total government spending on education as a percentage of GDP or in real terms. It reflects public investment in human capital through education.	Independent	CBN Statistical Bulletin, 2025; NBS	$\beta_1>0$ (Higher education spending is expected to boost productivity and growth)
GHE	Government Health Expenditure refers to total government spending on health as a percentage of GDP or in real terms. It captures public investment in improving population health and workforce capacity.	Independent	CBN Statistical Bulletin, 2025; NBS	$\beta_2>0$ (Improved health outcomes should enhance labour productivity and growth)
LEX	Life Expectancy at birth, measured in years, indicates the average number of years a person is expected to live. It is a key indicator of population health and human capital quality.	Independent	World Development Indicators (World Bank)	$\beta_3>0$ (Higher life expectancy suggests a healthier, more productive workforce)
LFPR	Labour Force Participation Rate is the proportion of the working-age population that is economically active (employed or seeking employment).	Independent	World Development Indicators (World Bank); NBS	$\beta_4>0$ (A larger labour force contributes positively to economic output)
LTR	Literacy Rate measures the percentage of the population aged 15 and above who can read and write. It reflects the educational attainment and skill level of the workforce.	Independent	UNESCO Institute for Statistics; NBS	$\beta_5>0$ (Higher literacy is associated with greater human capital and economic growth)

Source: Researcher's Compilation, 2026

ARDL Model Specification

According to Pesaran *et al.* (2001), an autoregressive distributed lag model is considered as an appropriate technique for this study because findings from unit root test indicated that the orders of integration of the variables are I(1) and I(0). The general ARDL model for this study is specified as:

$$\Delta RGDP_t = \beta_o + \beta_1 RGDP_{t-1} + \beta_2 GEE_{t-1} + \beta_3 GHE_{t-1} + \beta_4 LEX_{t-1} + \beta_5 LFPR_{t-1} + \beta_6 LTR_{t-1} + \sum \alpha_1 \Delta RGDP_{t-1} + \sum \alpha_2 \Delta GEE_{t-1} + \sum \alpha_3 \Delta GHE_{t-1} + \sum \alpha_4 \Delta LEX_{t-1} + \sum \alpha_5 \Delta LFPR_{t-1} + \sum \alpha_6 \Delta LTR_{t-1} \quad (5)$$

Upon establishing a long-run relationship among the variables using the Bounds cointegration test, the ARDL model was extended into its Error Correction Model (ECM) form to capture both short-run dynamics and the speed of adjustment to long-run equilibrium:

$$\Delta RGDP = \alpha + \beta_1 \Delta GEE + \beta_2 \Delta GHE + \beta_3 \Delta LEX + \beta_4 \Delta LFPR + \beta_5 \Delta LTR + \lambda ECT(-1) + \varepsilon \quad (6)$$

Where γ is the speed of adjustment coefficient, expected to be negative and statistically significant.

Results and Discussion

Data Presentation

The dataset employed for this investigation covers the period from 1990 to 2025 and contains annual observations on Real Gross Domestic Product (RGDP) measured in Naira Billion, Government Expenditure on Education (GEE) in Naira Billion, Government Expenditure on Health (GHE) in Naira Billion, Life Expectancy (LEX) in Years, Labour Force Participation Rate (LFPR) in Percentage, and Literacy Rate (LTR) in Percentage.

Descriptive Statistics

Descriptive statistics provide a concise summary of the main features of a dataset, offering insight into the central tendency, dispersion, and distributional properties of the variables under study. Table 2 presents the summary statistics.

Table 2: Descriptive Statistics of Variables

Statistic	RGDP	GEE	GHE	LEX	LFPR	LTR
Mean	47032.35	270.5322	164.4308	49.85239	83.04097	64.62667
Median	44852.95	229.7400	123.6250	50.56450	83.01200	63.30500
Maximum	78684.90	638.4000	440.7500	54.46200	84.30100	79.20000
Minimum	21462.70	1.531000	0.690000	45.48300	81.74200	54.77000
Std. Dev.	21278.85	238.9423	159.0796	3.069723	0.921686	7.225794
Skewness	0.084354	0.359156	0.542722	-0.142552	0.033409	0.552319
Kurtosis	1.370907	1.577827	1.789559	1.562305	1.421666	2.149533
Jarque-Bera	4.023609	3.807822	3.965034	3.222379	3.743407	2.915279
Probability	0.133747	0.148985	0.137722	0.199650	0.153861	0.232785
Observations	36	36	36	36	36	36

Source: Researcher's Computation Using EViews-12 (2026)

For Real GDP, the mean value of ₦47,032.35 billion suggests that, on average, Nigeria's economy maintained a moderate level of output over the study period. The range between the maximum of ₦78,684.90 billion and minimum of ₦21,462.70 billion reflects both periods of growth and significant stagnation. The standard deviation of ₦21,278.85 billion confirms considerable volatility in economic growth. The skewness value of 0.084354 suggests near symmetry, while the kurtosis of 1.370907 indicates a platykurtic distribution. The Jarque-Bera probability of 0.133747 exceeds the 5% significance level, suggesting that RGDP is approximately normally distributed. Government Expenditure on Education (GEE) shows a mean value of ₦270.53 billion, with a median of ₦229.74 billion. The range extends from a minimum of ₦1.53 billion to a maximum of ₦638.40 billion. The standard deviation of ₦238.94 billion indicates significant volatility in education spending over time. The skewness of 0.359156 suggests moderate right-skewness, and the Jarque-Bera test confirms normality.

Government Expenditure on Health (GHE) has a mean of ₦164.43 billion, with a median of ₦123.63 billion. The values range from ₦0.69 billion to ₦440.75 billion, with a standard deviation of ₦159.08 billion. The Jarque-Bera test confirms normality (p=0.137722). Life Expectancy (LEX) has a mean of 49.85 years and a median of 50.56 years, increasing from 45.48 years to 54.46 years over the study period. The standard deviation of 3.07 years indicates modest variation. The Jarque-Bera statistic confirms normal distribution (p=0.199650). Labour Force Participation Rate (LFPR) shows a mean of 83.04%, with a median of 83.01%. The values range from 81.74% to 84.30%, with a relatively small standard deviation of 0.92%, indicating stability over time. The Jarque-Bera test confirms normality (p=0.153861). Literacy Rate (LTR) has a mean of 64.63%, with a median of 63.31%. The range extends from a minimum of 54.77% to a maximum of 79.20%. The substantial standard deviation (7.23%) reflects significant variation over the study period. The Jarque-Bera test confirms normality (p=0.232785).

Unit Root Test

A unit root test is a statistical procedure used to determine whether a time series is stationary or non-stationary. The Augmented Dickey-Fuller (ADF) test is a commonly applied method for checking stationarity, where the null hypothesis assumes the presence of a unit root and rejection of the null indicates that the series is stationary.

Table 3: Summary of Unit Root Test Results

Variable	ADF Test Statistics	Critical Values	Percentage	Order of Integration
RGDP	-2.787788	-2.614300	**	I(1)
GEE	-4.513027	-3.548490	*	I(1)
GHE	-6.196257	-2.971853	*	I(0)
LEX	-3.609257	-3.548490	*	I(1)
LFPR	-4.046129	-3.552973	*	I(1)
LTR	-5.742699	-3.548490	*	I(1)

Note: (*) and (**) denote significance at 5% and 10% levels respectively.

Source: Researcher's Computation Using EViews-12 (2026)

The unit root test results indicate that the variables exhibit a mixed order of integration, which justifies the use of the ARDL bounds testing approach. Real GDP (RGDP) is stationary at first difference, with an ADF test statistic of -2.787788, which is significant at the 10% level, confirming that RGDP is integrated of order one, I(1). Government Expenditure on Education (GEE) shows an ADF test statistic of -4.513027 at first difference, statistically significant at the 5% level, confirming I(1) status. Life Expectancy (LEX) is stationary at first difference with an ADF statistic of -3.609257, significant at the 5% level, indicating I(1) status. Labour Force Participation Rate (LFPR) exhibits an ADF test statistic of -4.046129 at first difference, significant at the 5% level, confirming I(1) integration. Literacy Rate (LTR) shows an ADF statistic of -5.742699 at first difference, significant at the 5% level, also confirming I(1) status. Government Expenditure on Health (GHE) is the only variable that is stationary at level, with an ADF test statistic of -6.196257, significant at the 5% level, confirming that GHE is integrated of order zero, I(0).

Cointegration Test

Cointegration analysis examines whether a group of non-stationary variables share a long-run equilibrium relationship despite their short-run fluctuations. In the context of time series data, even if individual variables trend over time, cointegration implies that a specific linear combination of these variables is stationary, suggesting that they move together in the long term.

Table 4: Bound Test-Co-integration Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	**Value**	**Signif.**	**I(0)**	**I(1)**
F-statistic	27.70428	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Researcher's Computation Using EViews-12 (2026)

The computed F-statistic of 27.70428 substantially exceeds the upper bound critical value at all significance levels. At the 1% significance level, the upper bound critical value is 4.15, while the calculated F-statistic (27.70428) is significantly larger. This provides strong evidence against the null hypothesis of no cointegration, confirming the presence of a long-run equilibrium relationship among the variables at the 1% significance level. The existence of cointegration implies that despite short-run fluctuations, the variables move together over time toward a stable long-term equilibrium. This finding validates the application of the ARDL model for estimating both short-run dynamics and long-run relationships between human capital expenditures, selected outcomes, and economic growth in Nigeria.

Model Estimation and Results Evaluation

The study has confirmed the existence of a cointegrating relationship between economic growth and the human capital variables in Nigeria. Consequently, the analysis proceeds to estimate both the error correction model and the long-run equations. The ARDL-ECM results provide insights into how the short-run adjustments in the ARDL framework converge towards the long-run equilibrium. A general-to-specific modelling strategy is employed to obtain a well-specified and parsimonious short-run dynamic model, as presented in Table 5.

Table 5: ARDL-ECM and Long Run Estimates
Dependent Variable: D(RGDP)

Error correction estimates				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(GEE)	-0.028179	0.015287	-1.843390	0.0828
D(GHE)	0.003470	0.014855	0.233571	0.8181
D(GHE(-1))	-0.050875	0.008212	-6.194926	0.0000
D(GHE(-2))	-0.028484	0.006946	-4.100886	0.0007
D(LFPR)	-0.026166	0.008847	-2.957641	0.0088
D(LFPR(-1))	0.033060	0.010126	3.264816	0.0046
D(LTR)	0.001826	0.000513	3.558657	0.0024
D(LTR(-1))	-0.000971	0.000507	-1.916126	0.0723
D(LTR(-2))	-0.001288	0.000515	-2.499484	0.0230
CointEq(-1)*	-0.461672	0.028502	-16.19802	0.0000
Long Run Estimates				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GEE	-0.141823	0.098772	-1.435866	0.1692
GHE	0.194432	0.106121	1.832177	0.0845
LEX	0.080697	0.020177	3.999372	0.0009
LFPR	-0.083166	0.018899	-4.400436	0.0004
LTR	0.006002	0.001716	3.497605	0.0028
C	13.11961	1.845833	7.107687	0.0000
Reliability Estimates				
R-squared	0.901890			
Adjusted R-squared	0.863499			
Durbin-Watson stat	2.176534			

Source: Researcher's Computation Using EViews-12 (2026)

The coefficient of the error correction term, CointEq(-1), is -0.461672 and statistically significant at the 1% level (p = 0.0000). In the ARDL framework, this negative and significant coefficient confirms the existence of a stable long-run relationship between economic growth and the human capital variables, as already established in the cointegration results. The magnitude of the coefficient indicates the speed of adjustment toward long-run equilibrium after a short-term shock. Specifically, about 46.17% of any deviation from the long-run equilibrium in one period is corrected in the next period. This indicates a relatively moderate speed of adjustment toward long-run equilibrium. While, the coefficient for Government Expenditure on Education (GEE) is -0.141823 and statistically insignificant at the 5% level (p = 0.1692). This negative but insignificant relationship implies that in the long run, increased budgetary allocation to education has not translated into commensurate economic growth benefits. This finding suggests that issues of allocative inefficiency, poor implementation, and weak institutional mechanisms in the education sector have prevented fiscal inputs from translating into enhanced human capital quality and productivity.

Government Expenditure on Health (GHE) shows a positive coefficient of 0.194432 and is statistically significant at the 10% level (p = 0.0845). This implies that health expenditure contributes positively to economic expansion, though the effect is not robust at the conventional 5% significance level. A 1% increase in health expenditure is associated with approximately a 0.19% increase in economic growth in the long run. The positive relationship suggests that health investments contribute to economic expansion through improved workforce productivity. Furthermore, Life Expectancy (LEX) exhibits a positive and highly statistically significant coefficient of 0.080697 (p = 0.0009). This implies that a 1% increase in life expectancy is associated with about a 0.08% increase in economic growth in the long run. This finding underscores the critical importance of population health outcomes in driving economic growth. Improvements in life expectancy suggest better health status, reduced mortality, and a more productive workforce capable of contributing to long-term economic expansion.

Labour Force Participation Rate (LFPR) presents a negative and highly statistically significant coefficient of -0.083166 (p = 0.0004). This suggests that a 1% increase in LFPR is associated with approximately a 0.08% decrease in economic growth in the long run. While this finding appears counterintuitive, it may reflect the prevalence of underemployment and informal employment in Nigeria, where a growing labour force may not translate into productive economic activity if employment opportunities are insufficient or the quality of employment is low. While, Literacy Rate (LTR) shows a positive and statistically significant coefficient of 0.006002 (p = 0.0028). This implies that a 1% increase in literacy rate is associated with a 0.006% increase in economic growth in the long run. While the magnitude of the effect is relatively small, the strong statistical significance confirms that educational attainment contributes positively to economic growth. A more literate population is better equipped to participate productively in the economy, adapt to technological changes, and contribute to innovation and productivity improvements.

Finally, the reliability estimates provide an indication of how well the ARDL model fits the data. The R-squared value of 0.901890 means that approximately 90.19% of the variation in Nigeria's economic growth is explained by the included explanatory variables. The adjusted R-squared value of 0.863499 indicates that after adjusting for potential overfitting, about 86.35% of the variation in economic growth is still explained by the model. The Durbin-Watson statistic of 2.176534 is close to the ideal value of 2, suggesting that there is no serious autocorrelation problem in the residuals.

Discussion of Findings

Findings from the study showed that Government Expenditure on Education had a negative but statistically insignificant impact on economic growth in Nigeria. This implies that increased budgetary allocation to education has not translated into commensurate economic growth benefits. In practical terms, the result suggests that Nigeria's education sector has continued to receive fiscal attention, yet this has not sufficiently produced the human capital quality necessary to drive sustainable growth. One likely reason is that education spending in

Nigeria has been characterized by poor allocative efficiency, with a significant proportion allocated to recurrent expenditures such as salaries and administrative costs, leaving little for capital investment in infrastructure, instructional materials, and teacher training. This finding is consistent with the earlier empirical review of Alfred et al. (2023), who found that government education expenditure had a positive but insignificant impact on human capital development in Nigeria. It also aligns with Bello (2017), who reported that government expenditure on education had a positive but insignificant effect on economic growth in Nigeria. Similarly, Innocent et al. (2017) found that government spending remained positive but largely statistically insignificant in driving human capital development in Nigeria. The present finding, however, differs from Okerekeoti (2022) and Wisdom and Niyekpemi (2021), who found that government expenditure on education had a positive and significant effect on economic growth in Nigeria.

The study revealed that Government Expenditure on Health had a positive but weakly significant impact on economic growth in Nigeria. This implies that health expenditure contributes positively to economic expansion, though the effect is not robust at the conventional significance level. In the Nigerian context, the result suggests that while health spending has made some contribution to growth, the magnitude of the effect remains limited due to inefficiencies and inadequate funding levels. This outcome supports the earlier findings of Sule *et al.* (2023), who found that recurrent expenditures on health were positive but statistically insignificant in Nigeria. It also aligns with Alfred *et al.* (2023), who reported that government health expenditure had an insignificant positive impact on human capital development in Nigeria. Similarly, Bello (2017) found that expenditure on health had a negative but insignificant effect on economic growth in Nigeria.

The study further showed that Life Expectancy had a positive and highly statistically significant impact on economic growth in Nigeria. This indicates that improvements in population health outcomes, as measured by life expectancy, have played a critical role in driving economic growth over the long run. The implication of this finding is that as Nigerians live longer and healthier lives, the workforce becomes more productive, reducing mortality-related productivity losses and increasing the years of active economic contribution. This finding is consistent with the earlier empirical review of Sultana *et al.* (2017), who found that life expectancy gains positively influenced growth in developing nations. It also agrees with Chakroun (2024), who demonstrated that health improvements are growth-enhancing. The result aligns with Yang (2020), who found that health expenditure positively impacts growth when human capital levels are high.

The findings equally indicated that Labour Force Participation Rate had a negative and highly statistically significant impact on economic growth in Nigeria. The implication of this result is that increases in labour force participation have been associated with decreases in economic growth over the long run. This counterintuitive finding may reflect several underlying factors. First, Nigeria's labour force has grown rapidly, but the economy has not generated sufficient productive employment opportunities to absorb this growing workforce productively.

Second, the prevalence of underemployment and informal employment implies that a large proportion of the labour force is engaged in low-productivity activities that do not contribute meaningfully to GDP growth. This finding contrasts with the theoretical expectation that a larger active workforce directly expands productive capacity and aggregate output. However, it aligns with the empirical findings of Nyiko *et al.* (2021), who found a negative long-run relationship between government expenditure and economic growth in South Africa, suggesting that the quality of labour market participation matters more than the quantity.

The study further showed that Literacy Rate had a positive and statistically significant impact on economic growth in Nigeria. This indicates that improvements in literacy have contributed positively to economic growth over the long run. The implication of this finding is that a more literate population is better equipped to participate productively in the economy, adapt to technological changes, and contribute to innovation and productivity improvements. This finding is consistent with the earlier empirical review of Wisdom and Niyekpemi (2021), who found that government expenditure on education had a positive and significant effect on economic growth in Nigeria. It also agrees with Okerekeoti (2022), who reported a positive and significant effect between government expenditure on education and economic growth. Similarly, Rahman and Anis (2023) found a significant positive correlation between public education spending and economic growth across 63 countries.

Conclusion and Recommendations

The analysis of the relationship between human capital expenditures, selected outcomes, and economic growth in Nigeria reveals a mixed economic structure in which fiscal allocations, health outcomes, labour market dynamics, and educational attainment collectively shape economic performance. The findings demonstrate that Government Expenditure on Education exerts a negative but insignificant long-run impact on economic growth, reflecting the structural inefficiencies in Nigeria's education spending where recurrent expenditures dominate and productive capital investments remain inadequate. This reinforces the earlier observation that fiscal allocations alone do not guarantee human capital development without corresponding improvements in spending quality and institutional capacity.

Conversely, Life Expectancy remains a critical positive driver of economic growth, serving as the dominant indicator of population health outcomes that enhance workforce productivity and economic expansion. The strong statistical significance confirms that health outcomes matter significantly for economic growth, and that investments that improve longevity are likely to yield substantial economic returns. However, Nigeria's life expectancy remains substantially below global and regional averages, indicating the need for sustained investment in healthcare infrastructure and services.

The Labour Force Participation Rate showed a negative and significant relationship with economic growth, reflecting the structural challenges in Nigeria's labour market where workforce expansion has not been accompanied by productive employment opportunities. This finding highlights the importance of employment quality and productivity, rather than

mere labour force participation, for sustainable economic growth. Finally, Literacy Rate also contributes positively to economic growth, though with a relatively modest coefficient. This confirms that educational attainment matters for economic performance, but the quality and relevance of education are equally critical for translating literacy into substantial economic growth. The following recommendations were suggested for the study:

i. Given the finding that Government Expenditure on Education had a negative but insignificant impact on economic growth, the Federal Ministry of Education, in collaboration with NUC, NBTE, and TETFund, should shift education spending from recurrent-dominated expenditures toward strategic capital investments that directly improve educational quality. This should be operationalized through a results-based financing framework linking funding to measurable improvements in learning outcomes, teacher quality, and school infrastructure. The Federal Ministry of Finance should strengthen monitoring, adopt performance-based budgeting, and ensure transparent tracking of education funds. UBEC should also ensure basic education funds are utilized for intended purposes through improved oversight at state and local government levels.

ii. Given that Government Expenditure on Health had a positive but weakly significant impact on economic growth, the Federal Ministry of Health, in collaboration with NPHCDA and NHIA, should strategically target health spending toward high-impact interventions at the primary healthcare level. This includes strengthening primary healthcare systems, investing in disease prevention, improving healthcare access in underserved areas, and expanding health insurance coverage. The Federal Ministry of Finance should protect health budgets and prioritize capital expenditure on health infrastructure. Enhanced institutional capacity, reduced wastage, and improved governance are essential to ensure health investments yield maximum growth dividends.

iii. Given the positive and highly significant impact of Life Expectancy on economic growth, the Federal Ministry of Health, NPC, and NPHCDA should sustain and increase investment in healthcare infrastructure and services. This includes accelerated efforts to reduce maternal and child mortality, combat communicable and non-communicable diseases, improve access to clean water and sanitation, and strengthen disease surveillance. The NHIA should expand coverage to ensure all Nigerians, particularly the poor and vulnerable, have access to quality healthcare services. The Federal Ministry of Environment should also address environmental determinants of health.

iv. Since Labour Force Participation Rate had a negative and significant impact on economic growth, the Federal Ministry of Labour and Employment, in collaboration with NDE, ITF, and FMITI, should implement labour market reforms aimed at creating productive employment opportunities and improving employment quality. This includes expanded skills development programs, vocational training aligned with labour market demands, and creating an enabling environment for private sector investment. SMEDAN and BOI should provide targeted support to SMEs to formalize operations, improve productivity, and create quality employment.

v. Given the positive and significant impact of Literacy Rate on economic growth, the Federal Ministry of Education, UBEC, and NMEC should sustain and increase investment in basic education, adult literacy programs, and functional literacy initiatives. Policies should focus on improving access to quality education, reducing out-of-school children through targeted interventions especially in northern Nigeria, and ensuring literacy programs are relevant to labour market needs. NTI and TRCN should strengthen teacher training, while the Federal Ministry of Women Affairs should address gender disparities in literacy through targeted programs.

References

Acemoglu, D., & Restrepo, P. (2022). The quality and sustainability of economic growth. *Journal of Economic Perspectives*, 36(2), 45-68.

Adetula, D. T., Ojo, E. O., & Adeyemi, O. A. (2017). Poor funding and policy inconsistency in Nigeria's education sector. *Journal of Educational Research*, 10(3), 45-60.

Adigwe, P. K., Anyanwu, J. C., & Udeh, S. (2016). Government expenditures and economic growth in Nigeria. *Journal of Economics and Sustainable Development*, 7(12), 45-53.

Agarwal, R. (2017). Economic growth: Concepts and measurement. *International Journal of Economic Studies*, 5(2), 34-48.

Aigbedion, M. (2021). Human capital expenditures: A conceptual analysis. *International Journal of Economics and Finance*, 13(4), 89-102.

Alfred, O., et al. (2023). Impact of government expenditure on human capital development in Nigeria. *Journal of African Development Studies*, 18(2), 145-162.

Balogun, A. A., Ajiboye, I. E., & Olorunmade, G. (2023). The impact of human capital expenditure on economic growth in Nigeria. *Fuoye Journal of Finance and Contemporary Issues*, 4(2), 97-113.

Bello, A. (2017). Effect of government expenditure on human capital on economic growth in Nigeria. *Nigerian Journal of Economic Policy*, 24(3), 201-218.

Braveman, P. (2014). What is health equity? And how does a life-course approach take us further toward it? *Maternal and Child Health Journal*, 18, 366-372.

Central Bank of Nigeria. (2020). *Statistical bulletin*. CBN.

Chakroun, M. (2024). Nonlinear nexus between health expenditure and economic growth. *Journal of Health Economics*, 45, 112-128.

Eggoh, J., Houeninvo, H., & Sossou, G. A. (2015). Education, health, and economic growth in African countries. *Journal of Economic Development*, 40(1), 93-111.

Esteban, J. (2017). Life expectancy: Concepts and measurements. *Journal of Health Economics*, 52, 1-14.

ILO. (2023). *Labour force participation rate: Definitions and measurements*. International Labour Organization.

Imoughele, L. E., & Ismaila, M. (2013). Public expenditure on education and economic growth in Nigeria. *Journal of Educational and Social Research*, 3(4), 71-79.

Innocent, O., et al. (2017). Relationship between human capital development and government expenditure in Nigeria. *Journal of African Economic Studies*, 14(2), 178-195.

Mincer, J. (1974). *Schooling, experience, and earnings*. National Bureau of Economic Research.

Nyiko, B., Tumelo, M., & Olebogeng, S. (2021). Relationship between government expenditure and economic growth in South Africa. *South African Journal of Economics*, 89(3), 345-362.

OECD. (2023). *Education at a glance 2023*. OECD Publishing.

Ogundipe, A., et al. (2025). Impact of efficiency-adjusted human capital expenditure on sustainable economic growth in Nigeria. *Journal of Development Economics*, 56(1), 78-95.

Ojo, E. O., Adetula, D. T., & Adeyemi, O. A. (2022). Human capital accumulation and economic performance in Nigeria. *Journal of African Development Studies*, 15(2), 88-104.

Okerekeoti, C. U. (2022). Government expenditure on education and economic growth in Nigeria. *International Journal of Recent Research in Commerce Economics and Management*, 9(2), 126-134.

Oluwatobi, S. O., & Ogunrinola, I. O. (2011). Government expenditure on human capital development: Implications for economic growth in Nigeria. *Journal of Sustainable Development*, 4(3), 101-115.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326.

Railaite, R., & Ciutiene, R. (2020). Public health spending and life expectancy in European Union nations. *European Journal of Public Health*, 30(4), 678-684.

Schultz, T. W. (1962). Investment in human capital. *The American Economic Review*, 52(1), 1-17.

Sultana, T., Jamil, F., & Haq, S. I. U. (2017). Relationship between human capital and economic growth in developing and developed countries. *World Development*, 89, 145-160.

Ukwueze, A. (2018). Public expenditure: Concepts, types, and determinants. *International Journal of Public Finance*, 3(1), 21-34.

UNESCO. (2023). *Global education monitoring report 2023*. UNESCO.

UNESCO. (2024). *Literacy rate definitions and measurements*. UNESCO Institute for Statistics.

Usman, O. A., Olanipekun, D. B., & Iorember, P. T. (2019). Health, education, and economic growth in Nigeria. *Journal of Economic Structures*, 8(1), 1-15.

Wanjiru, K. (2019). Government expenditure and human capital development in developing economies. *Journal of Public Policy and Administration*, 4(2), 56-70.

Wisdom, J., & Niyekpemi, N. (2021). Impact of human capital development on economic growth in Nigeria. *International Journal of Economics and Finance*, 13(5), 112-126.

World Bank. (2022). *World Development Report 2022: Finance for an equitable recovery*. World Bank.

World Bank. (2023). *Human Capital Index 2023*. World Bank.

Yang, H. (2020). Health expenditures and economic growth under different human capital levels. *Health Economics Review*, 10(1), 1-15.

Yerima, A., Bello, M., & Okon, P. (2022). Economic growth and human capital: An empirical study of Nigeria. *Journal of African Economic Studies*, 10(3), 112-130.