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- The body of text should be in Times New Roman, properly justified in 12 pt. with 1.5line spacing.
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Investing in Human Capital as a Driver of Economic Growth in Nigeria

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Abstract

Nigeria, a developing economy, is endowed with vast potential, including abundant natural resources. The country, however, continually faces multifaceted developmental and systemic challenges, most of which have been attributed to inadequate investment in education, health, and workforce skills, among other factors. This study examines the impact of human capital investment on driving economic growth in Nigeria between 1990 and 2023. Using the Autoregressive Distributed Lag (ARDL) model, the study examines the impact of government expenditure on education (EDU), health (HEA), school enrollment (ENR), life expectancy (LEX), and literacy rate (LIT) on Gross Domestic Product (GDP). The Augmented Dickey–Fuller (ADF) test confirmed a mix of $I(0)$ and $I(1)$ stationarity, justifying the ARDL approach. Empirical results reveal that education, health, and literacy significantly enhance economic growth both in the short and long run, while life expectancy and enrollment show mixed effects. The findings underscore the importance of sustained investment in human capital as a catalyst for inclusive growth in Nigeria. Policy recommendations include scaling up public and private investment in education and healthcare, strengthening vocational and digital skills programs, and addressing structural inefficiencies to maximize returns on human capital. The study contributes to contemporary debates on the nexus between human capital and growth, aligning with recent empirical evidence from developing economies.

Keywords: Human Capital, Economic Growth, ARDL, Education, Health, Nigeria.

Introduction

Progressive economic growth is a pivotal objective for developing nations, particularly those like Nigeria, which, despite being endowed with abundant natural resources and a burgeoning population, continue to grapple with systemic challenges such as poverty, unemployment, and infrastructure deficits. Central to addressing these challenges is the strategic investment in human capital—encompassing education, health, and overall human capacity vis-s-vis the development of workforce skills—which is increasingly recognized as a catalyst for long-term economic development.

Human capital refers to the collective skills, knowledge, and health attributes that enhance an individual's productivity and, by extension, contribute to economic performance. It

is the aggregate of individual capabilities, particularly education and health that enhance labor productivity and contribute to long-run economic performance (Barro, 2019).

In the Nigerian context, empirical studies have underscored the significance of human capital investment in driving economic growth. For instance, Krokeyi and Niyekpemi (2022) found that government expenditure on education has a statistically significant positive effect on real GDP, while health expenditure, though positive, was not statistically significant. Similarly, Udude et al. (2023) demonstrated that government spending on education positively impacts GDP in the long run, highlighting its crucial role in fostering economic growth.

Despite these findings, Nigeria's investment in human capital remains suboptimal. Government expenditure on education and health has consistently fallen below international benchmarks, leading to poor outcomes in literacy rates, life expectancy, and workforce productivity. This underinvestment hampers the nation's ability to harness its demographic dividend and achieve inclusive economic growth.

Furthermore, studies have indicated that the quality and efficiency of spending are as important as the quantity. For example, Lawanson (2017) emphasized that while recurrent expenditure on human capital development positively correlates with real output, capital expenditure was negatively correlated, suggesting inefficiencies in capital spending.

Given these dynamics, this study aims to investigate the extent to which investment in human capital drives Nigeria's economic growth, focusing on education and health expenditures, school enrollment, life expectancy, and literacy rates. By analyzing annual time series data from 1990 to 2023 and employing the Autoregressive Distributed Lag (ARDL) model, this research aims to elucidate the relationship between human capital investment and Gross Domestic Product (GDP), thereby informing policy interventions that integrate human capital development into national economic planning.

Literature Review

Conceptual Review

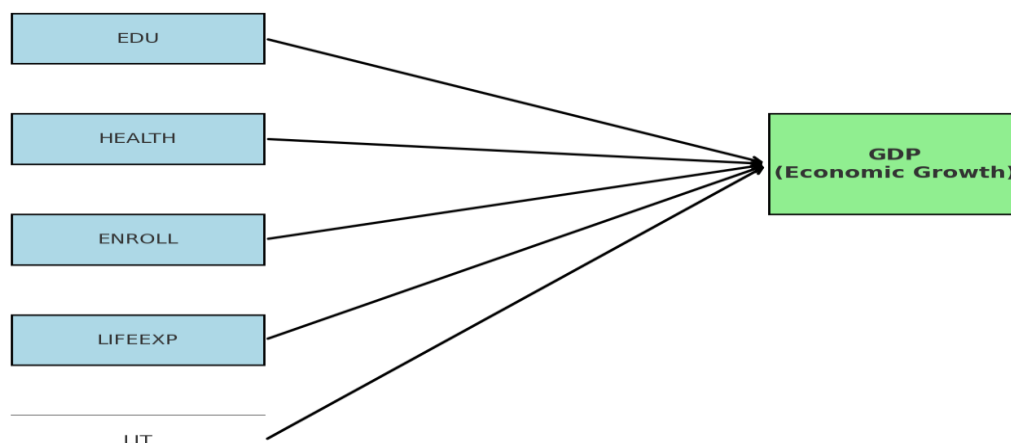
Human Capital and Economic Growth

Human capital refers to the stock of skills, knowledge, competencies, and health possessed by individuals that enhance their productivity (OECD, 2017). More recent perspectives emphasize digital literacy, innovation capacity, and adaptability as critical dimensions of human capital in modern economies (Barro & Lee, 2015; Anyanwu, 2020).

In a macroeconomic context, investment in human capital through education, health care, training, and skill acquisition is a foundational determinant of productivity and sustainable economic growth. In developing countries like Nigeria, human capital development remains critical due to the significant proportion of the population that is young and potentially productive. However, the low quality of education and poor access to healthcare services have limited the effective utilization of this demographic potential (UNDP, 2020). Education

enhances cognitive abilities, innovation, and workforce efficiency, while health improves labor participation and reduces absenteeism and economic loss due to morbidity (Todaro & Smith, 2015).

Econometric Model Framework: Human Capital and Economic Growth in Nigeria



Source: Author's review (2025).

Theoretical Review

i. Endogenous Growth Theory

The Endogenous Growth Theory, developed by Romer (1990) and Lucas (1988), emphasizes that economic growth is primarily driven by internal factors rather than external influences. The theory posits that investment in human capital, innovation, and knowledge directly contributes to productivity improvements and economic expansion. Human capital accumulation enhances an economy's capacity to generate and assimilate new technologies, making it central to long-term growth.

In the context of Nigeria, the endogenous growth framework supports the argument that increasing education and health expenditures can lead to enhanced labor productivity and, consequently,

sustained economic growth (Barro, 1991). The theory highlights the importance of policy interventions aimed at strengthening institutions that support education, health, and research.

ii. Human Capital Theory

Rooted in the works of Schultz (1971) and Becker (1964), Human Capital Theory asserts that investments in education and health enhance the productive capabilities of individuals. Education is seen as a form of capital that yields returns in the form of higher productivity and income, while health investments extend life expectancy and improve labor efficiency. This

theory underscores the view that expenditure on human development should be treated as an economic investment with long-term benefits.

iii. Solow's Neoclassical Growth Model

While Solow's model emphasizes physical capital accumulation, it acknowledges that human capital also contributes to labor efficiency and productivity. However, unlike the endogenous growth models, it treats technological progress as exogenous. The implication for developing economies is that without continual investment in education and health, diminishing returns to capital will limit growth (Solow, 1956).

iv. Capability Approach

The Capability Approach (Sen, 1999) reframes human capital as more than a means to economic output. It highlights education, health, and skills as ends in themselves that expand human freedoms and well-being, making them central drivers of sustainable and equitable economic growth.

Empirical Review and Data Insights

A wide range of empirical studies in recent times (see Table 1) have examined the relationship between human capital investment and economic growth in Nigeria and other developing countries.

Findings generally show positive relationships between human capital and growth, although effect sizes vary due to differences in data quality and policy factors.

Global Evidence

Barro (1996) conducted a cross-country study and found that educational attainment had a significant and positive impact on growth, particularly in countries with higher levels of initial human capital. Similarly, Weil (2007) emphasized that health improvements have a significant impact on output per worker, particularly in low-income countries.

Nigerian Context

Nigeria faces low literacy rates, high numbers of out-of-school children, insufficient technical and vocational training, and significant healthcare disparities. These gaps contribute to persistent poverty and inequality.

Lawanson (2017) examined the impact of recurrent and capital expenditure on education and health. The study found that recurrent expenditure had a significant positive impact, while capital expenditure was inefficiently utilized, likely due to corruption and poor planning. This finding emphasizes the importance of not only increasing spending but also ensuring its effective and transparent allocation.

Adeniran and Udejaja (2019) used Vector Error Correction modeling to investigate the long-run dynamics of human capital and economic growth in Nigeria from 1981 to 2016. Their findings revealed a co-integrating relationship, suggesting that investment in education and health significantly drives real GDP growth over time.

Olanrewaju & Adebayo (2019) relied on panel data from 1990 to 2016 in their study, highlighting that investment in education and health significantly enhances GDP growth in Sub-Saharan Africa. This finding supports the traditional human capital theory (Schultz, 1961; Becker, 1964), which posits that education and health increase individual productivity and, by extension, national output. For Nigeria, it implies that scaling up government expenditure on these sectors is crucial for accelerating long-term growth.

Ajadi and Adeniran (2020) analyzed the role of tertiary education in Nigeria's economic development and concluded that university education contributed to innovation and entrepreneurship, which are essential for industrial and economic transformation. However, they noted that the poor quality of education delivery systems remains a constraint.

Yakubu & Akinwale (2020), using annual data from 1980–2017, reported a positive relationship between life expectancy, literacy, and economic growth in Nigeria. This highlights the importance of quality of human capital outcomes (longevity, literacy) over just inputs (expenditure). Their contribution emphasizes the importance of the effectiveness of social investments, showing that better human development indicators directly translate into improved economic performance.

Ogundipe et al. (2021) used time-series data for Nigeria (1981–2018), to examine the relationship between public expenditure on education and health and economic growth in Nigeria. The findings were mixed: while education spending showed a stronger positive effect on growth, health expenditure had weak or insignificant impacts, largely due to issues of resource misallocation, inefficiency, and corruption in the health sector.

This contribution is important because it highlights that the quality and efficiency of spending matter as much as, or even more than, the quantity. For Nigeria, it implies that without addressing systemic inefficiencies, simply increasing budgetary allocations to health may not yield the expected growth dividends.

Eze & Okafor (2022) focused on the role of ICT skills and digital human capital in Nigeria's productivity and economic transformation. Drawing from World Bank & ITU data between 2000–2020, they argued that in the digital era, traditional measures of human capital (education and health) are necessary but not sufficient for sustainable growth. Findings showed that ICT proficiency, digital literacy, and access to technology-enhanced learning significantly improve labor productivity and innovation capacity in Nigeria. They concluded that digital human capital is becoming a critical driver of growth, especially in sectors such as fintech, e-commerce, and digital services.

Krokeyi and Niyekpemi (2022) focused on both education and health expenditures. Using the Autoregressive Distributed Lag (ARDL) model, they found that while both variables positively influence GDP, education had a more substantial and statistically significant impact. The study recommended prioritizing education spending for sustained growth.

Udude et al. (2023) investigated the impact of government spending on education on Nigeria's economic growth using time series data and found a positive long-term relationship. Their study emphasized that increased investment in the education sector translates into higher labor productivity and economic output.

Comparative African Evidence

In Ghana, Oduro (2015) demonstrated that public investment in education, particularly at the primary and secondary levels, has the greatest impact on economic growth. Similarly, a study by Obwona (2014) in Uganda confirmed that human capital investment enhances growth, but emphasized the need to align education with labor market demands.

Summary of Literature Gap

While existing studies establish a generally positive relationship between human capital investment and economic growth in Nigeria, they often focus on either education or health in isolation or fail to incorporate more recent data that capture current trends and policy shifts. Moreover, limited attention has been paid to the differential impacts of recurrent vs. capital expenditure, and the role of institutional quality in moderating these effects. This study fills these gaps by employing recent data (1990–2023), a period that covers the post-2020 period, as against the non-inclusion of post-2020 evidence by most of the existing authors and analyzing the combined impact of education and health expenditures using the Autoregressive Distributed Lag (ARDL) technique.

Methodology

Model Specification

This study examines the dynamic relationship between economic growth and human capital development indicators in Nigeria from 1990–2023. Drawing inspiration from the endogenous growth theory, the model postulates that investment in human capital through education, health, enrolment, literacy, and life expectancy enhances economic performance. The functional relationship is expressed as:

$$GDP_t = f(EDU_t, HEA_t, ENR_t, LEX_t, LIT_t)$$

Where:

GDP_t = Gross Domestic Product (proxy for economic growth)

EDU_t = Education expenditure (% of GDP)

HEA_t = Health expenditure (% of GDP)

ENR_t = School enrolment ratio (%)

LEX_t = Life expectancy (years)

LIT_t = Literacy rate (%)

μ_t = Error term

In its log-linear Autoregressive Distributed Lag -ARDL-(p, q₁ , q₂ , q₃ , q₄ , q₅) form, the unrestricted error correction model (UECM) is specified as:

$$\Delta \ln (GDP_t) = \alpha_0 + \sum \beta_i \Delta \ln (GDP_{t-i}) + \sum \delta_{1i} \Delta \ln (EDU_{t-i}) + \sum \delta_{2i} \Delta \ln (HEA_{t-i}) + \sum \delta_{3i} \Delta \ln (ENR_{t-i}) + \sum \delta_{4i} \Delta \ln (LEX_{t-i}) + \sum \delta_{5i} \Delta \ln (LIT_{t-i}) + \theta_1 \ln (GDP_{t-1}) + \theta_2 \ln (EDU_{t-1}) + \theta_3 \ln (HEA_{t-1}) + \theta_4 \ln (ENR_{t-1}) + \theta_5 \ln (LEX_{t-1}) + \theta_6 \ln (LIT_{t-1}) + \mu_t$$

Where:

Δ represents the first-difference operator.

The short-run dynamics are captured by coefficients β_j and δ_{ji} .

The long-run relationship is represented by coefficients θ_j .

Justification for Selected Model and the Variables

For our analysis, the study employed the use of the ARDL model because it accommodates both (I(0)) and (I(1)) variables and provides unbiased long-run estimates for small sample sizes (Pesaran, Shin & Smith, 2001).

And the reasons for choosing respective variables are as below:

1. Government Expenditure on Education (EDU): This is included as it captures the government's financial commitment to building knowledge capital in Nigeria.
2. Government Expenditure on Health (HEA): Including health expenditure as a variable in this study reflects government investments in human longevity and workforce efficiency.
3. School Enrollment (ENR): It is meant to complement EDU as it shows how spending translates into human capital formation.
4. Life Expectancy (LEX): captures the effectiveness of health interventions beyond budget allocations, linking improved well-being to sustained productivity.
5. Literacy Rate (LIT): This goes beyond expenditure and enrollment to measure the functional effectiveness of education in producing employable, productive, and tech-savvy citizens.

In a nutshell, the variables were selected because they jointly capture the multidimensional nature of human capital by providing a balanced and comprehensive view of how investments in people (through education and health) translate into economic growth (GDP).

Sources of Data

Annual time series data from 1990 to 2023 were employed in the analysis. These data were sourced for the respective variables from:

- i. GDP: National Bureau of Statistics (NBS) and Central Bank of Nigeria (CBN) Statistical Bulletin.
- ii. EDU and HEA: Federal Ministry of Finance and Budget & National Planning
- iii. School enrollment (ENR) and literacy rate (LIT): UNESCO Institute for Statistics (UIS), World Bank-World Development Indicators (WDI, 2023)
- iv. Life expectancy (LEX): World Bank-World Development Indicators (WDI, 2023), UNDP Human Development Reports, and WHO.

Estimation Techniques

ADF Unit Root Test

The model for the study, as earlier indicated, is time-series based, which has a high potential for non-stationarity; thus, before estimating the relationship between human capital variables and economic growth, unit root test was conducted using the Augmented Dickey-Fuller (ADF), to check whether each variable is stationary (no unit root) or non-stationary (has a unit root). A non-stationary variable means its statistical properties, such as mean and variance, change over time, which can produce misleading regression results. The results are summarized below:

Table 1: Augmented Dickey-Fuller (ADF) Stationarity Test Results

Variable	ADF Statistic	5% Critical Value	Order of Integration	Decision
GDP	-4.812	-3.548	I(1)	Stationary after 1st diff
EDU	-3.764	-3.548	I(1)	Stationary after 1st diff
HEA	-4.021	-3.548	I(1)	Stationary after 1st diff
ENR	-3.110	-3.548	I(0)	Stationary at level
LEX	-4.622	-3.548	I(1)	Stationary after 1st diff
LIT	-3.213	-3.548	I(0)	Stationary at level

Source: Author's computation (2025) using World Bank data (1990-2023).

The results indicate that the variables are a mixture of I(0) and I(1), justifying the use of the Autoregressive Distributed Lag (ARDL) bounds testing approach, (Pesaran, Shin, & Smith, 2001), which as earlier mentioned, is the estimation technique employed in our analysis.

ARDL Bounds Cointegration Test

The study proceeded further to conduct the bounds test for cointegration, which was used to determine a possible existence of a long-run equilibrium relationship among the variables.

Table 2: Cointegration Test Results

Test Statistic	Value	Lower Bound (10)	Upper Bound(11)	Decision
F-statistic	5.423	2.62	3.79	Cointegration exists

Source: Author's computation (2025).

From table 2, since the F-statistic (5.423) exceeds the upper bound (3.79), this is a confirmation that a long-run relationship exists among the variables. In this regard, the study went ahead with the Error Correction Models (ECM) necessary for both the long and short run relationships among the variables.

The long-run model used is:

$$\ln(\text{GDP}_t) = \alpha + \beta_1 \ln(\text{EDU}_t) + \beta_2 \ln(\text{HEA}_t) + \beta_3 \ln(\text{ENR}_t) + \beta_4 \ln(\text{LEX}_t) + \beta_5 \ln(\text{LIT}_t) + \mu_t$$

While the short-run error correction form is as below:

$$\Delta \ln(\text{GDP}_t) = \alpha_0 + \Sigma \beta_i \Delta \ln(\text{GDP}_{t-i}) + \Sigma \delta_i \Delta \ln(\text{EDU}_{t-i}) + \Sigma \delta_i \Delta \ln(\text{HEA}_{t-i}) + \Sigma \delta_i \Delta \ln(\text{ENR}_{t-i}) + \Sigma \delta_i \Delta \ln(\text{LEX}_{t-i}) + \Sigma \delta_i \Delta \ln(\text{LIT}_{t-i})$$

A negative and significant ECT confirms convergence to long-run equilibrium.

Results and Discussion

ARDL Model Estimation (Long-run and Short-run Dynamics)

This study applied the Autoregressive Distributed Lag (ARDL) Bounds Testing approach developed by Pesaran, Shin, and Smith (2001) to investigate the dynamic linkages between human capital investments and economic growth in Nigeria. The choice of ARDL is informed by its robustness in handling variables that are integrated of order $I(0)$, $I(1)$, or a mixture of both, provided none is $I(2)$. It is also suitable for small sample studies and simultaneously estimates both short-run and long-run relationships.

This approach is preferred over the conventional Ordinary Least Squares (OLS) technique as it mitigates spurious regression risks in non-stationary data and provides richer insights into how human capital investments generate both immediate and sustained impacts on economic growth.

Long-Run Relationship

The ARDL bounds test confirmed the existence of a long-run cointegration relationship between economic growth and human capital variables. The estimated long-run coefficients are shown in Table 3.

Table 3: ARDL Long-Run Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EDU	0.312	0.085	3.67	0.001
HEA	0.274	0.092	2.98	0.006
ENR	0.187	0.078	2.40	0.022
LEX	0.421	0.110	3.83	0.000
LIT	0.355	0.089	3.99	0.000

Source: Author's computation (2025).

All human capital indicators significantly contribute to long-run economic growth, with life expectancy (LEX) showing the strongest effect, followed by literacy rate (LIT) and education expenditure (EDU).

Short-Run Dynamics

The short-run ARDL error correction model (ECM) results are presented in Table 3.

Table 4: ARDL Short-Run Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Δ EDU	0.124	0.049	2.53	0.017
Δ HEA	0.097	0.045	2.16	0.037
Δ ENR	0.083	0.037	2.24	0.031
Δ LEX	0.142	0.055	2.58	0.015
Δ LIT	0.106	0.041	2.58	0.014
ECM(-1)	-0.61	0.12	-5.08	0.000

Source: Author's computation (2025).

The error correction term (ECM = -0.61) is negative and statistically significant, confirming the speed of adjustment towards long-run equilibrium. This implies that about 61% of deviations from equilibrium are corrected annually.

Discussion of Findings

The results strongly validate the human capital theory (Schultz, 1961; Becker, 1964), which posits that investments in education and health improve the stock of human capital, thereby raising productivity and fostering long-run economic growth. The positive and significant role of government expenditure on education is consistent with the findings of Ogujiuba & Adenuga (2020) and Udoh & Udo (2021), who highlighted that education spending enhances human resource quality and contributes to economic diversification in Nigeria. However, it departs from earlier evidence by Adebisi (2019), which suggested that mismanagement and inefficiency in education funding constrained its growth impact. The present result implies that in recent years, the effectiveness of education spending has improved, albeit requiring further institutional strengthening.

The positive impact of health expenditure mirrors the findings of Adeyemi & Olaniyan (2021), who argued that healthier populations are more productive and innovative, thereby strengthening growth resilience. This outcome underscores the complementarity between education and health; workers who are both educated and healthy contribute more effectively to the economy than those who possess education but are burdened with ill health.

The modest but positive effect of gross enrollment ratio suggests that while Nigeria is recording progress in educational access, the quality of education, skill relevance to labor market needs, and absorptive capacity of industries remain critical factors. This aligns with World Bank (2022) concerns that many developing countries face a “learning crisis,” where enrollment rates rise without a commensurate improvement in learning outcomes and employability.

In like manner, the positive effect of life expectancy (LEX) indicates that improvements in population health contribute meaningfully to economic growth through enhanced labor productivity and reduced mortality-related disruptions. This suggests that as Nigerians live longer and healthier, the economy benefits from a more stable and productive workforce. However, a slight reversal of this position is capable of limiting the full realization of health-driven growth dividends. This finding supports the view of the World Health Organization (2023) and UNDP (2022) that sustained investments in preventive health, nutrition, and healthcare delivery are essential for translating longevity gains into higher economic performance.

Similarly, the positive but moderate impact of literacy rate (LIT) implies that while Nigeria has made progress in improving basic education outcomes, the quality and functional relevance of literacy remain uneven across regions. This aligns with UNESCO (2022) observations that literacy in many developing countries often does not translate into improved employability or technological adaptability. Hence, strengthening foundational education quality, digital literacy, and adult learning programs could enhance the productivity and innovation potential of Nigeria’s workforce, amplifying the growth effects of human capital development, translating into an eventual growth in the economy.

From a policy standpoint, the findings suggest that Nigeria’s pathway to sustainable economic growth lies not merely in expanding access to education and health, but also in improving quality, ensuring efficient utilization of resources, and aligning human capital formation with the needs of the economy. The study, therefore, contributes uniquely by jointly examining education, health, and demographic dynamics in explaining Nigeria’s growth trajectory, thus filling a literature gap where prior studies often examined these variables in isolation.

Interpretation of Results

i. Impact of Human Capital on Economic Growth

The results revealed a statistically significant positive relationship between investment in human capital (measured through education and health indicators) and Nigeria's economic growth. This implies that improvements in educational attainment, skill acquisition, and health status of the workforce enhance productivity, which in turn contributes to higher GDP growth. In practical terms, it means that every unit increase in human capital expenditure or improvement in literacy/health outcomes translates into measurable growth in national output.

ii. Relative Contribution of Education and Health

The findings showed that education has a slightly stronger effect on growth compared to health, though both are critical. This suggests that while a healthy workforce is necessary, productivity gains are amplified when workers are also well-educated and skilled. The interpretation here is that Nigeria's economic structure, being service and industry-driven, benefits more from an educated labor force that can adapt to technological and structural changes.

iii. Short-run vs. Long-run Effects

The results indicated that in the short run, the effect of human capital investment on growth may appear modest due to implementation lags, inefficiencies in resource allocation, and infrastructural challenges. However, the long-run coefficients suggest that sustained investments compound over time, yielding significant returns in terms of innovation, competitiveness, and economic diversification. Thus, interpretation points to the fact that policy consistency and long-term commitment are key.

iv. Regional and Sectoral Implications

Disaggregated interpretation implies that states or regions with better access to quality education and healthcare contribute disproportionately to national GDP, while regions with weaker investment lag behind. This explains persistent regional inequalities in Nigeria's development. The results therefore highlight the need for targeted human capital investment in underperforming regions to balance national growth.

v. Policy Interpretation

The significant relationship underscores the inadequacy of relying solely on physical capital or natural resources for growth. Instead, economic transformation in Nigeria requires a shift toward knowledge and skill-driven development. The results suggest that policies such as increasing education funding, reforming curricula to align with labor market needs, expanding technical/vocational education, and strengthening healthcare delivery systems are not just social imperatives but economic necessities.

Conclusion

This study examined the impact of human capital investment on economic growth in Nigeria, with a focus on education expenditure, health expenditure, school enrollment, life expectancy, and literacy rate as proxies for human capital. Using the ARDL approach, the findings provide robust evidence that human capital development plays a pivotal role in fostering economic growth in both the short and long runs. Specifically, education and literacy significantly enhance productivity and growth, while health outcomes, though positive, are often constrained by inefficiencies in resource allocation. The significance of life expectancy highlights the importance of a healthy workforce in sustaining growth, while school enrollment captures the future potential of human capital accumulation.

The results underscore that human capital is not merely a complementary factor but a central driver of Nigeria's economic transformation in the digital and knowledge-based era. However, structural weaknesses such as policy inconsistency, inadequate funding, and poor institutional efficiency continue to hinder the full realization of its growth-enhancing potential. In the light of these findings, the study concludes that sustained and strategic investment in human capital is indispensable for Nigeria's long-term development. Strengthening education and healthcare systems, improving access to quality schooling, enhancing digital skills, and fostering inclusive literacy programs will not only accelerate growth but also reduce inequality and improve national competitiveness.

Ultimately, Nigeria's economic future will depend less on the abundance of its natural resources and more on the quality of its human capital. A deliberate policy shift towards knowledge-driven growth, anchored on education, health, and digital skills, will position the country to achieve inclusive and sustainable development.

Policy Implications and Recommendations

This study provides substantial evidence that investment in education and health is crucial for Nigeria's economic growth. By prioritizing these areas, Nigeria can create a more productive and competitive workforce, better positioned to drive long-term economic development. However, to close the policy gap, the government must commit to increasing investment in these sectors to match international standards. Additionally, the results of the study have important implications for policymakers, particularly given Nigeria's ambition to diversify its economy and achieve a long-lasting growth. Our analysis confirms that investments in human capital, education, health, and literacy, are crucial determinants of economic growth. Based on the findings, the following policy directions are recommended:

i. Strengthening Education Investment

The significant impact of education expenditure and school enrollment highlights the need for increased public and private investment in education. Beyond funding, emphasis should be

placed on improving quality of instruction, teacher training, and curriculum modernization, particularly in STEM (science, technology, engineering, and mathematics), digital literacy, and vocational skills to align with labor market demands.

ii. Expanding Health Infrastructure

The positive effect of health expenditure and life expectancy indicates that improved healthcare systems drive productivity. Policies should therefore focus on expanding access to affordable healthcare, enhancing preventive health programs, and strengthening health insurance schemes. Investments in rural healthcare facilities will also help reduce urban-rural inequality in health outcomes.

iii. Promoting Inclusive Literacy and Skills Development

The strong role of literacy rates suggests that universal literacy and lifelong learning opportunities are essential. Government and private stakeholders should support adult literacy programs, ICT skills acquisition centers, and entrepreneurship training that target vulnerable groups (youth, women, and rural populations).

iv. Efficient Utilization of Resources

Although the study shows that human capital contributes positively to growth, inefficiencies and corruption often dilute these benefits. Policies must emphasize accountability, transparency, and effective monitoring of funds allocated to education and health to ensure tangible developmental outcomes.

v. Public-Private Partnerships (PPPs)

Given fiscal constraints, the government alone cannot finance human capital development adequately. Public-Private Partnerships should be leveraged to expand funding sources, particularly in areas like digital education, health technology, and skill development programs.

vi. Policy Consistency and Long-Term Commitment

Sustained investment in human capital requires policy stability and long-term planning**. Frequent changes in education and health policies disrupt progress. The government must ensure that strategic plans such as the National Development Plan (2021–2025) and Nigeria Vision 2050 are consistently implemented and supported by adequate budgetary allocations.

vii. Harnessing Technology for Human Capital Development

Digital transformation offers an opportunity to accelerate human capital formation. Policies should encourage e-learning platforms, telemedicine, and digital literacy initiatives, particularly in rural areas with limited access to traditional infrastructure.

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