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The Analysis of Human Capital Development, Economic Growth and Longevity in West African Countries

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Abstract: Human capital is critical in directing all resources to serve people and influencing the productivity of an economy. Human capital can be increased through good health and education. This research examined the effects of human capital development on economic growth and longevity in West Africa. This study was concentrated on four West African countries: Nigeria, Ghana, Burkina Faso, and the Benin Republic. We used panel ordinary least squares (POLS), fully modified ordinary least squares (FM-OLS), and dynamic ordinary least squares (DOLS) for robust analysis to look at how human capital development affects economic growth and longevity over the long term. Life expectancy at birth was employed to evaluate longevity. Before the estimate, correlation, unit root, and cointegration tests were run. According to the findings of this study, human capital development has a 347.5% favorable and significant long-term effect on economic growth. This indicates that enhancing human capital can stimulate economic growth. According to the data, human capital development has a 26.8 percent positive and significant long-term effect on life expectancy at birth. Based on the findings, this study concluded that human capital development has a favorable impact on economic growth and life expectancy at birth in West Africa, demonstrating that developing human capital is advantageous to both growth and life expectancy. As a result, West African governments must increase health and education budgetary expenditures to strengthen human capital.

Keywords: Human Capital development; life expectancy at births; Education; Health; Economic growth.

JEL classification: I15; O15; O47.

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1. INTRODUCTION

Human capital, as defined by Goldin (2016), consists of an individual's knowledge and abilities; its effective utilisation is crucial to advancing society and the economy at large. The findings of previous research conducted by Keji (2021), Akinlo and Oyeleke (2020), and Khan and Chaudhry (2019) have provided empirical evidence supporting the positive relationship between human capital and economic growth. According to the World Bank (2023), economic growth depends on investments in human capital via education, health, and social programs because of the correlation between human capital, good health, and quality education. A decreased level of human capital development causes poor health outcomes in terms of low life expectancy at birth and mortality rates, which reduces the productivity level of individuals due to poor economic growth. Some countries with developed human capital enjoy reduced poverty, good health, equitable income and sustainable economic growth due to superior technology and high R&D efforts (Dao and Khuc, 2023). Adeyemi and Ogunsola (2016) and Jaiyeoba (2015) stated that education and health are important and used to measure human capital development. They enhance economic growth and have a positive effect on a country's health sector. Although these selected West African countries have abundant natural resources, they are encumbered with challenges regarding economic and human capital development. As noted by Keji (2021), even though Nigeria, one of the four countries selected has human and physical resources, the nation faces significant challenges, such as the migration of skilled labour to developed countries, high unemployment and underemployment rates, poverty, and dilapidated healthcare systems. Due to the state of existing health facilities, they lack the capacity to participate in a market-driven economy because of bureaucracy and insufficient funding (Adenuga and Ibiyemi, 2012; Awoyemi and Olaniyan, 2021). On a more advanced level, investments in health structures, including personnel and infrastructure, are projected to improve health conditions at the macro level, leading to improved human capital and output. However, this proposition does not hold in some west African countries like Nigeria, Benin, and Burkina Faso. According to Awoyemi and Nwibe (2022) and Kojo Edeme *et al.* (2017), Nigeria's health status is still below the global average.

In 2021, the health situation in terms of life expectancy at birth was approximately 60, 59, 64 and 53 years in Benin, Burkina Faso, Ghana and Nigeria, respectively. The prevalence of HIV/AIDS infection, malaria, and tuberculosis infections have also contributed significantly to these countries' poor health conditions (WDI, 2023). The prevalence of HIV/AIDS infection was estimated to be 1.3% and 1.7% of the population aged 15-49 years in Nigeria and Ghana, respectively, which are higher than the global average (0.7%). These poor health conditions have hampered the countries' growth because adequate and effective healthcare services are critical to improving longevity (Anyanwu and Erhijakpor, 2009). Healthcare budgets have been a subject of debate in many West African countries due to scarce resources. World Bank (2023) noted that Sub-Saharan Africa remains the poorest region; its human capital indicators, such as out-of-school children, learning, and stunting, lag behind other regions. In 2020 specifically, the adult literacy rate percentage of people ages 15 and above in Benin, Burkina Faso, Ghana and Nigeria was estimated at 42%, 39%, 79% and 62%, which were far below the World average of 87% (WDI, 2023). UNESCO (2021) statistics showed that Nigeria spent 0.5% (2013), Ghana 3.9% (2018) and Benin 3% of GDP on education in 2020. These countries have spent less than 4-6% of the GDP established international benchmark that countries should spend on education to ensure that countries

have enough financial resources to provide education for all without pushing out anyone. These and many more are the challenges West African countries face, which affects economic growth in these countries. Akinlo and Oyeleke (2020) asserted that the level of economic development is pivotal to the accessibility of trained teachers, teaching manuals and infrastructure necessary to maintain the standards required for education. Countries with deficiencies in these areas may face prolonged economic growth because of a lack of competence in human capital. Both health and education as components of human capital make an individual productive. Therefore, this study focuses on the effects of human capital development on economic growth and longevity in West Africa. The empirical insights are expected to provide policy guidance for policymakers, economists, government stakeholders, and other social scientists and expand the frontier of knowledge in this area.

2. LITERATURE REVIEW

2.1 Human Capital Development, Economic Growth and Longevity in West Africa

West African countries face considerable challenges in human capital development as they are mainly developing countries. This is because of the divergence between the rest of the world and what is occurring in the region. Nigeria, for instance, is the most populous black country with diverse cultures and tribes and unstable political climates; however, its challenges are similar to those of other countries like Ghana, Burkina Faso, and the Benin Republic with relatively smaller populations. Chikwe *et al.* (2015) and Fagbemi *et al.* (2022) highlighted these challenges as low rating in human development indices (HDI), migration of skilled workforce, unemployment, and underemployment. Baah-Boateng (2013) further explained that a lack of public investment in education has contributed significantly to low human capital development in West Africa. In 2021, Ghana ranked 133rd, Nigeria ranked 163rd, Benin Republic ranked 165th, and Burkina Faso ranked 184th, the lowest amongst these four countries, respectively, on the Human Development Index and its components (UNDP, 2022). Only Ghana falls in the middle HDI group. The report factors in life expectancy at birth, mean and expected years of schooling, and gross national income per capita, amongst other variables. For these countries, life expectancy at birth is significantly better for women. Another critical issue is the migration of skilled workers, especially in the health sector, which has impacted these developing countries' systems. In Nigeria, Onah *et al.* (2022) found that 43.9 per cent of physicians were willing to migrate, while Nigerian physicians make up the largest number of foreign doctors in some countries. Similarly, in other West African countries such as Ghana, Burkina Faso, and the Benin Republic, brain drain among health workers and teachers, who build the human capital of any nation, is attributed to poor remuneration, inadequate housing, training and education, security, and political unrest (Adjei-Mensah, 2023).

Bloom *et al.* (2018) explained the relationship between health and economic growth; it depends on the health dimension examined. This research selected mortality rate and life expectancy at birth as health variables. Reducing the mortality rate dramatically helps increase human capital, especially in developing countries. Also, intervention to help children at the earliest stages has long-term effects on their adult lives and positively affects their learning ability. Valero (2021) explored various measures of education and their impact on the individual and economy on a grand scale using the following criteria: stages of education, its quality, and the type of education received. The primary research finding affirms that

education and its positive externalities contribute to economic growth. Similarly, Akpolat (2014) viewed education's impact on economic growth through labor efficiency and its improvements in science and technology with potential skills the citizens acquire. Furthermore, the study found a long-term relationship between education and health; educated people develop healthier habits, and a more educated generation maintains an economy's high human capital. Finally, health and education have significant effects on economic growth. Healthier individuals generally exhibit higher professional performance compared to individuals with lower levels of health. Furthermore, improvements in a nation's healthcare infrastructure contribute to the enhancement of investments in education and life expectancy.

2.2 Theory and empirical literature

Economic theories have been expanded to account for the importance of health and education as human capital inputs. In this regard, studies have focused on economic human capital theory to explain how human capital generates both higher income and individual well-being. They suggested that human and social capital investment should be increased for long-term economic growth because good health promotes high productivity levels (Acemoglu and Johnson, 2007; Li and Huang, 2009; Ponzetto and Troiano, 2018). Individuals with better health tend to exhibit extended life expectancies, providing them with greater motivation to allocate resources to enhance their life skills. Consequently, such investments are expected to yield more enduring effects. The correlation between healthcare and economic growth has been categorised across different dimensions, including methodology, data sources, nation groupings, periods, and outcomes. In their study, Narayan *et al.* (2010) examined the correlation between health and economic growth in five Asian nations. Their findings revealed a statistically significant and positive association between health and investment, which augments per capita income. Bloom *et al.* (2019) analyzed how health investments have improved longevity and labor force participation in developed countries, suggesting that West African countries should model health systems after these developed countries to prolong life. Acemoglu and Johnson (2007) provided empirical evidence favouring neoclassical growth theory, positing that a rise in life expectancy leads to population growth. This, in turn, results in a decline in the ratios of capital-to-labor and land-to-labor, thus reducing per capita income. The effect of health on economic growth, as measured by life expectancy at birth, has no significant impact on total GDP. In nations with a substantial increase in life expectancy, there has been a corresponding reduction in both GDP per capita and GDP per working-age population. There needed to be more per capita income convergence among countries previously classified as low, middle-income, and wealthy.

Howitt (2005) proposed a straightforward framework for Schumpeterian growth theory, which centres on innovation. This model identifies six potential pathways by which improvements in a nation's population health can impact its long-term economic growth. All of these impacts exhibit a consistent trend, except a potential anomaly. Their primary objective is to significantly enhance the productivity and per-capita GDP of an already economically prosperous nation, enabling it to maintain a growth trajectory comparable to that of global technological frontrunners. They enhance the per-capita GDP growth rate of nations with weaker growth rates compared to technology leaders, enabling certain countries to achieve relative stability in closing the gap in living standards that separates them from the

technology leaders. This research enhanced the current theoretical framework by examining the influence of health on economic growth within the context of West African nations.

Extensive empirical evidence and scholarly literature have been dedicated to examining the impact of human capital development on both economic growth and health outcomes in Africa and developed economies. The empirical study by Eggoh *et al*. (2015) examined the relationship between education, health, and economic growth in African countries. The research utilized secondary time series data from 1996 to 2010 and employed a panel technique for analysis. The Generalized Method of Moments (GMM) was applied for the analysis. The findings indicate a positive relationship between public expenditure on education and health and economic growth in African economies. The study revealed that a specific threshold of health expenditure is necessary to observe favourable outcomes from investments in education and vice versa. Consequently, it is recommended that efficiency be considered when making public investments in education and health, as this will enable the development of human capital to impact economic growth positively in African nations.

Shuaibu and Popoola (2016) analyzed the determinants of human capital development in African economies. The research utilized a panel technique and evaluated data from 33 African countries, covering the period from 2000 to 2013. The data underwent analysis through the application of the Pedroni and Kao cointegration approach and the panel Granger Causality test. The Pedroni and Kao cointegration test results provide evidence supporting a long-term equilibrium relationship among the variables. This finding suggests that the variables examined in this study play a significant role in influencing human capital development over the long term. The findings of the Granger Causality analysis indicate the presence of a reciprocal causal relationship between the human capital development and economic growth, wherein the former influences the latter and vice versa, with feedback effects from economic growth. Furthermore, it was seen that there is a one-way causal relationship, specifically from the human capital development to economic growth, with no reciprocal influence. This suggests that human capital development has a causal relationship with improving health, education infrastructure, and institutional quality. The study recommends that African countries should prioritize the continuation and expansion of their investments in education and human health. Additionally, efforts should be made to improve infrastructure and institutional quality.

Hu and Yao (2021) examined the possible unequal impacts of investing in human capital and technical innovation on the health of populations in the BRIC countries. The study employed data from 1991 to 2019 and used a panel non-linear autoregressive distributed lag pooled mean group (NARDL-PMG) approach to examine the long-term and short-term relationships among the variables. The variables under investigation were found to exhibit integration of orders I(0) and I(1) based on the use of the Levin, Lin, Chu (LLC) test, the Im, Pesaran, Shin (IPS) test, and the Fisher-ADF stationarity tests. According to long-term estimates derived from the NARDL model, it is evident that positive shocks in government sector education expenditure have a substantial effect on life expectancy. Furthermore, it is worth noting that the reduction in government-sector education expenditure has a detrimental impact on life expectancy in BRICS economies. In the context of the BRICS economies, it has been observed that a 1 percent increase in public education expenditure leads to a corresponding increase of 0.804 percent in life expectancy. Conversely, a 1 percent increase in public education expenditure results in a decrease of 3.1 percent in life expectancy. The report suggests that it would benefit governments in BRIC countries to augment their funding

for the education and health sectors. Mulia and Saputra (2021) established a practical and theoretical view of human capital improvement from 2011-2021 using data from eighty-three empirical literature. They employed visualisation tools like bar charts, pie charts, and tables to analyse data. Findings confirm declining human capital development in Indonesia and attribute this to the government's neglect of the education and health sectors. They propose that the government should improve the educational quality and public health services to enhance human capital development.

An assessment of human capital from a global corporate perspective was the primary concern of the study by Danaeefard and Babashahi (2021), which concentrated on human capital development and national well-being. The paper aimed to ascertain whether human capital development promotes national well-being and competitiveness. Data from 135 countries worldwide from 2009 to 2011 were analyzed using Pearson's correlation and Structural Equation Modeling (SEM). The results confirm a positive relationship between human capital development and national well-being. However, further study is required using recent data for a more elaborate finding consistent with recent human health and economic developments.

From 1981 to 2017, Keji (2021)'s study looked into the connection between output growth and human health in Nigeria. The Johansen cointegration technique was utilised in this study to identify cointegrating correlations among the variables examined. The Vector Error Correction (VECM) analysis revealed a statistically significant and positive association between human capital and economic growth in Nigeria. The study's findings indicate that human capital indicators, such as the rate of student enrolment, labour participation rate, and total labour force, significantly influence economic growth. The study further suggests that one effective strategy for maintaining sustained economic growth is for the government to allocate a larger budget to the education and health sectors. Gumbau Albert (2021) examined the relationship between human health indicators and regional economic performance in Spain. The research conducted a comparative analysis by utilising data to estimate the association between health, education, and growth variables across seventeen areas in Spain from 2000 to 2016. The econometric analysis involved the application of the Generalized Method of Moments (GMM) estimation technique. The study employed various criteria to assess health status, including life expectancy at birth, life expectancy at age 65, an individual's self-perceived health condition, and the proportion of individuals with long-term health issues. The measurement of the education component of human capital relied on the count of workers who had attained higher education. The fixed effects (FE) outcomes analysis provided strong evidence supporting the positive and statistically significant relationship between health status and regional output. The study suggests that policymakers should prioritise augmenting investments in the health sector to foster sustained economic growth in the Spanish region.

Kia *et al.* (2021) examined how the growth of human capital affects both health and economic systems. This study analysed primary data obtained through a sample survey of 302 respondents from the health sector in Iran. The research utilised statistical techniques, including analysis of variance (ANOVA), t-tests, and partial least squares (PLS), to analyse the collected data. The study identified several variables that significantly influence the development of the healthcare system. These variables include the need for financial resources to support human capital, effective management of health services, efficient internal processes, and active participation of human capital. The study suggests that in-service training should be provided to the workforce to address the country's present and future human resource requirements.

3. METHODOLOGY

The study's scope spans the years 1990–2022 to cover the decades before and after the epidemic, and four West African countries were chosen, two of which were English-speaking (Nigeria and Ghana) and two French-speaking (Burkina Faso and Benin). The data was sourced from the World Bank and Central Bank's annual report. Panel ordinary least squares (POLS) was used to estimate the stated model while, fully modified ordinary least squares (FM-OLS) and dynamic ordinary least squares (DOLS) were also used for robust analysis. Economic growth was quantified using the log of real gross domestic product (RGDP). However, longevity was measured using a frequently used indicator in the literature, life expectancy at birth, which measures health outcomes. Other control variables include gross fixed capital formation, which measures domestic investment, government spending on education and health, human capital development index (HDI) and labour force participation. These variables were included given their influence as the determinants of longevity and economic growth in line with previous studies and theory (Howitt, 2005; Ben Yedder *et al.*, 2023; Roffia *et al.*, 2023). Summary statistics such as mean, minimum, maximum, and standard deviation were used prior to estimation to describe the features of the data. A unit root test (Augmented Dickey-Fuller, or ADF) was also used to determine if the related data series were stationary, and correlation analysis was used to determine if there was multicollinearity. The existence of a long-run relationship among the variables was tested with the cointegration method.

Model 1: Human capital development and economic growth

$$RGDP_{it} = f(GEE\_GDP_{it}, CHE\_GDP_{it}, GFCF\_GDP_{it}, HDI_{it}, \varepsilon_t) \quad (1)$$

$$ln\, R\, GDP_{it} = \alpha_0 + \alpha_1 GEE\_GDP_{it} + \alpha_2 CHE\_GDP_{it} + \alpha_3 GFCF\_GDP_{it} + \alpha_4 HDI_{it} + \varepsilon_{it}$$

Model 2: Human capital development and life expectancy at birth

$$LEB_{it} = f(GEE\_GDP_{it}, CHE\_GDP_{it}, GFCF\_GDP_{it}, HDI_{it}, RGDP, LTLF, \varepsilon_t) \quad (1)$$

$$LLEB_{it} = \alpha_0 + \alpha_1 GEE_{GDP_{it}} + \alpha_2 CHE_{GDP_{it}} + \alpha_3 GFCF_{GDP_{it}} + \alpha_4 HDI_{it} + \alpha_5 LRGDP_{it} + \alpha_6 LTLF_{it} + \varepsilon_{it} \quad (2)$$

where $\alpha_0$is the intercept of the model, and $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$what are the coefficients?

$RGDP_{it}$ = Real gross domestic product for each country i over a period of time t

GEE_GDP_{it} = education expenditure as % of GDP for each country i over a period of time

CHE_GDP_{it}= expenditure on health as % of GDP for each country i over a period of time t

$GFCF\_GDP_{it}$= gross fixed capital formation as % of GDP for each country i over a period of time t

HDI_{it} = Human Development index for each country i over a period of time t

$LTLF_{it}$= Total labour force for each country i over a period of time t

LEB_{it} = Life expectancy at birth for each country i over a period of time t

ε_t= Error term

4. RESULTS

4.1 Descriptive Statistics

This section analyzes the characteristics of key variables over 32 years (1990–2022) by providing brief descriptions of the data series using the most widely used descriptive statistical tools, correlation, and summary statistics to understand better the data set utilized in this study. Table no. 1 shows the variable summary statistics. It demonstrates that the mean of real gross domestic product (RGDP) in the selected West African countries is $109.12 billion, with a standard deviation of $134.1 billion, demonstrating a considerable variation in RGDP among the countries. The average human development index (HDI) is 0.468, with a standard deviation of 0.076, indicating that the HDI data series has minimal variability. The average GEE_GDP is 4.03%, with a deviation of 1.530%; the result indicates that the data are scattered around the mean, and it may be deduced that government expenditure on education accounts for approximately 4% of the countries' GDP.

Furthermore, the mean of gross fixed capital formation as a percentage of GDP (GFCF_GDP) is 21.49%, with a low of 11.76% and a high of 53.12%. It demonstrates that gross fixed capital formation accounts for approximately 22% of a country's GDP. The average value of CHE_GDP is 3.71%, and the standard deviation is 0.894%, showing that CHE_GDP varies little between countries. The total labour force (TLF) is 357.5 million on average, with a variation of 808.77 million, indicating heterogeneity in TLF values among nations. Finally, the average LEB is 55 years old, with minimum and highest values of 45 and 64 years, respectively. In general, variables like the human capital index, public education spending as % of GDP, gross fixed capital formation as % of GDP, current spending on health as % of GDP, and life expectancy at birth all show low variability. In contrast, variables such as real GDP and the total labour force are widely dispersed.

Table no. 1 – Summary Statistics

	RGDP	HDI	GEE_GDP	GFCF_GDP	CHE_GDP	TLF_M	LEB
Mean	109.120	0.467	4.033	21.489	3.706	357.513	55.01
Median	58.648	0.481	3.679	19.722	3.419	22.576	55.64
Max	502.942	0.611	8.140	53.122	6.029	4012.093	64.07
Min	3.042	0.293	1.440	11.764	2.388	3.899	45.84
Std. Dev.	134.082	0.077	1.530	7.7228	0.894	808.778	5.13
Skewness	1.684	-0.343	0.896	1.7731	0.744	2.881	-0.30
Kurtosis	4.939	2.526	3.515	6.4513	2.599	11.008	2.014
Obs.	123	98	53	123	80	124	120

Source: Author's computation based on the data from the World Bank (2023)

4.2 Correlation analysis

This section covers the degree of connection and the potential correlation between the response and the explanatory variables. It also demonstrates how variables are related and determines whether the explanatory variables are highly correlated. The correlation analysis is shown in Table no. 2. The correlation coefficient between real gross domestic product (RGDP) and the human capital index (HCI) is 0.303, indicating that RGDP has a weak but positive relationship with HCI. Furthermore, the correlation coefficient between RGDP and GEE_GDP is 0.567. Similarly, RGDP has correlation coefficients of 0.846 and 0.813 with CHE_GDP and

TLF, respectively. TLF and CHE_GDP have a strong and positive association with RGDP. The correlation value between HDI and LEB is 0.831, indicating a strong positive association between the two variables. The results reveal that as RGDP increases, so do HDI, GEE_GDP, GFCF_GDP, and CHE_GDP.

Table no. 2 – Correlation analysis

	RGDP	HDI	GEE_GDP	GFCF_GDP	CHE_GDP	TLF_M	LEB
RGDP	1.000	0.303	0.57	0.11	0.81	0.846	0.116
HDI	0.303	1.000	0.324	0.218	-0.34	0.188	0.831
GEE_GDP	0.567	0.324	1.000	0.143	0.408	-0.49	0.320
GFCF_GDP	0.105	0.218	0.143	1.000	-0.04	0.103	0.284
CHE_GDP	0.813	-0.33	0.408	-0.04	1.000	-0.68	0.026
TLF_M	0.846	0.188	-0.49	0.103	-0.68	1.000	0.144
LEB	0.116	0.831	0.320	0.284	0.026	0.144	1.000

Source: Author's computation based on the data from the World Bank (2023)

4.3 Unit root test

To avoid estimating a spurious regression, the ADF Fisher, Im Pearson, and Shin W-stat unit root tests are presented in Table no. 3 so that the stationary condition of the series can be determined before further estimation is carried out. The ADF-Fisher Chi-Square unit root test result shows that LRGDP, HDI, GEE_GDP, GCFC_GDP, LTLF, and LEB are stationary at first difference. The Im Pearson and Shin W-stat show that CHE_GDP is stationary at level, while LRGDP, HDI, GEE_GDP, GCFC_GDP, LTLF, and LEB are stationary at first difference. Overall, the result shows that variable CHE_GDP is stationary at a level, while other variables are stationary at first difference.

Table no. 3 – Unit root test

ADF Test	Level		First Difference		
	Trend and Intercept Stat	**Prob**	**Trend and Intercept Stat**	**Prob**	**Remark**
LRGDP	0.7126	0.9995	24.5453	0.0019	I(1)
HDI	2.46634	0.9633	23.0942	0.0032	I(1)
GEE_GDP	4.31136	0.6346	32.9391	0.0000	I(1)
GCFC_GDP	10.4839	0.2327	68.7903	0.0000	I(1)
CHE_GDP	12.0533	0.1488	66.3112	0.0000	I(1)
LTLFT	3.93100	0.8633	38.5071	0.0000	I(1)
LLEB	2.67977	0.9528	35.3666	0.0000	I(1)
IPS TEST	**Trend and intercept Stat**	**Prob**	**Trend and intercept Stat**	**Prob**	**Remark**
LRGDP	2.00812	0.9777	-4.98540	0.0000	I(1)
HDI	2.31062	0.9896	-1.89415	0.0291	I(1)
GEE_GDP	0.26027	0.6027	-4.53592	0.0000	I(1)
GCFC_GDP	-0.85962	0.1950	-8.36190	0.0000	I(1)
CHE_GDP	-1.30338	0.0962	-8.81231	0.0000	I(0)
LTLFT	2.62733	0.9957	-4.49650	0.0000	I(1)
LLEB	1.34817	0.9112	-10.0582	0.0000	I(1)

Source: author's computation

4.4 Cointegration Test

The Kao test result for model 1 indicates cointegration and a long-run relationship between all variables with statistics -1.928 and a p-value of 0.0267. As a result, the null hypothesis (H0) of no cointegration is rejected at the 5% significance level. Table no. 4 shows that using the Pedroni test, the H0 in a panel pp is rejected with statistics -1.7406(0.0409) at a 5% significance level. Also, with -3.8168(0.0001) and -3.6822(0.0001), respectively, group PP and group ADF indicate that there is a long-run link between the variables, and the null hypothesis of no cointegration may be rejected at a 1% level of significance. According to Kao and Pedroni's findings, there is a long-run relationship between human capital development and economic growth. At a 1% significance level, the Kao statistics of -3.474 and probability value of 0.0003 indicate a stable long-run association in model 2. Panel PP statistics of -3.242 and probability value of 0.0006 and panel ADF statistics of -3.242 and probability value of 0.0006 reject the non-cointegration hypothesis in the case of the Pedroni statistics. Also, with -3.538(0.0002) and -1.7766(0.0378), respectively, group PP and group ADF indicate that there is a long-run link between the variables, and the null hypothesis of no cointegration may be rejected at a 1% level of significance. As a result, the research suggests a long-run equilibrium relationship between human capital development and health.

Table no. 4 – Cointegration test

	Model 1		Model 2	
Test	**Stat (P-Value)**	**Weighted Stat (P-Value)**	**Stat (P-Value)**	**Weighted Stat (P-Value)**
Kao Test	-1.928 (0.027)		-3.474 (0.000)	
Pedroni Test				
Panel v-Stat	0.2656 (0.395)	1.787 (0.037)	2.931 (0.002)	2.985 (0.001)
Panel rho-Stat	1.331 (0.908)	1.272 (0.898)	1.1368 (0.872)	1.136 (0.872)
Panel PP-Stat	-1.741 (0.041)	-2.097 (0.018)	-3.242 (0.000)	-3.243 (0.000)
Panel ADF-Stat	1.743 (0.041)	-2.094 (0.018)	2.737 (0.003)	-2.735 (0.003)
Group rho-Stat	1.693 (0.955)		1.578 (0.943)	
Group PP-Stat	-3.817 (0.000)		-3.5388 (0.000)	
Group ADF-Stat	-3.682 (0.000)		-1.776 (0.038)	

Source: author's computation

4.5 Long-Run Effect of Human Capital Development on Economic Growth

The coefficient of determination, or R2, from the panel least squares (POLS) results suggests that human capital development and other explanatory variables account for around 85.7% of the changes in economic growth. When more variables are added to the model, the modified R-squared value of 84.4% reveals that the selected explanatory factors still explain 84.4% of the variances. Table no. 5 demonstrates that at the 1% significance level, the F-statistic (64.63) is hugely significant. The model's outcomes are validated, showing they are highly predictive and applicable. These findings demonstrate, at the 1% significance level, that human development has a positive and significant effect on economic growth over the long term, with a unit rise in HDI increasing LRGDP by 361.8 percent. Government spending on education has a positive and significant effect on long-term economic growth, as shown by a 10.7 percentage

point rise in LRGDP for every percentage point increase in GEE_GDP at the 1% level of significance. Long-term economic growth is positively impacted by current health expenditure at the 1% significance level, as shown by the 26.8% increase in LRGDP for a 1% increase in CHE_GDP. According to fully modified least squares (FMOLS) panel results, R2 estimates that human capital development and other explanatory factors account for about 85.2% of changes in economic growth. In addition, the model's adjusted R-square of 82.75 indicates that the chosen explanatory variables still account for 82.75% of the variation, even when all other explanatory variables are accounted for. The FMOLS result shows that an increase of one unit in HDI raises LRGDP by 305.3 percent (at the 1% significance level), demonstrating how human development positively and significantly impacts long-term economic growth. Further, at the 10% significance level, a rise in GEE_GDP by a percentage point leads to an increase in LRGDP of 21.9%, indicating that government spending on education has a positive and significant effect on economic growth over the long term.

Human capital development and other explanatory variables account for around 82.3% of the variability in economic growth, as shown by the R2 value from the panel dynamic least squares (DOLS) results. If more explanatory factors are added to the model, the adjusted R-squared value of 81.9 still indicates that the selected explanatory variables adequately explain 81.9% of the variation. The finding demonstrates that at the 1% significance level, human capital development positively and significantly affects LRGDP growth, with a unit increase in HDI increasing LRGDP by 347.5 percent. Gross fixed capital formation has a positive and significant effect on economic growth over the long term; an increase of one percentage point in GFCF_GDP results in an increase of 0.4% in LRGDP at the 5% level of significance. Similarly, a 1% increase in CHE_GDP results in a 3.9% increase in LRGDP, demonstrating that current health expenditure positively and significantly affects economic growth at the 5% significance level. The influence of human capital development on economic growth is determined using the DOLS model, which has the highest R-squared value and the lowest long-run variation relative to the POLS and FM-OLS. According to the underlying data, it works best for cointegrated panel regressions. Thus, the analysis shows that the human development index, gross fixed capital formation, and government spending on health have a positive and significant long-run effect on economic growth.

Table no. 5 – Long-run effect of human capital development on economic growth

Variables	Panel (POLS) Coefficient(t-Stat)	Panel (FMOLS) Coefficient(t-Stat)	Panel (DOLS) Coefficient(t-Stat)
HDI	3.618 (10.882) ***	3.053 (82.238) ***	3.475 (33.124) ***
GEE_GDP	0.107 (3.062) ***	0.219 (1.807) *	0.011 (1.602)
GFCF_GDP	0.014 (1.465)	-0.022 (-0.558)	0.004 (2.413) **
CHE_GDP	0.268 (4.805) ***	-0.149 (-0.981)	0.039 (2.422) **
Constant	24.313 (71.275)		
R-squared	0.857393	0.852781	0.862742
Adjusted R-squared	0.844128	0.827544	0.849485
F-statistic	64.63213(0.000)		
Long-run variance		0.003085	0.001031

Note: ***, ** and * represent 1%, 5% and 10% levels of significance
Source: author's computation

4.6 Long-Run Effect of Human Capital Development on Life Expectancy at Birth

The panel least squares (POLS) finding demonstrates that human capital development and other explanatory variables account for around 86.2% of the variability in life expectancy at birth. Additionally, the adjusted R-square of 84.2 shows that the selected explanatory variables will still explain 84.2% of the changes even after including all other explanatory variables in the model. At the 1% significance level, the F-statistic (42.67) is highly significant. These results prove the model's impressive predictive power and practical use. At the 1% significance level, the panel least squares show that a unit increase in HDI improves LLEB by 23.5%, demonstrating that human capital development has positive and significant long-term benefits on life expectancy at birth. Additionally, at the 5% significance level, an increase of one percentage point in GFCF_GDP boosts LLEB by 0.1%, indicating that gross fixed capital formation has long-term positive and significant effects on life expectancy at birth. Similarly, a 1% rise in CHE_GDP leads to a 2.9 percentage point increase in LLEB, showing that current health expenditure positively and significantly affects life expectancy at birth. The R squared value of 74.3 from the panel Fully Modified Least Squares (FMOLS) analysis indicates that human capital development and other explanatory variables account for 74.3% of life expectancy at birth variability. When more variables are added to the model, the adjusted R-squared value remains at 70.7%, indicating that the selected explanatory variables adequately describe the observed variation. The FMOLS results reveal that an increase in LRGDP raises LLEB by 13.6%, suggesting that LRGDP positively and significantly influences LLEB at the 1% significance level. Human development has a positive and considerable long-term effect on life expectancy at birth; a unit increase in HDI improves LLEB by 26.8 percent. This is significant at the 1% level. Furthermore, a percentage point rise in GFCF_GDP results in a percentage point increase in LRGDP, suggesting at the 0.1% significance level that gross capital fixed formation positively and significantly affects life expectancy at birth. Additionally, at the 10% significance level, an increase in current health spending (CHE_GDP) leads to an increase in long-term real GDP growth (LLEB) of 3.5 percent. There is a positive and statistically significant relationship between the labour force and LLEB; for example, a 1% rise in LTLF results in a 3.1% increase in LLEB.

Human capital development and other explanatory variables account for around 76.8% of the variation in life expectancy at birth, according to the R2 value from the panel dynamic least squares (DOLS) analysis. The adjusted R-square 74.1 implies that the selected explanatory variables will still explain 74.1 percent of the variations even when all other explanatory factors are included in the model. The finding demonstrates that a 1% rise in LRGDP leads to a 13.7% increase in LLEB, indicating that economic growth positively and significantly affects LLEB. Additionally, a unit increase in HDI improves LLEB by 25.6%, revealing that human development positively and significantly affects life expectancy at birth at the 1% significance level. Long-term real GDP growth is positively affected by current health expenditure at the 10% significance level, as measured by a 3% rise in LLEB for a 1% increase in CHE_GDP. Similar to how a rise in LTLF raises LLEB by 3.1%, the labour force has a positive and statistically significant impact on LLEB at the 1% level. The FMOLS model has the highest R-squared value and the lowest long-run variance compared to the POLS, FM-OLS, and DOLS in determining the impact of human capital development on economic growth. Based on the underlying data, it is most appropriate for cointegrated panel

regressions. Thus, the findings demonstrate that real GDP, HDI, GFCF, health spending, and the labour force have positive and significant long-term effects on life expectancy at birth.

Table no. 6 – Long-run results of the effect of human capital development on LEB

Variables	Panel (POLS) Coefficient(t-Stat)	Panel (FMOLS) Coefficient(t-Stat)	Panel (DOLS) Coefficient(t-Stat)
LRGDP	0.011 (0.426)	0.136 (559.763) ***	0.137 (41.683) ***
HDI	0.235 (2.202) **	0.268 (95.223) ***	0.256 (7.793) **
GEE_GDP	-0.003 (-1.184)	0.0003 (-1.338)	0.002 (0.628)
GFCF_GDP	0.001 (2.143) **	0.001 (12.552) ***	0.001 (0.759)
CHE_GDP	0.029 (6.105) ***	0.035 (48.198) ***	0.03 (3.655) ***
LTLF	0.006 (1.135)	0.031 (150.013) ***	0.031 (12.691) ***
C	3.751 (4.68) ***		
R-squared	0.861965	0.872654	0.768607
Adjusted R-squared	0.841765	0.856911	0.74106
F-statistic	42.67(0.000)		
Long-run variance		2.73E-06	0.000773

Note: ***, ** and * represent 1%, 5% and 10% levels of significance
Source: author's computation

4.7 Diagnostic Test

The diagnostic test results for verifying the ARDL model are shown in Table no. 7. We employed the Breusch-Godfrey serial correlation LM test and the normality tests. The results of the Breusch-Pagan LM test show that F-statistics with corresponding p-values are not statistically significant. This means there is a significant rejection of the (H0) null hypothesis of no serial correlation at the 1% significance level. The normal distribution of the error term test shows that the Jarque-Bera test statistics (4.902) and the related p-values (0.086) are not significant for Model 1. Furthermore, Table 7 displays an insignificant F-statistic and p-value of 4.332 (0.228) for the Breusch-Pagan LM test results. Therefore, the lack of a serial correlation (H0) is accepted at a 5% significance level. The normal distribution of the error term test implies that the Jarque-Bera test statistics (0.887) and p-values (0.642) for Model 2 are insignificant. This analysis accepts the null hypothesis of a normal distribution and finds that the error terms in Models 1 and 2 follow a normal distribution.

Table no. 7 – Diagnostic test

Statistic	Breusch-Pagan LM:	Normality test
F-statistic (Model 1)	6.5597 (0.0873)	4.902(0.086)
F-statistic (Model 2)	4.332(0.228)	0.887(0.642)

Source: author's computation

5. DISCUSSION

The study's findings about the impact of human capital development on economic growth indicate a favourable and statistically significant relationship between human capital development and long-term economic growth. This suggests that enhancing education and

health, the primary constituents of human capital can stimulate economic growth. Additionally, factors like domestic investment, as measured by gross fixed capital formation, have a positive and significant impact on economic growth trajectory. Similarly, the allocation of government funds towards healthcare exhibits a favourable and noteworthy impact on long-term economic growth. Numerous scholarly investigations have elucidated the significance of human capital as a crucial element in the optimisation of viable resources for the betterment of humanity. Moreover, these studies underscore the pivotal role of human capital in shaping the productivity levels of an economy (Jaiyeoba, 2015; Lawanson, 2015; Somé *et al.*, 2019; Haini, 2020; Sarpong *et al.*, 2020; Ogbeifun and Shobande, 2021). According to the study by Jaiyeoba (2015), evidence suggests a favourable correlation between investments in human capital development, tertiary education enrolment, and economic growth. Lawanson (2015) conducted a study to examine the impact of education and health components of human capital on economic growth. The study's findings indicated that the education and health components of human capital positively and significantly affected economic growth in the West African region. In their study, Sarpong *et al.* (2020) investigate the impact of health on long-term economic growth within sub-Saharan African (SSA) nations. Their findings reveal that a proportional increase in human capital leads to a corresponding 0.21 percent rise in economic growth. The study by Ogbeifun and Shobande (2021) examines the correlation between human capital accumulation and economic growth, revealing a statistically significant positive association between human capital and economic growth. Additionally, the research outcomes about the impact of human capital development on life expectancy at birth in West Africa indicate that human development exerts a favourable and substantial influence on life expectancy at birth over an extended period. Enhancing human capital development via education and health interventions can extend individuals' lifespans. Furthermore, several additional factors positively contribute to longevity, as indicated by life expectancy at birth over an extended period. These factors encompass enhancements in economic growth, gross fixed capital creation, health expenditure, and the labour force.

The study's main implications are that the human development index, domestic investment (gross fixed capital formation), and government health spending all have positive and significant long-run effects on economic growth. This means that increased human capital development, domestic investment, and health-care spending are all beneficial to economic growth. Fostering domestic investment in a country, according to Ben Yedder *et al.* (2023), boosts job creation, promotes innovation, and increases output and productivity, all of which spur economic growth. Investing in productive assets can improve infrastructure and boost production capacity, resulting in increased productivity and efficiency. Similarly, supporting human capital development is frequently related to improved health and education, both of which can add to productivity; a healthier and more educated population is generally more productive and innovative, fostering economic progress. An increase in government expenditure, according to Keynes (1936), is expected to enhance employment and investment through multiplier effects on aggregate income. According to Aboubacar and Xu (2017), proper and effective health care spending is often seen as vital to economic growth since government health investment adds health infrastructure for illness prevention, helps retain a productive work force, and improves productivity. Intuitively, this study identifies that a healthy and educated population, together with targeted investments in capital formation and healthcare, can provide an ideal environment for sustained economic growth in West African

countries. Nevertheless, the efficacy of these factors is contingent upon how well they are put into practice and other contextual circumstances specific to each nation.

Our findings also innovatively demonstrate that economic growth, HDI, health spending, and the labor force have positive and significant long-term effects on life expectancy at birth. Economic growth frequently leads to higher income levels, which can enhance people's access to basic necessities like food, clean water, and shelter, as well as allow for investments in healthcare infrastructure, resulting in better-equipped hospitals, clinics, and healthcare services. Similarly, countries with higher HDI ratings tend to have better healthcare and educational systems, which can enhance living standards, contribute to better overall well-being and access to healthcare, and influence life expectancy. Furthermore, appropriate health spending enables preventative interventions such as immunization programs, disease surveillance, and public health campaigns, which can lower illness incidence and enhance general health. Increased health spending can result in greater healthcare infrastructure, more medical experts, and easier access to healthcare services. A healthier labor force is more productive in general, resulting in higher economic output (Ben Yedder *et al.*, 2023; Roffia *et al.*, 2023). In essence, increased economic levels in the selected West African countries can translate into better living circumstances, improved access to healthcare, and longer lives. Human capital development and employment also contribute to general well-being by lowering stress and increasing mental health, both of which improve life expectancy.

6. CONCLUSION AND RECOMMENDATIONS

The following conclusion is reached from the findings: West Africa's health performance continues to lag behind many other countries worldwide. This is due to poor life expectancy at birth, which is still lower than in many other countries worldwide. This demonstrates that some West African countries have yet to meet the WHO's suggested 4-6% health spending as a percentage of GDP; some countries still spend less than 4% of their GDP on health, preventing them from meeting the essential health interventions required to approach universal health coverage. Furthermore, human capital development in West Africa has been found to impact economic growth positively. This study supported the notion that cultivating human capital is pivotal in fostering economic progress. The knowledge and skills acquired through education, training, and job experience impact labour productivity.

Furthermore, investment in health tends to increase an individual's labour-market productivity, contributing to economic growth. Furthermore, government spending on health and domestic investment, as measured by gross fixed capital formation, among other things, has the potential to boost West African economic growth. Increasing domestic investment creates jobs and improves well-being and productivity, promoting economic growth. Aside from human capital development, other important drivers of West African life expectancy and economic growth include labour force participation, gross fixed capital formation (a measure of domestic investment), and public health spending. According to the conclusions of this study, the government and stakeholders in West African countries need to enhance budgetary allocations for health and education to attain universal health coverage while strengthening the educational system. Furthermore, efforts should be increased to increase domestic investment in locally produced goods to reduce the number of imported goods significantly and encourage local consumption to stimulate employment; this will improve people's welfare, thereby increasing life expectancy, productivity, and economic growth.

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References

Aboubacar, B., & Xu, D. (2017). The impact of health expenditure on the economic growth in Sub-Saharan Africa. *Theoretical Economics Letters, 7*(3), 615-622. http://dx.doi.org/10.4236/tel.2017.73046

Acemoglu, D., & Johnson, S. (2007). Disease and development: The effect of life expectancy on economic growth. *Journal of Political Economy, 115*(6), 925-985. http://dx.doi.org/10.1086/529000

Adenuga, O., & Ibiyemi, A. (2012). An assessment of the maintenance of public hospital buildings in Southwest Nigeria. *Construction Economics and Building, 9*(2), 51-60. http://dx.doi.org/10.5130/AJCEB.v9i2.3021

Adeyemi, P. A., & Ogunsola, A. J. (2016). The impact of human capital development on economic growth in Nigeria: ARDL approach. *IOSR Journal Of Humanities And Social Science, 21*(3), 1-7. http://dx.doi.org/10.9790/0837-2103040107

Adjei-Mensah, S. (2023). Factors Influencing Brain Drain Among Health Workers in Ghana. *European Journal of Human Resource, 7*(1), 17-30. http://dx.doi.org/10.47672/ejh.1349

Akinlo, T., & Oyeleke, O. J. (2020). Human capital formation and economic growth in Sub-Saharan African countries: An empirical investigation. *The Indian Economic Journal, 68*(2), 249-268. http://dx.doi.org/10.1177/0019466220972848

Akpolat, A. G. (2014). The long-term impact of human capital investment on GDP: A panel cointegrated regression analysis. *Economic Research International, 2014*, 1-10. http://dx.doi.org/10.1155/2014/646518

Anyanwu, J. C., & Erhijakpor, A. E. O. (2009). Health expenditures and health outcomes in Africa. *African Development Review, 21*(2), 400-433. http://dx.doi.org/10.1111/j.1467-8268.2009.00215.x

Awoyemi, B. O., & Olaniyan, O. (2021). The effects of market concentration on health care price and quality in hospital markets in Ibadan, Nigeria. *Journal of Market Access & Health Policy, 9*(1), 1938895. http://dx.doi.org/10.1080/20016689.2021.1938895

Awoyemi, O. B., & Nwibe, D. A. (2022). A causal assessment of Nigeria's crude oil revenue, health expenditure, and economic growth. *International Journal of Energy Economics and Policy, 12*(5), 420-424. http://dx.doi.org/10.32479/ijeep.13318

Baah-Boateng, W. (2013). Human Capital Development: The Case of Education as a Vehicle for Africa's Economic Transformation. *Legon Journal of International Affairs and Diplomacy, 7*(1), 1-24.

Ben Yedder, N., El Weriemmi, M., & Bakari, S. (2023). The Impact of Domestic Investment and Trade on Economic Growth in North Africa Countries: New Evidence from Panel CS-ARDL Model. *Munich Personal RePEc Archive, 117956*.

Bloom, D. E., Canning, D., Kotschy, R., Prettner, K., & Schünemann, J. J. (2019). *Health and economic growth: reconciling the micro and macro evidence*. (26003). Cambridge.

Bloom, D. E., Kuhn, M., & Prettner, K. (2018). *Health and economic growth*. (11939). Bonn, Germany.

Chikwe, C. K., Ogidi, R. C., & Nwachukwu, K. (2015). Challenges of Research and Human Capital Development in Nigeria. *Journal of Education and Practice, 6*(28), 44-47.

Danaeefard, H., & Babashahi, J. (2021). How Does Human Capital of the Public Sector Affect National Well-being? *Iranian Journal of Management Studies, 14*(3), 469-486.

Dao, T. B., & Khuc, V. Q. (2023). The Impact of Openness on Human Capital: A Study of Countries by the Level of Development. *Economies, 11*(7), 1-13. Retrieved from http://dx.doi.org/10.3390/economies11070175

Eggoh, J., Houeninvo, H., & Sossou, G.-A. (2015). Education, health and economic growth in African countries. *Journal of Economic Development, 40*(1), 93-111. http://dx.doi.org/10.35866/caujed.2015.40.1.004

Fagbemi, F., Osinubi, T. T., Nzeribe, G. E., & Bankole, T. O. (2022). Human Capital Development Challenge: Why Corruption Eradication is a Panacea in Nigeria. *Journal of Development Policy and Practice, 7*(2), 180-205. http://dx.doi.org/10.1177/24551333221090312

Goldin, C. D. (2016). Human capital *Handbook of Cliometrics*. Berlin Heidelberg: Springer Verlag. http://dx.doi.org/10.1007/978-3-642-40406-1_23

Gumbau Albert, M. (2021). The impact of health status and human capital formation on regional performance: Empirical evidence. *Papers in Regional Science, 100*(1), 123-140. http://dx.doi.org/10.1111/pirs.12561

Haini, H. (2020). Spatial spillover effects of public health and education expenditures on economic growth: Evidence from China's provinces. *Post-Communist Economies, 32*(8), 1111-1128. http://dx.doi.org/10.1080/14631377.2020.1722586

Howitt, P. (2005). Health, human capital and economic growth: a Schumpeterian perspective. *Health and Economic Growth: Findings and Policy Implications*, 19-40.

Hu, G. G., & Yao, L. P. (2021). Do Human Capital Investment and Technological Innovation Have a Permanent Effect on Population Health? An Asymmetric Analysis of BRICS Economies. *Frontiers in Public Health, 9*, 723557. http://dx.doi.org/10.3389/fpubh.2021.723557

Jaiyeoba, S. V. (2015). Human capital investment and economic growth in Nigeria. *African Research Review, 9*(1), 30-46. http://dx.doi.org/10.4314/afrrev.v9i1.4

Keji, S. A. (2021). Human capital and economic growth in Nigeria. *Future Business Journal, 7*(1), 1-8. http://dx.doi.org/10.1186/s43093-021-00095-4

Keynes, J. M. (1936). *The general theory of employment, interest and money*. London: Macmillan: Macmillan.

Khan, R., & Chaudhry, I. S. (2019). Impact of human capital on employment and economic growth in developing countries. *Review of Economics and Development Studies, 5*(3), 487-496. http://dx.doi.org/10.26710/reads.v5i3.701

Kia, F., Ghaffari, F., Hashemi, A., & Tavakoli, N. (2021). Presenting a human capital development model in the country's health economy system. *Majallah-i Ulum-i Pizishki-i Razi, 28*(3), 59-67.

Kojo Edeme, R., Emecheta, C., & Omeje, M. O. (2017). Public health expenditure and health outcomes in Nigeria. *American Journal of Biomedical and Life Sciences, 5*(5), 96-102. http://dx.doi.org/10.11648/j.ajbls.20170505.13

Lawanson, A. O. (2015). Economic growth experience of West African region: Does human capital matter. *International Journal of Business and Social Science, 6*(12), 127-137.

Li, H., & Huang, L. (2009). Health, education and economic growth in China: Empirical findings and implications. *China Economic Review, 20*(3), 374-387. http://dx.doi.org/10.1016/j.chieco.2008.05.001

Mulia, R. A., & Saputra, N. (2021). Systematic Literature Review: Determination of Government Policy in Health and Education Development for Improved Human Capital. *Jurnal EL-RIYASAH, 12*(1), 92-107.

Narayan, S., Narayan, P. K., & Mishra, S. (2010). Investigating the relationship between health and economic growth: Empirical evidence from a panel of 5 Asian countries. *Journal of Asian Economics, 21*(4), 404-411. http://dx.doi.org/10.1016/j.asieco.2010.03.006

Ogbeifun, L., & Shobande, O. A. (2021). A reevaluation of human capital accumulation and economic growth in OECD. *Journal of Public Affairs, 22*(4), e2602. http://dx.doi.org/10.1002/pa.2602

Onah, C. K., Azuogu, B. N., Ochie, C. N., Akpa, C. O., Okeke, K. C., Okpunwa, A. O., . . . Ugwu, G. O. (2022). Physician emigration from Nigeria and the associated factors: The implications to safeguarding the Nigeria health system. *Human Resources for Health, 20*(1), 85. http://dx.doi.org/10.1186/s12960-022-00788-z

Ponzetto, G. A., & Troiano, U. (2018). *Social capital, government expenditures and growth*. (24533).

Roffia, P., Bucciol, A., & Hashlamoun, S. (2023). Determinants of life expectancy at birth: A longitudinal study on OECD countries. *International Journal of Health Economics and Management, 23*(2), 189-212. http://dx.doi.org/10.1007/s10754-022-09338-5

Sarpong, B., Nketiah-Amponsah, E., & Owoo, N. S. (2020). Health and economic growth nexus: Evidence from selected sub-Saharan African (SSA) countries. *Global Business Review, 21*(2), 328-347. http://dx.doi.org/10.1177/0972150918778966

Shuaibu, M., & Popoola, O. T. (2016). Determinants of human capital development in Africa: A panel data analysis. *Oeconomia Copernicana, 7*(4), 523-549. http://dx.doi.org/10.12775/OeC.2016.030

Somé, J., Pasali, S., & Kaboine, M. (2019). Exploring the impact of healthcare on economic growth in Africa. *Applied Economics and Finance, 6*(3), 45-57. http://dx.doi.org/10.11114/aef.v6i3.4110

UNDP. (2022). *Human Development Report 2021/2022*. Retrieved from New York, USA: https://reliefweb.int/report/world/human-development-report-20212022-uncertain-times-unsettled-lives-shaping-our-future-transforming-world-enruzh?gad_source=1&gclid=CjwKCAjw17qvBhBrEiwA1rU9wx5y33e1ZBnCgDPC98QWVTkH1KpkX0RIZ8WLb1UupKdpfopWt9kBHRoCt0cQAvD_BwE

UNESCO. (2021). UNESCO Member States unite to increase investment in education Retrieved from https://www.unesco.org/en/articles/unesco-member-states-unite-increase-investment-education

Valero, A. (2021). *Education and Economic Growth*. (1764).

WDI. (2023). World development indicators. https://databank.worldbank.org/source/world-development-indicators

World Bank. (2023). Human Capital-Led Economic Growth in Africa: A Focus on Learning and Skills. Retrieved from https://www.worldbank.org/en/news/video/2023/08/08/human-capital-led-economic-growth-in-africa-a-focus-on-learning-and-skills