HUMAN CAPITAL DEVELOPMENT AND ECONOMIC GROWTH NEXUS IN NIGERIA

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Abstract
This study examines human capital development and economic growth nexus in Nigerian using a secondary time series data. The study applied an econometric regression technique of the Ordinary Least Square (OLS) to ascertain the effect of macroeconomic growth induced variables on human capital development in Nigeria. Our findings from the cointegrating regression result test suggest that there is a strong evidence of cointegration between dependent variable (HCD) and the independent Variables. Also the study revealed a long-run causal relationship between dependent variable (HCD) and the independent Variables. It could be observed from our findings that the relationship between some of the variables like TGE, TEE, THE, and FDI and human capital development is positive while that of LEI is negative. This means that TGE, TEE, THE, and FDI have direct relationships with human capital development. In other words, an increase in TGE, TEE, THE, and FDI will results to a rise in human capital development whereas an increase in LEI will probably result in a fall in human capital development. In addition, the results show that TGE, TEE, THE, and FDI have statistical significance on human capital development in Nigeria while LEI is statistically insignificance on human capital development. This study therefore recommends that the government should give educational grants, provide vocational training, provide basic health facilities; enhance the competitiveness of the economy. This will avail the country the enhanced entrepreneurial creativity, a suitable, competent, healthy and educated labor force to contribute meaningfully to national development. The government should make adequate budget for education in line with the UNESCO recommendation. This will help facilitate proper administration of financial revenues and other school resources. There is the need for increased government funding for health care. The will help reduce the challenges in healthcare and the increasing medical tourism outside the country and consequently enhance the countries life expectancy. The government should create a secured and business friendly environment to help attract FDI in the country.
Key Words: *Total Government Expenditure, Recurrent and Capital Expenditure, Education Expenditure, Health Expenditure, Life Expectancy Index, Foreign Direct Investment*

Introduction

The role of human capital in the productive processes of any nation cannot be overstated. It is seen as the most vital component in the socio-economic development of modern nations and so Nigeria and other developing nations seeking rapid advancement and economic growth cannot afford to toil with it (Adelakun, 2011). The developed nations are so because they boast of a robust human capital formation that is highly educated, skillful, technology driven and healthy. Attesting to this, studies have proven that the differences observed in the levels of socio-economic development across nations is largely due to the caliber of human capital possessed by nations rather than the natural endowments of land, mineral resources, capital e.t.c possessed by them (Adeyemi, & Ogunsola, 2016; Afridi, 2016; Akaakohol & Ijirshar, 2018). Human resources are critical to produce economic value for driving sustainable national development, therefore, investment in human capital is a vital means of increasing and sustaining a nation's competitiveness, improving the quality of life of the citizens and boosting economic growth (Raymond, & Ekponaanuadum, 2021;Tiganasu, Pascariu & Lupu, 2022).

To commit to human capital formation requires good educational system, training and well-funded health care system. What this means is that government must be ready to spend a substantial amount of its earnings on education to derive the quality of education to impart the needed skills, knowledge and abilities on her citizens (Adewumi & Enebe, 2019; Ndiyo, 2008); encourage all stakeholders to adequately train their workforces to keep them abreast of latest technologies; upgrade and maintain a sound health sector to improve and sustain welfare and health of workers and citizens alike as only healthy workers can be highly productive, and maintain an economic structure that enables her citizen to be hardworking and productive. To revitalize Nigeria's ailing economy, government must deploy the nation's abundant natural and human resources to be the driving force behind economic progress. Policy makers should at this time be preoccupied with how to create knowledge-based sectors that will lead to a multiplicity of knowledge-based workers fit for the 21st century. Bachama, Hassan, and Ibrahim (2021) cited in Awogbemi (2023) stated that the major concerns of stakeholders and policy formulators is how investing in education can ostensibly impact per capital income. It is also stated in the literature that knowledge has inverse relationship with poverty as it increases productivity of human capital (Adawo, 2011). Thus, it is essential for growing any economy. Likewise, spending to provide health care service to the people leads to a healthy society and a healthy society is a factor for high productivity. Nigeria's expenditures on education and health have reportedly been low, and a far cry from what the UN proposed (Saidu & Ibrahim, 2019). This is evident in the poor healthcare system to the poor educational establishments in every part of the country. This is despite the fact that in today's world, there is a huge reliance on the human capital component of the production system and the need to continuously develop this component to bring about skilled, effective and knowledge driven individuals to contribute effectively to nation building which impacts on economic growth.

Statement of the Problem

Nigeria's drive to economic growth has faced a lot of challenges. Inability to develop the right human resource capital may be a significant contributor. The rate of illiteracy is high in the country and most of her workers are unskilled and bereft of sophisticated technology needed for today's modern world. World Bank in 2004 recorded that Nigerian government expenditure on education was only 0.9% of the GNP in 2002 (World Bank, 2004). The United Nations Development Programme (UNDP, 2010) record of Human Development Index (HDI) for Nigeria rated her **among countries with the lowest human development.** Studies have equally revealed that the socio-economic development of a country is associated with the preservation and enhancement of human capital through the provision of public health services to ensure the development of the country's full potentials. Health they say is wealth and so leaders of many countries understand that investing in health will lead to return on investment in the long run. Inability of Nigeria to achieve economic growth is often linked to her inability to fund critical sectors of the economy such as education and health to develop her human capital. Her weak funding of infrastructural development with regards to these two vital sectors have often led to incessant strikes amid decay in the systems, shortages of qualified and skilled personnel and spread of poverty. As observed in the developed economies, these sectors have largely been responsible for the impressive economies of these countries, thus necessitating that Nigeria needs to undertake a critical assessment of her sectorial allocations to various sectors if any meaning growth is to be achieved with the economy. This is important because she is unable to fully exploit the abilities and skills of human capital after training due to lack of jobs to accommodate them leading to mass unemployment and brain drain and ultimately poverty. These issues beget the mind and so this

study aims to investigate impact of human capital development on the growth of Nigerian economy.

Objective of the Study

The general objective of the study is to examine human capital development and economic growth nexus in Nigerian**.** Specifically, the study intends to:

i. Examine the effect of total government expenditure on human capital development in Nigeria.
ii. Assess the effect of total education expenditure on human capital development in Nigeria.
iii. Determine the effect of total health expenditure on human capital development in Nigeria.
iv. Ascertain the effect of life expectancy index on human capital development in Nigeria.
v. Examine the effect of foreign direct investment on human capital development in Nigeria.

Statement of Hypotheses

Ho_1: Total government expenditure has no significant effect on human capital development in Nigeria.

Ho_2: Total education expenditure has no significant effect on human capital development in Nigeria.

Ho_3: Total health expenditure has no significant effect on human capital development in Nigeria.

Ho_4: Life expectancy index has no significant effect on human capital development in Nigeria.

Ho_5: Foreign direct investment has no significant effect on human capital development in Nigeria.

Methodology

Model Specification

To achieve a robust result in the context of the Nigerian environment, the augmented Solow human-capital-growth model would be modified to take an additional variable. This is, total government expenditure (TGE) compromising both the recurrent and capital expenditure, total education expenditure (TEE), total health expenditure (THE), life expectancy index (LEI) and foreign direct investment (FDI). This additional variable is necessary because the development and growth of the economic sector is one major way of achieving the human capital development. Hence, human capital development (HCD) will be measured and used as a proxy to Education Index (EDI) in this model.

Thus, the model for research study is stated as follows:

The functional form of the model is:

$$EDI = f(TGE, TEE, THE, LEI, FDI) \quad \ldots\ldots\ldots\

It is measured by the adult literacy rate (with two-weighing) and the combined primary, secondary and tertiary gross enrollment ratio (GER) (with one-third weighing). The adult literacy rate gives an indication of the ability to read and write, while the GER gives an indication of the level of education from kindergarten to postgraduate education.

Education is a major component of well-being and is used in the measure of economic development and quality of life which is a key factor determining whether a country is a developed, developing or underdeveloped country.

2. Total Government Expenditure (TGE):

Total Government Expenditure or spending includes all government consumption, investment and transfer payments. It is spending by the government sector including both the purchase of final goods and services, or gross domestic product, and transfer payments.

Government expenditures are used by the government sector to undertake key functions, such as national defense and education. These expenditures are financed with a combination of taxes and borrowing.

3. ***Total Education Expenditure (TEE):***

Government expenditure on education refer to expenditure on all levels of education, such as pre-school, primary, secondary, university and technical and further education (TAFE), by the general government sector. It excludes expenditure on courses provided by non-educational institutions, such as the vocational training programs of private businesses.

Public education expenditure includes government spending on educational institutions (both public private), education administration, and subsidies for private entities (students/households and other private's entities).

4. Total Health Expenditure (THE):

Government health expenditure consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from International agencies and non-governmental organisations), and social (compulsory) health insurance funds.

General government (excluding social security) expenditure on health refers to expenditures incurred by central, state or regional and local government authorities, excluding social security schemes. Included is non-market, non-profit institutions that are controlled and mainly financed by government units.

5. Life Expectancy Index (LEI):

It is the most commonly used measure to describe population health. Life expectancy measures how long, on average, a person is expected to live base on current age and sex-specific death rate. It is often expressed as the number of years of life a person born today is expected to live.

It summarises the mortality pattern that prevails across all age groups in a given year – children and adolescents, adults and the elderly.

6. Foreign Direct Investment (FDI):

Primarily FDI involves a multinational firm investing directly outside its home country, in other words when a multinational firm leaves its country of origin and invests in another country probably for the reasons of market expansion or market exploitation is seen as FDI.

This is the inflow of foreign income into a particular economy through investment which involves Multinational Corporation. The variables were chosen based on assumption that it is the direct indicator of growth in the economy.

7. Stochastic Error Term (μ):

The disturbance term or white noise, as sometimes called, captures all those determinants of economic growth/ human capital development that are not explicitly taken into account in the model. It is random variable that has well defined probabilistic properties.

Technique for Data Estimation

The economic technique employed in the study is the ordinary least square (OLS). This is because the OLS computational procedure is fairly simple a best linear estimator among all unbiased estimation, efficient and shown to have the smallest (minimum variance) thus, it become the best linear unbiased estimator (BLUE) in the classical linear regression (CLR) model. Basic assumptions of the OLS are related to the forms of the relationship among the distribution of the random variance (μ_i). It is used exclusively to estimate the unknown parameters of a linear regression model. The Economic views (E-views) software will also be adopted for regression analysis.

Evaluation of Estimates

The estimates obtained from the model shall be evaluated using three (3) criteria. The three (3) criteria include:

1. The Economic a priori criteria.
2. The Statistical Criteria: First Order Test
3. The Econometric Criteria: Second Order Test

Evaluation Based on Economic A Priori Criteria

This could be carried out to show whether each regressor in the model is comparable with the postulations of economic theory; i.e., if the sign and size of the parameters of the economic relationships follow with the expectation of the economic theory.

Table 1: A priori expectation

Parameters	Variables		Expected Relationships	Expected Coefficients
	Regressand	Regressor		
β_1	EDI	TGE	+	$\beta_1 > 0$
β_2	EDI	TEE	+	$\beta_2 > 0$
β_3	EDI	THE	+	$\beta_3 > 0$
β_4	EDI	LEI	+	$\beta_4 > 0$
β_5	EDI	FDI	+	$\beta_5 > 0$

Source: Authors compilation

Evaluation Based on Statistical Criteria: First Order Test

This is otherwise known as first order test, is carried out to show the statistical reliability of the estimated parameters of the model. In the model, the tools of t-statistic, F- statistic, Standard Error (SE), as well as the Coefficient of Determination (R^2) are used.

Student t-statistic (T-test)

The ***t-statistic*** is used to determine the reliability and statistical significance of each variables coefficient. The calculated t is compared with the table t-value and if the calculated t- value is greater than the table t-value, the coefficient is statistically significant; otherwise, it is not statistically significant.

F-statistic test (F-test)

The ***F-statistic test*** if there is significant impact between the dependent and independent variables. If the calculated F value is greater than the tabulated F value, there is significant impact between the dependent and independent variables; otherwise, there is no significant impact.

Standard Error Test (S.E)

The ***Standard Error Test*** is used to test if the regression coefficients of the explanatory variables are statistically significant, individually (different from zero). The precision or reliability of estimates (i.e., the intercepts and scopes) would also be measured by the Standard Error.

Coefficient of Determination (R^2)

The R^2 is a measure of goodness of fit and is used to judge the explanatory power of the explanatory variables i.e. the independent variables on the dependent variable. It denotes the percentage of variations in the independent variables. The higher the R^2 the more the model is able to explain the changes in the dependent variable.

Evaluation based on Econometric Criteria: Second Order Test

This aims at investigating whether the assumption of the econometric method employed are satisfied or not. It determines the reliability of the statistical criteria and establishes whether the estimates have the desirable properties of unbiasedness and consistency. It also tests the validity of non-autocorrelation disturbances. In the model, Durbin-Watson (DW), unit root test, co-integration test are used to test for:

i. Autocorrelation
ii. Multicolinearity
iii. Heteroscedasticity.

Stationarity (Unit Root) Test:

The importance of this test cannot be overemphasized since the data to be used in the estimation are time-series data. In order not to run a spurious regression, it is worthwhile to carry out a stationary test to make sure that all the variables are mean reverting that is, they have constant mean, constant variance and constant covariance. In other words, that they are stationary. The Augmented Dickey-Fuller (ADF) test would be used for this analysis since it adjusts for serial correlation.

Decision Rule: If the ADF test statistic is greater than the MacKinnon critical value at 5% (all in absolute term), the variable is said to be stationary. Otherwise it is non stationary.

Cointegration test:

Econometrically speaking, two variables will be cointegrated if they have a long-term, or equilibrium relationship between them. Cointegration can be thought of as a pre-test to avoid spurious regressions situations (Granger, 1986:226). As recommended by Gujarati (2004), the ADF test statistic will be employed on the residual.

Decision Rule: if the ADF test statistic is greater than the critical value at 5%, then the variables are cointegrated (values are checked in absolute term)

Test for Autocorrelation

The Durbin-Watson (DW) test is appropriate for the test of First-order autocorrelation and it has the following criteria.

1. If d* is approximately equal to 2 (d* =2), we accept that there is no autocorrelation in the function.
2. If d*= 0, there exist perfect positive auto-correlation. In this case, if 0<d*< 2, that is, if d* is less than two but greater than zero, it denotes that there is some degree of positive autocorrelation, which is stronger the closer d* is to zero.
3. If d* is equal to 4 (d*=4), there exist a perfect negative autocorrelation, while if d* is less than four but greater than two (2<d*< 4), it means that there exist some degree of negative autocorrelation, which is stronger the higher the value of d*.

Hence, we employ the Heteroscedasticity Autocorrelation Correction (HAC) to remove its influence in the model

Test for multicolinearity:

This means the existence of an exact linear relationship among the explanatory variable of a regression model. It is use to determine whether there is a correlation among variables.

Decision Rule: From the rule of Thumb, if correlation coefficient is greater than 0.8, we conclude that there is multicolinearity but if the coefficient is less than 0.8 there is no multicolinearity.

Test for heteroscedasticity:

The essence of this test is to see whether the error variance of each observation is constant or not. Non-constant variance can cause the estimated model to yield a biased result. White's General Heteroscedasticity test would be adopted for this purpose.

Decision Rule: We reject H_0 if $F_{cal} > F_{tab}$ at 5% critical value. Or alternatively, we reject H_0 if $n.R^2 > x^2$ tab at 5% critical value.

Decision Rule for Testing of Hypothesis

The above stated hypothesis will be tested at 0.05 levels

The probability at which the t-value is significant will be the chosen level of significance (0.05).

- If the probability (Sig) > 0.05, the null hypothesis will be accepted and the alternate hypothesis, rejected.
- If the probability (Sig) < 0.05, the null hypothesis and the alternate hypothesis, accepted.

Empirical Results and Analysis

Unit Root Test

The Augmented Dickey-Fuller (ADF) test for unit roots was conducted for all the time series employed for the study. The ADF results in Table 2 show that TGE and LEI are stationary in their levels, that is, *I*(0). However, EDI, TEE, THE and FDI are stationary at their first differences, that is, they are *I*(1). Since the ADF value of each of these variables are greater than the 5% critical value, they are all stationary at levels (TGE and LEI) and at first differences (EDI, TEE, THE, and LEI).

The result of the regression is presented in appendix A and the summary in table 2 below.

Table 2: Summary of ADF Test

Variables	ADF Statistics	Lagged difference	5% Critical Value	Order of Integration
EDI	-5.734749	1	-2.960411	*I*(1)
TGE	5.615625	1	-2.957110	*I*(0)
TEE	-5.494965	1	-2.963972	*I*(1)
THE	-4.559649	1	-2.960411	*I*(1)
LEI	-5.191800	1	-2.957110	*I*(0)
FDI	-4.093346	1	-2.960411	*I*(1)

Source: Authors computation

Cointegration Test

Having substantiated that all the variables in our model are stationary from ADF tests, we proceed to present the result of the Johansen co-integration test. The co-integration tests for our model are based on the assumption of a linear deterministic trend in the data; also the assumption which allows for intercept but no trend in co-integration equation is used. The results of our co-integration test are presented in appendix B and the summary shown in the table 3 below.

Table 3: Summary of Johansen Co-integration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.844741	144.5089	95.75366	0.0000
At most 1 *	0.764324	86.76653	69.81889	0.0012
At most 2	0.553320	41.96226	47.85613	0.1598
At most 3	0.311392	16.97899	29.79707	0.6416
At most 4	0.133677	5.413428	15.49471	0.7634
At most 5	0.030650	0.965004	3.841466	0.3259

Source: Authors computation

From table 3 above, the result of the co integration test shows that the Trace test indicates two cointegration variables at 0.05 significant levels. The implication of this result is a long run relationship between human capital development and other variables used in the model.

Estimated Model

Having verified the existence of long-run relationships among the variables in our model, we therefore, subject the model to ordinary least square (OLS) and also the Newey-West method to generate the coefficients of the parameters of our regression model. The result is summarized as follows:

Table 4: summary of regression results

Dependent Variable: EDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.367428	0.907654	7.015259	0.0000
TGE	3.17E-07	2.38E-07	2.334692	0.1931

TEE	6.19E-09	7.27E-07	2.058513	0.9933
THE	7.54E-06	2.18E-06	3.458606	0.0018
LEI	-1.055593	2.308513	-0.457261	0.6511
FDI	1.69E-05	5.90E-06	2.869689	0.0079

R-squared	0.684794	F-statistic	11.73167
Adjusted R-squared	0.626423	Prob(F-statistic)	0.000004
S.E. of regression	0.900384	Durbin-Watson stat	0.322345

Source: *Authors computation*

Discussions of Findings

Economic A Priori Test

From table 4, it is observed that the regression line have a positive intercept as presented by the constant (α_0) = 6.367428. This means that if all the variables are hold constant (zero), human capital will be valued at 6.367428. Thus, the a-priori expectation is that the intercept could be positive or negative.

From the regression analysis it is observed that all the variables conform to the a priori expectation except Life Expectancy Index, which implies that they all have a positive relationship with human capital development except life expectancy index which has a negative relationship with human capital development. This means that if TGE, TEE, THE and FDI are increasing, human capital development will be increasing and vice versa. The same applies to LEI, which means that if LEI is increasing, HCD will be decreasing.

Table 5: Summary of a priori test

Parameters	**Variables**		**Relationships**		**Remarks**
	Regressand	**Regressor**	**Expected**	**Observed**	
β_1	EDI	TGE	+	+	Conform
β_2	EDI	TEE	+	+	Conform
β_3	EDI	THE	+	+	Conform
β_4	EDI	LEI	+	-	Does not conform
β_5	EDI	FDI	+	+	Conform

Source: Authors compilation

Statistical Test

This subsection applies the R^2, adjusted R^2, the S.E, the t–test and the f–test to determine the statistical reliability of the estimated parameters. These tests are performed as follows:

The coefficient of determination (R^2)*:*

From our regression result, the R^2 is given as 0.684794. This implies that 68.48% of the variations in the growth of the TGE, TEE, THE, LEI and FDI is being accounted for or explained by the variations in Human Capital Development.

While other determinants of human capital development not captured in the model explain just 31.52% of the variation in economic growth in Nigeria.

The Adjusted R^2

The Adjusted R^2 supports the claim of the R^2 with a value of 0.626423 indicating that 62.64% of the total variation in the dependent variable (Human Capital Development proxied by Education Index (EDI)) is explained by the independent variables (the regressors). Thus, this supports the statement that the explanatory power of the variables is high and strong.

Standard Error Test

The standard errors for the five explanatory variables were all low. The low values of the standard errors in the result show that some level of confidence can be placed on the estimates.

The F-statistic

The F-test is applied to check the overall significance of the model.

Where k-1 = 6-1 (***Hint***: k is the number of parameters i.e. 6)

= 5

Degree of freedom (d.f) = n-k

Where n (number of observation) = 32

And k (number of parameters) = 6

Thus, d.f = 32-6 = 26

Therefore,

$F_{0.05(5,26)} = 2.21$ (from the F table) ……. F-table

F-statistic = 11.73167 (from the regression result) ….. F-calculated

Since the F-calculated > F-table, we reject H_0 and accept H_1 that the model has goodness of fit and is statistically different from zero. In other words, there is significant impact between the dependent and independent variables in the model.

T-statistic

Here, we compare the estimated or calculated t-statistic with the tabulated t-statistic at $t_{\alpha/2} = t_{0.025} = t_{0.025}$ (two-tailed test).

Degree of freedom (d.f) = n-k

= 32-6

= 26

So, we have:

$T_{0.025(26)}$ = 2.056 ….. Tabulated t-statistic

Table 5: summary of t-test

Variable	t-calculated (t_{cal})	t-tabulated ($t_{\alpha/2}$)	Conclusion
Constant	7.015259	2.056	Statistically Significant
TGE	2.334692	2.056	Statistically Significant
TEE	2.058513	2.056	Statistically Significant
THE	3.458606	2.056	Statistically Significant
LEI	-0.457261	2.056	Statistically Significant
FDI	2.869689	2.056	Statistically Significant

Source: Authors computation

From table 5, the ***t-test*** result is interpreted below;

For TGE, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis, which means that TGE do have significant effect on HCD.

For TEE, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis, this means that TEE do have a significant impact on HCD.

For THE, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis.
For LEI, $t_{\alpha/2} > t_{cal}$, therefore we accept the null hypothesis and reject the alternative hypothesis. This means that LEI do not have significant effect on HCD.
For FDI, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. It indicates that FDI have a significance effect on HCD.

Econometric Test

In this subsection, the following econometric tests are used to evaluate the result obtained from our model: autocorrelation, multicolinearity and heteroscedasticity.

Autocorrelation test

Using Durbin-Watson (DW) statistic which we obtain from our regression result in appendix C, it is observed that DW statistic is 0.322345 or 0.32%, which indicate the absence of autocorrelation in the series so that the model is reliable for predications.

Multicolinearity test

This means the existence of an exact linear relationship among the explanatory variable of a regression model.

Table 6: Correlation Matrix Result

	TGE	TEE	THE	LEI	FDI
TGE	1.000000	0.912659	0.922535	0.301393	0.451042
TEE	0.912659	1.000000	0.877555	0.198195	0.370402
THE	0.922535	0.877555	1.000000	0.389084	0.403010
LEI	0.301393	0.198195	0.389084	1.000000	0.186886
FDI	0.451042	0.370402	0.403010	0.186886	1.000000

Source: Authors computation

If correlation coefficient is greater than 0.8, we conclude that there is multicolinearity but if the coefficient is less than 0.8 there is no multicolinearity.
From table 6, there is multicolinearity between

a. TGE and TEE
b. TGE and THE
c. TEE and THE

Heteroscedasticity Test

This test is conducted using the white's general heteroscedascity test.
Hypothesis testing: $H_0: \beta_0 = \beta_1 = \beta_2 = \beta_3 = 0$ (homoscedastic)
$H_1: \beta_0 = \beta_1 = \beta_2 = \beta_3 \neq 0$ (heteroscedastic)

From Appendix D, we observe that the probability of F- statistic of the white test is 0.3164. Since the probability of F- test is greater than the 0.05 significance level, we reject the null hypothesis that there is heteroscedasticity in the residuals. This goes to say that the residuals of our estimated model do have a constant variance (homoscedastic). This finding has some adverse implications. Amongst these is the bias that heteroscedasticity may create in the standard errors and t-values, hence leading to erroneous inferential decisions. To circumvent this, we employed the Newey-West method. This crucial technique produces Heteroscedasticity and Autocorrelation Consistent (HAC) standard errors. Therefore, notwithstanding the presence of heteroscedasticity in the

residuals of our estimated model, our inferences remain untainted, since the Newey-West method has neutralized the consequences of heteroscedasticity on the standard errors.

Conclusions and Policy Recommendations

The aim of this study is to determine the effect of human capital development on economic growth in Nigeria. Our findings from the cointegrating regression result test suggest that there is a strong evidence of cointegration between dependent variable (HCD) and the independent Variables. Also the study revealed a long-run causal relationship between dependent variable (HCD) and the independent Variables. The high level of human capital development has increased the utilization of resources both human and material and as expected, there has been a multiplier effect that has led to economic growth in Nigeria. As a result, a high sense of optimism has emerged concerning the benefits of increased continuous development of human skills and abilities.

It could be observed from our findings that the relationship between some of the variables like TGE, TEE, THE, and FDI and human capital development is positive while that of LEI is negative. This means that TGE, TEE, THE, and FDI have direct relationships with human capital development. In other words, an increase in TGE, TEE, THE, and FDI will result to a rise in human capital development whereas an increase in LEI will probably result in a fall in human capital development. In addition, the results show that TGE, TEE, THE, and FDI have statistical significance on human capital development in Nigeria while LEI is statistically insignificance on human capital development. This study therefore recommends that the government should give educational grants, provide vocational training, provide basic health facilities; enhance the competitiveness of the economy. This will avail the country the enhanced entrepreneurial creativity, a suitable, competent, healthy and educated labor force to contribute meaningfully to national development. The government should make adequate budget for education in line with the UNESCO recommendation. This will help facilitate proper administration of financial revenues and other school resources. There is the need for increased government funding for health care. The will help reduce the challenges in healthcare and the increasing medical tourism outside the country and consequently enhance the countries life expectancy. The government should create a secured and business friendly environment to help attract FDI in the country.

References

Adawo, M.A. (2011). Has education (human capital) contributed to the economic growth of Nigeria? *Journal of Economics and International Finance*, 3(1), 46-58.

Adelakun, O. J. (2011). Human capital development and economic growth in Nigeria. European Journal of Business and Management, 3(9), 29-38.

Adewumi, S. B. & Enebe, N. B. (2019). Government educational expenditure and human capital development in West African countries. *International Journal of Research and Innovation in Social Science (IJRISS)* Volume III, Issue VI.

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.

Afridi, A. H. (2016). Human capital and economic growth of Pakistan. Business & Economic Review, 8(1), 77-86. http://www.bereview.pk/ index.php/ BER/article/view/109

Akaakohol, B. M., & Ijirshar, V. U. (2018). Human capital development and economic growth in Nigeria. Lafia Journal of Economics and Management Sciences, 3 (1), 95 – 116

Awogbemi, T. O. (2023). Human capital development and Nigeria's economic growth. *Journal of Public Administration, Finance and Law*. 67-76

Ndiyo (2008) "The Paradox of Education and Economic Growth in Nigeria: An Empirical Evidence" NES Proceedings

Raymond M., & Ekponaanuadum N. (2021), Human capital development and economic development in Nigeria. African Journal of Economics and Sustainable Development, 4(1), 32-44.

Saidu, I. E., & Ibrahim, A. (2019). Impact of Public Capital Expenditure on Economic Growth in Nigeria. Lapai Journal of Economics, 3(1), 169-177.

Tiganasu, R., Pascariu, G., & Lupu, D. (2022). Competitiveness, fiscal policy and corruption: evidence from Central and Eastern European countries. Oeconomia Copernicana, 13(3), 667-698.

United Nations Development Programme (2010). *Summary: Human Development Report Nigeria.* Abuja: UNDP, 2009-2010.

World Bank (2004). World Bank Development Indicator Nigeria. Data retrieved from https://data.worldbank.org/country