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Human capital development and poverty reduction in Nigeria

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Abstract

This study was informed by the rising poverty level in Nigeria. Despite Nigeria's plentiful agricultural resources and oil wealth, poverty is widespread in the country and has increased since the late 1990s, with some 70 per cent of Nigerians living on less than US$1.25 a day. Arguably, it has been asserted that government investment in education, agriculture, skill acquisition and small and medium enterprises measured through financial intermediation can help in the reduction of poverty as observed in other developed economies of the world. It is against this backdrop that this study tries to examine the effect of human capital development on poverty reduction in Nigeria by modelling the effect of government investment in education, agriculture, and skill acquisition on poverty reduction in Nigeria using an econometric regression model of the Ordinary Least Squares (OLS). Findings revealed that human capital development, government expenditures on agriculture, education and skill acquisition are statistically significant in reducing poverty in Nigeria. The study therefore recommends, among others, that the government should prioritize its investment in education, agriculture and skill acquisition and to also make sure that its investment in these areas is structurally balanced, supervised and focused because they have been identified to significantly influence poverty reduction in Nigeria.

Keywords: Human capital development; Poverty reduction; Government expenditure; Skill acquisition

1. Introduction

Over the years, according to Oparah, Nwagbala and Iloanya (2023) Nigerian economy has been plagued by policies that have not made any impact on the development of the nation, due to a lack of political will for effective implementation. This persistent gap between policy formulation and execution has exacerbated a range of socio-economic challenges demanding urgent government intervention. Among these are increasing unemployment, escalating violent crime, high mortality rates, and the proliferation of insecurity in the form of banditry, cultism, and terrorism (Oluwadare & Oni, 2016; Imoisi & Ephraim, 2015; Oparah et al., 2023).

Poverty remains one of the most pressing socio-economic challenges facing Nigeria today. Nigeria's basic infrastructure has deteriorated significantly, while virtually every sector of the economy continues to grapple with persistent challenges. The unemployment rate has surged to unprecedented levels, and the accompanying increase in poverty has compelled many individuals to pursue self-employment and entrepreneurial ventures as survival strategies (Berisha & Pula, 2015; Oparah et al., 2023). World Bank (2018) reports that a significant percentage of the Nigerian population lives below the international poverty line. This persistent poverty has had far-reaching implications for national development, social cohesion, and political stability (Marsinta, 2020). Human capital development, which encompasses

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investments in education, health, skills acquisition, and workforce training, has long been recognized as a critical driver of economic growth and poverty alleviation. The ability of individuals to contribute meaningfully to economic activities is closely tied to their level of education, skills, and overall well-being (World Bank, 2021). Countries that have successfully reduced poverty rates over time have done so by investing heavily in human capital, thereby enhancing productivity, innovation, and inclusive economic participation (Omede & Adamu, 2021).

As stated in Ezeanokwasa, Nwagbala and Nwachukwu (2023) many organizations struggle to realize the full benefits of change initiatives, with intended improvements in performance often failing to materialize. Key challenges include employee resistance, lack of alignment between change programs and strategic goals, and insufficient systems for tracking and evaluating progress. Scholars highlight that these challenges, spanning cultural resistance to inadequate performance measurement, significantly hinder the effectiveness of change management and reduce its capacity to drive organizational success (Cameron & Green, 2015; Ezeanokwasa et al., 2023). Employee development plays a pivotal role in developing both individual careers and organizational performance by cultivating a workforce that is skilled, engaged, and motivated (Rothwell & Kazanas, 2021; Ezeanokwasa et al., 2023). It involves deliberate organizational efforts to enhance employees' knowledge, skills, and abilities, thereby equipping them to meet evolving job demands. Beyond enhancing immediate job performance, such initiatives also support long-term career development and foster higher levels of commitment and engagement among employees (Goldstein & Ford, 2020; Ezeanokwasa, Nwagbala, & Nwachukwu, 2023).

According to Stella et al. (2024) Capacity building refers to the deliberate process of enhancing individuals' skills, knowledge, and competencies so they can perform their roles more effectively. It typically involves initiatives such as training programs, mentorship, and continuous learning opportunities that promote professional growth and empowerment. By investing in these efforts, organizations and communities enable people to make more meaningful contributions to collective goals (McClelland, 2021; Stella, Musa, Samuel, & Chimamkpa, 2024). The concept covers beyond individual development to include broader dimensions such as technological advancement, workforce capability, institutional strengthening, and infrastructure improvement, all of which are essential for sustainable organizational progress (Bakdiah, Satriawan, & Yanti, 2024; Stella et al., 2024).

In relation to Nigeria, human capital development has not received sufficient or consistent attention. Public spending on education, health, agriculture, and skill acquisition remains inadequate and often poorly managed (World Bank, 2021). As a result, a large portion of the population lacks access to quality education, basic healthcare, and vocational training, tools that are essential for breaking the cycle of poverty (Ukeje et al., 2021). Stella et al. (2024) argued that skills enhancement represents a deliberate and coordinated approach to identifying, developing, and aligning workforce capabilities with organizational objectives (Auzar, Ngaliman, & Khaddafi, 2024; Stella et al., 2024). It encompasses a range of initiatives such as structured training programs, mentorship, experiential learning, and individualized coaching, all designed to strengthen both technical and interpersonal competencies. These efforts not only build hard skills such as technical expertise, analytical proficiency, and project management but also cultivate essential soft skills, including communication, critical thinking, problem-solving, and emotional intelligence (McClelland,2021; Stella, Musa, Samuel & Chimamkpa, 2024).

This has further deepened inequality and limited the ability of many citizens to participate in or benefit from economic opportunities. Investment in human capital development, according to the World Bank, has been identified as an agent of national development in all countries of the world (World Bank, 2018). Providing education and health services to people is one of the major ways of improving the quality of human resources. Against this backdrop, there is a growing need to empirically examine the extent to which government expenditures in human capital development contribute to poverty reduction in Nigeria.

1.1. Statement of the Problem

Despite Nigeria's abundant natural resources and considerable revenue from oil, poverty levels in the country remain alarmingly high (World Bank, 2021). Over the decades, various administrations have initiated programs aimed at reducing poverty, yet a significant portion of the population continues to live below the poverty line. The inability of these programs to yield meaningful and sustainable outcomes points to a more fundamental issue, which is the insufficient investment in the critical areas that drive human capital development (Ogunleye et al, 2017). In particular, inadequate government expenditure on education, agriculture, and skill acquisition may have hindered the empowerment of individuals to become economically self-reliant and productive members of society.

Education is widely regarded as a powerful tool for poverty reduction, as it equips individuals with the knowledge and skills necessary to access better employment and entrepreneurial opportunities. However, in Nigeria, public investment

in the education sector has remained consistently below the UNESCO-recommended benchmark (World Bank, 2021). This underfunding has led to dilapidated infrastructure, poorly motivated teachers, and low learning outcomes, particularly in rural areas where poverty is most prevalent (Rafael et al, 2016). As a result, millions of Nigerians are denied the opportunity to acquire the quality education that could lift them out of poverty. Similarly, agriculture remains a key sector with the potential to significantly reduce poverty, given that it employs a large proportion of the Nigerian workforce. Yet, government expenditure on agriculture has been inadequate, irregular, and often misallocated. Many farmers lack access to modern inputs, extension services, irrigation, and markets, thereby limiting their productivity and income. This underinvestment continues to trap rural dwellers who are most dependent on agriculture in a vicious cycle of low yield, food insecurity, and poverty.

Skill acquisition is another critical pathway to economic empowerment, especially in a developing economy with limited formal employment opportunities. However, the absence of a robust framework for vocational training and entrepreneurial development in Nigeria means that many youths and adults are ill-prepared for the labour market or self-employment. Government spending in this area has been sporadic and poorly aligned with market needs, leaving many training programs ineffective and unsustainable. Given these concerns, it becomes imperative to investigate the effect of government expenditures on education, agriculture, and skill acquisition on poverty reduction in Nigeria. The lack of empirical clarity on how investments in these human capital components influence poverty outcomes poses a major challenge to effective policy formulation. It is against this backdrop that this study tries to juxtapose human capital development and poverty reduction in Nigeria by modelling the effect of government investment in education, health, agriculture, skill acquisition and small and medium enterprises on poverty reduction in Nigeria.

Objectives of the Study

The main objective of the study is to examine the effect of human capital development on poverty reduction in Nigeria. Specifically, the study aimed to:

- Explore the effect of government expenditure in education on poverty reduction in Nigeria.
- Determine the effect of government expenditure in agriculture on poverty reduction in Nigeria.
- Ascertain the effect of government expenditure in skill acquisition on poverty reduction in Nigeria.

1.2. Conceptual Clarification

1.2.1. Human Capital Development

The building of a nation depends upon the development of the people and the organisation of human activities. According to Chinelo, Okechukwu and Victor (2023) Human capital consists of a pool of knowledge, skills, and abilities inherent in individuals, while human capital development is the structured process of enhancing these attributes to ensure their relevance and impact in national development (Chinelo et al., 2023). This process is typically driven by investments in education, healthcare, training, and social services, which strengthen individual capacity and, in turn, contribute to broader socio-economic growth (Abass, 2001; Becker, 2012; Chinelo, Okechukwu & Victor, 2023). The importance of the human factor in attaining success or any meaningful socio-economic development in any given society cannot be overemphasized. Human capital development is therefore associated with investment in man and his development as a creative and productive resource. For nations seeking sustainable economic growth, it is essential to align government spending with deliberate investment in human capital. This requires consistent allocation of resources to education, training, and healthcare sectors, widely recognized as the most critical components of human capital for driving national development and long-term economic progress (Atilgan, Kilic, & Ertugrul, 2017; Chinelo, Okechukwu, & Victor, 2023).

Moyo et al. (2022) believe that human capital development is the process of further developing the productive capacity of human resources through investment in education or other means. It is the process for ensuring that human capital requirements of an organization are identified and plans are made for satisfying those requirements. Government investment in education and healthcare directly enhances labour productivity and strengthens national productive capacity (Chinelo et al., 2023). Health initiatives promote citizen well-being, enabling individuals to remain active and efficient, while education not only boosts productivity but also supports personal growth and self-actualization. Together, these sectors complement one another in shaping a workforce that is both highly skilled and resilient, equipped with renewed knowledge and competencies to drive innovation in production processes. As such, education and health are indispensable pillars of human capital development, accelerating economic growth and fostering sustainable national advancement (Imoughele & Ismaila, 2013; Odior, 2011; Serap, 2016; Chinelo, Okechukwu, & Victor, 2023).

1.2.2. Government Expenditure in Skill Acquisition and Poverty Reduction

Government expenditure on skill acquisition is widely recognized as a strategic tool for addressing poverty and promoting sustainable development. Skill acquisition refers to the process of equipping individuals with practical ability and competencies that enhance employability, productivity, and income generation (Azolike & Onyema, 2023). When governments invest in vocational training, entrepreneurship programs, and capacity-building initiatives, they create opportunities for citizens to participate meaningfully in economic activities, thereby reducing poverty levels. When governments allocate funds to skill acquisition, they not only enhance individual capabilities but also strengthen national productive capacity. This is particularly relevant in developing countries like Nigeria, where unemployment and underemployment remain pressing challenges (Eteng et al., 2025). As Nwagbala, Ezeanokwasa and Aziwe (2023) observe, organizations require not only access to knowledge but also effective systems for storing, sharing, and applying it among employees, who remain central to operational success. Knowledge management encompasses the processes of acquiring, creating, organizing, disseminating, and utilizing both tacit and explicit knowledge, thereby enabling employees to make informed decisions and carry out their responsibilities effectively. This practice is essential for navigating dynamic trends, sustaining competitive advantage, delivering superior value, and continuously improving organizational performance (Nwagbala, Ezeanokwasa & Aziwe, 2023).

Empirical studies have shown that skill acquisition programs funded by government expenditure contribute to poverty reduction by creating employment opportunities, improving self-reliance, and stimulating entrepreneurship (Babagana, 2022). For instance, vocational training and empowerment schemes have been linked to improved livelihoods and reduced poverty incidence in rural communities (Eteng et al., 2025). However, the effectiveness of such programs depends on adequate funding, proper implementation, and alignment with labour market demands. Moreover, government spending on skill acquisition complements other social investments such as healthcare and education, thereby creating a holistic framework for poverty alleviation. When individuals are healthy and educated, skill acquisition initiatives become more impactful, leading to a workforce that is both productive and innovative (Azolike & Onyema, 2023). In essence, government expenditure on skill acquisition is not merely a poverty alleviation strategy but a long-term investment in human capital. By equipping citizens with relevant skills, governments can foster innovation, reduce unemployment, and accelerate national development. In addition, skills enhancement requires a systematic approach that begins with identifying existing gaps within the workforce, followed by the design and implementation of targeted training and development programs. It also involves nurturing a culture of continuous learning, promoting knowledge-sharing, and encouraging collaboration across functions to facilitate the acquisition of interdisciplinary skills (Sembiring, 2016; Stella, Musa, Samuel, & Chimamkpa, 2024).

1.2.3. Government Expenditure in Education and Poverty Reduction

Education remains a cornerstone of poverty reduction strategies, as it equips individuals with the knowledge and skills necessary to improve their livelihoods and contribute to national development. Government expenditure on education is therefore not just a social responsibility but a strategic investment in human capital. By funding schools, teacher training, infrastructure, and curriculum development, governments create opportunities for citizens to access quality education, which enhances employability, productivity, and income generation (Becker, 2012; Psacharopoulos & Patrinos, 2018). Recent studies highlight the critical role of education spending in addressing multidimensional poverty. For instance, Dankumo, Shido-Ikwu, Ibrahim, and Auta (2024) found that government expenditure on education significantly influences poverty reduction outcomes in Nigeria, though challenges remain in ensuring equitable distribution and effective utilization of resources. Similarly, Nabena, Eze, Rowe, Mohammed, and Oni (2024) emphasized that education is not only a fundamental human right but also a catalyst for socio-economic development, underscoring the importance of sustained public investment at both national and sub-national levels. In Nigeria, where poverty remains widespread, government expenditure on education is particularly vital for empowering marginalized groups and bridging inequality gaps (Kwode, 2024). Ensuring the provision of quality education and healthcare for all Nigerians, should remain a top priority for government at every level, as these sectors are fundamental to sustaining a pool of highly skilled, knowledgeable, and adaptable human capital capable of driving economic growth and supporting long-term national development (Adesoye, Maku, & Atanda, 2010; De la Fuente & Ciccone, 2002; Chukwuemeka, 2009; Chinelo, Okechukwu, & Victor, 2023). Ihim, Kekeocha and Stella (2024) stated that from a strategic standpoint, digital business models allow organizations to harness technology in ways that drive innovation, disrupt established practices, and reimagine traditional industries (Ihim et al., 2024). By adopting these models, firms can create new revenue opportunities, strengthen customer engagement, and enhance operational efficiency, thereby positioning themselves more competitively in an increasingly digital economy (Awawdeh, Abulaila, Alshanty, & Alzoubi, 2022; Ihim, Kekeocha, & Stella, 2024).

However, the effectiveness of educational expenditure depends on adequacy, efficiency, and accountability. Mismanagement, corruption, and poor alignment with labour market needs can undermine the impact of spending,

limiting its contribution to poverty reduction (Dankumo et al., 2024). Sustainable investment requires consistent policy commitment, monitoring, and reforms that ensure education systems deliver relevant and high-quality outcomes. Moreover, government expenditure on education is a powerful driver of poverty reduction. By strengthening human capital, education empowers individuals, enhances productivity, and promotes inclusive development. Current research underscores the need for sustained, equitable, and accountable investment to maximize its impact on poverty alleviation.

2. Methodology

2.1. Model Specification

The essence of economic modelling is to represent the phenomenon under investigation in such a way as to enable the researcher to attribute numerical values to the concept. Thus, the study examined the impact of human capital development on poverty reduction in Nigeria by incorporating human capital development, government expenditure on agriculture, education, and skill acquisition as the explanatory variables, while poverty as proxied by poverty incidence was used as the dependent variable. Thus, the study model is specified as:

The structural form of the model is:

$$POV = f(HCD, AGX, EDX, SQX,) \quad (1)$$

The mathematical form of the model is:

$$POV = \beta 0 + \beta_1 HCD + \beta_2 AGX + \beta_3 EDX + \beta_4 SQX \quad (2)$$

The econometric form of the model is:

$$POV = \beta 0 + \beta_1 HCD + \beta_2 AGX + \beta_3 EDX + \beta_4 SQX + \mu_i \quad (3)$$

Where;
POV = Poverty reduction proxied by poverty incidence
HCD = Human capital development measured by Human development index
AGX = Government agricultural expenditure
EDX = Government education expenditure
SQX = Government skill acquisition expenditure
β_0 = Intercept of the model
$\beta_1 - \beta_4$ = Parameters of the regression coefficients of the model
μ = Stochastic error term.

The economic technique employed in the study is the ordinary least squares (OLS). This is because (i) the OLS estimators are expressed solely in terms of the observable (i.e. sample) quantities. Therefore, they can be easily computed. (ii) They are point estimators; that is, given the sample, each estimator will provide only a single value of the relevant population parameter. (iii) The mechanism of the OLS is simple to comprehend and interpret. (iv)Once the OLS estimates are obtained from the same data, the sample regression line can be easily obtained.

2.2. 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, 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 terms), the variable is said to be stationary. Otherwise, it is non-stationary.

2.3. 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 regression situations (Granger, 1986). 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 terms)

2.3.1. Evaluation of parameter estimates

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

- The economic a priori criteria.
- The statistical criteria: First Order Test
- The econometric criteria: Second Order Test

2.3.2. 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 align with the expectations of the economic theory. The a priori expectations, in tandem with the study, are presented in Table 3.1 below:

Table 1 Economic a priori expectation

Parameters	**Variables**		**Expected Relationships**	**Expected Coefficients**
	Regress and	**Regressor**		
β_0	POV	Intercept	(+/-)	$0 < \beta_0 > 0$
β_1	POV	HCD	-	$\beta_1 < 0$
β_2	POV	AGX	-	$\beta_2 < 0$
β_3	POV	EDX	-	$B_3 < 0$
β_4	POV	SQX	-	$\beta_4 < 0$

Source: Researchers compilation

A positive '+' sign indicates that the relationship between the regressor and regressand is direct and moves in the same direction, i.e. increase or decreases together. On the other hand, a '-' shows that there is an indirect (inverse) relationship between the regressor and regress, and i.e. they move in opposite or different directions.

2.3.3. Evaluation based on statistical criteria: First Order Test

This aims at the evaluation of the statistical reliability of the estimated parameters of the model. In this case, the F-test, the coefficient of determination (R^2) and the Adjusted R^2 are used.

The square of the coefficient of determination, R^2 or the measure of goodness of fit, is used to judge the explanatory power of the explanatory variables on the dependent variables. The R^2 denotes the percentage of variations in the dependent variable accounted for by the variations in the independent variables. Thus, the higher the R^2, the more the model is able to explain the changes in the dependent variable. However, if R^2 equals one, it implies that there is 100% explanation of the variation in the dependent variable by the independent variable, and this indicates a perfect fit of the regression line. When R^2 equals zero, it indicates that the explanatory variables cannot explain any of the changes in the dependent variable. Therefore, the higher and closer the R^2 is to 1, the better the model fits the data. Note that the above explanation goes for the adjusted R^2.

F-test: The F-test is a measure of the overall significance of the estimated regression. It is used to compare two population variances. Thus, in verifying the overall significance of the estimated model, the hypothesis tested is:

H_0: The model has no goodness of fit

H_1: The model has a goodness of fit

Decision rule: Reject H_0 if $F_{cal} > F_{\alpha}$ (k-1, n-k) at $\alpha = 5\%$, accept if otherwise.

2.3.4. Econometric criteria: Second Order Test

This aims at investigating whether the assumptions 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-autocorrelated disturbances. In the model, autocorrelation, multicolinearity and heteroscedasticity tests are used to test for the reliability of the data for prediction.

2.3.5. Test for Autocorrelation

Autocorrelation can be regarded as "correlation between members of a series of observations ordered in time (as in time series data) or space (as in cross-sectional data)". This test is carried out to see if the error or disturbance term (μ_t) is temporarily independent. It tests the validity of a non-autocorrelated disturbance. The Durbin-Watson (DW) test is appropriate for the test of First-order autocorrelation, and it has the following decision criteria.

If d* is approximately equal to 2 (d* =2), we accept that there is no autocorrelation in the function.

If d*= 0, there exists perfect positive autocorrelation. 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.

If d* is equal to 4 (d*=4), there exists a perfect negative autocorrelation, while if d* is less than four but greater than two (2<d*< 4), it means that there exists some degree of negative autocorrelation, which is stronger the higher the value of d*.

2.3.6. Test for multicollinearity

Multicollinearity means the existence of a "perfect," or near-perfect, linear relationship among some or all explanatory variables of a regression model. Decision Rule: From the rule of Thumb, if the 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. Also, reject the null hypothesis (H_0) if any two variables in the model are in excess of 0.8 or even up to 0.8. Otherwise, we accept.

2.3.7. 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 the null hypothesis (H_0) that there is a heteroscedasticity in the residuals if F calculated is greater than F tabulated ($F_{cal} > F_{tab}$) at 5% critical value, otherwise accept at 5% level of significance.

2.3.8. Test for research hypotheses

This study will test the research hypothesis using a t-test. The t-test tells us if there is an existence of any significant relationship between the dependent variable and the explanatory variables. The t-test will be conducted at a 0.05 or 5% level of significance.

Decision rule: Reject H_0 if $t_{cal} > t_{\alpha/2}$, (n-k). Otherwise, we accept.

2.3.9. Nature and source of data

All data used in this research are secondary time series data, which are sourced from the National Bureau of Statistics (NBS), National Population Commission (NPC) and World Bank Data Bank.

2.4. Data presentation and analysis

Data for the analysis are in Appendix 1, and the variables include poverty reduction, human capital development, agricultural expenditure, and education expenditure and skill acquisitions.

2.5. Data analysis

The data are analyzed by OLS using E-views. The summary of this and other preliminary tests discussed in section three is presented in the tables below.

2.5.1. Summary of Stationary Unit Root Test

Establishing stationarity is essential because if there is no stationarity, the processing of the data may produce biased results. The consequences are unreliable interpretation and conclusions. We test for stationarity using Augmented Dickey-Fuller (ADF) tests on the data. The ADF tests are done on level series, first and second-order differenced series. The decision rule is to reject stationarity if the ADF statistic is less than 5% critical value; otherwise, accept stationarity when the ADF statistic is greater than 5% criteria value. The summary is shown in Table 2 below.

Table 2 Summary of ADF test results

Variables	ADF Statistics	Lagged Difference	1% Critical Value	5% Critical Value	10% Critical Value	Order of Integration
POV	-6.151567	1	-3.752946	-2.998064	-2.638752	*I*(1)
HCD	-5.353548	1	-3.752946	-2.998064	-2.638752	*I*(1)
AGR	-4.825868	1	-3.752946	-2.998064	-2.638752	*I*(1)
EDX	-4.155398	1	-3.752946	-2.998064	-2.638752	*I*(1)
SQX	-4.919514	1	-3.752946	-2.998064	-2.638752	*I*(1)

Source: Researcher computation

Evidence from the unit root table above shows that none of the variables is stationary at level difference, that is, *I*(0), rather all the variables are stationary at first difference, that is, *I*(1). Since the decision rule is to reject stationarity if ADF statistics is less than 5% critical value, and accept stationarity when ADF statistics is greater than 5% criteria value, the ADF absolute value of each of these variables is greater than the 5% critical value at their first difference but less than 5% critical value in their level form (see, appendixes 2). Therefore, they are all stationary at their first difference integration.

2.5.2. Summary of Johansen Cointegration Test

Cointegration means that there is a correlation among the variables. The cointegration test is done on the residuals of the model. Since the unit root test shows that none of the variables is stationary at level *I*(0), rather all the variables are at first difference *1*(1), we therefore test for cointegration among these variables. The result is summarized in the tables 3 below for Trace and the Maximum Eigenvalue cointegration rank test, respectively.

Table 3 Summary of Johansen Cointegration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		**Trace**	**0.05**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None *	0.996927	270.1891	125.6154	0.0000
At most 1 *	0.916447	137.1280	95.75366	0.0000
At most 2 *	0.787734	80.03574	69.81889	0.0061
At most 3	0.379862	18.83142	29.79707	0.5051
At most 4	0.287030	7.841716	15.49471	0.4825
Trace test indicates 3 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
*MacKinnon-Haug-Michelis (1999) p-values				

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.996927	133.0610	46.23142	0.0000
At most 1 *	0.916447	57.09229	40.07757	0.0003
At most 2 *	0.787734	35.64810	33.87687	0.0304
At most 3	0.379862	10.98971	21.13162	0.6484
At most 4	0.287030	7.781267	14.26460	0.4014
Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Researchers computation

Table 3 indicates that trace has only 3 cointegrating variables in the model, while the Maximum Eigenvalue indicates only 3 cointegrating variables. Both the trace statistics and Eigen value statistics reveal that there is a long-run relationship between the variables. That is, the linear combination of these variables cancels out the stochastic trend in the series. This will prevent the generation of spurious regression results. Hence, the implication of this result is a long-run relationship between poverty reduction and other variables used in the model.

3. Presentation of Result

The result of the regression test is presented in Table 4 below.

Table 4 Summary of regression results

Dependent Variable: POV				
Method: Least Squares				
Sample: 1991 2015				
Included observations: 25				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	49.65170	27.47136	8.807399	0.0000
HCD	-16.91465	8.954068	-5.889046	0.0001
AGX	-0.012549	0.009982	-3.257161	0.0028
EDX	-0.000963	0.000575	-3.673134	0.0019
SQX	-0.033699	0.039022	-4.863595	0.0002
R-squared	0.692276	F-statistic		16.78986
Adjusted R-squared	0.589701	Prob (F-statistic)		0.000013
S.E. of regression	6.859314	Durbin-Watson stat		1.633069

Source: Researchers computation

3.1. Evaluation of Findings

To discuss the regression results as presented in Table 4, the study employs economic a priori criteria, statistical criteria and econometric criteria.

3.2. Evaluation based on economic a priori criteria

This subsection is concerned with evaluating the regression results based on a priori (i.e., theoretical) expectations. The sign and magnitude of each variable coefficient are evaluated against theoretical expectations.

From Table 4, it is observed that the regression line has a positive intercept as presented by the constant (c) = 49.65170. This means that if all the variables of the study are held constant or fixed (zero), poverty reduction will be valued at 49.65170. Thus, the a priori expectation is that the intercept could be positive or negative, so it conforms to the theoretical expectation.

It is observed in Table 4.3 that human capital development, agricultural expenditure, health expenditure, education expenditure, skill acquisition and small and medium enterprises hinder poverty reduction in Nigeria. Thus, increases in human capital development, agricultural expenditure, health expenditure, education expenditure, skill acquisition and small and medium enterprises will bring about a decline in the poverty rate in Nigeria.

From the regression analysis, it is observed that all the study variables conform to the a priori expectation. Thus, Table 5 summarizes the a priori test of this study.

Table 5 Summary of economic a priori test

Parameters	Variables		Expected Relationships	Observed Relationships	Conclusion
	Regress	Regressor			
β_0	POV	Intercept	+/-	-	Conform
β_1	POV	HCD	-	-	Conform
β_2	POV	AGR	-	-	Conform
β_3	POV	EDX	-	-	Conform
β_4	POV	SQX	-	-	Conform

Source: Researchers compilation

3.3. Evaluation based on statistical criteria

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

From the regression result, the coefficient of determination (R^2) is given as 0.692276, which shows that the explanatory power of the variables is moderately high and/or strong. This implies that 69% of the variations in poverty alleviation are being accounted for or explained by the variations in human capital development, agricultural expenditure, health expenditure, education expenditure, skill acquisition and small and medium expenditure in Nigeria. While other determinants of poverty reduction not captured in the model explain about 31% of the variation in poverty reduction in Nigeria.

The adjusted R^2 supports the claim of the R^2 with a value of 0.589701, indicating that 59% of the total variation in the dependent variable (poverty reduction) is explained by the independent variables (the regressors). Thus, this supports the statement that the explanatory power of the variables is moderately high and strong.

The F-statistic: The F-test is applied to check the overall significance of the model. The F-statistic is instrumental in verifying the overall significance of an estimated model. The hypothesis tested is:

H_0: The model has no goodness of fit

H_1: The model has a goodness of fit

Decision rule: Reject H_0 if $F_{cal} > F_{\alpha}$ (k-1, n-k) at $\alpha = 5\%$, accept if otherwise.

Where:

V_1 / V_2 Degree of freedom (d.f)

$$V_1 = n-k, V_2 = k-1:$$

Where n (number of observations), k (number of parameters)

Where k-1 = 7-1= 6

Thus, n-k = 25-7= 18

Therefore, $F_{0.05(6,18)}$ = 2.66 (From the F table) … F-table

F-statistic = 16.78986 (From 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, the dependent and independent variables have a significant impact on the model.

3.4. Evaluation based on econometric criteria

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

3.4.1. Test for Autocorrelation

Using Durbin-Watson (DW) statistics, which we obtain from our regression result in Table 3, it is observed that the DW statistic is 1.633069 or approximately 2. This implies that there is no autocorrelation since d* is approximately equal to two. 1.633069 tends towards two more than it tends towards zero. Therefore, the variables in the model are not autocorrelated and the model is reliable for predictions.

3.4.2. Test for Heteroscedasticity

This test is conducted using the white's general heteroscedasticity test. The hypothesis testing is thus:

- H_0: There is a heteroscedasticity in the residuals
- H_1: There is no heteroscedasticity in the residuals

Decision rule: Reject H_0 if the computed F-statistic is greater than the tabulated F-statistic ($F_{cal} > F_{tab}$) at 5% critical value, otherwise accept at 5% level of significance. Hence, F_{cal} = 16.78986 and F_{tab} = 2.66, which means that the computed F-statistics is greater than the tabulated F-statistic; therefore, we reject H_0 and accept H_1 that the model has no heteroscedasticity in the residuals and therefore, the data is reliable for prediction.

3.4.3. Test for Multicolinearity

This means the existence of a "perfect," or exact, linear relationship among some or all explanatory variables of a regression model. This will be used to check if collinearity exists among the explanatory variables. The basis for this test is the correlation matrix obtained using the series. The result is presented in Table 6 below.

Table 6 Summary of multicollinearity test

Variables	Correlation Coefficients	Conclusion
HCD and AGX	0.070580	No multicollinearity
HCD and EDX	0.796816	No multicollinearity
HCD and SQX	0.729973	No multicollinearity
AGR and EDX	-0.005786	No multicollinearity
AGR and SQX	0.061847	No multicollinearity
EDX and SQX	0.775371	No multicollinearity

Source: Researchers compilation

Decision Rule: From the rule of Thumb, if the 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. We therefore conclude that the explanatory variables are not perfectly linearly correlated.

3.4.4. Test of Research Hypotheses

The t-test is used to determine the statistical significance of the individual parameters. Two-tailed tests at 5% significance level are conducted. The Result is shown in Table 6 below. Here, we compare the estimated or calculated t-statistic with the tabulated t-statistic at $t_{\alpha/2} = t_{0.05} = t_{0.025}$ (two-tailed test).

Degree of freedom (df) = n-k = 25-7 = 18

So, we have:

$T_{0.025(19)} = 2.101$ …Tabulated t-statistic

In testing the working hypotheses, which partly satisfy the objectives of this study, we employ a 0.05 level of significance. In so doing, we are to reject the null hypothesis if the t-value is significant at the chosen level of significance; otherwise, the null hypothesis will be accepted. This is summarized in Table 7 below.

Table 7 Summary of t-statistic

Variable	**t-calculated (t_{cal})**	**t-tabulated ($t_{\alpha/2}$)**	**Conclusion**
Constant	8.807399	±2.101	Statistically Significant
HCD	-5.889046	±2.101	Statistically Significant
AGR	-3.257161	±2.101	Statistically Significant
EDX	-3.673134	±2.101	Statistically Significant
SQX	-4.863595	±2.101	Statistically Significant

Source: Researchers computation

The study begins by bringing our working hypothesis to focus by considering the individual hypothesis. From Table 7, the t-test result is interpreted below;

- For HCD, $t_{cal} > t_{\alpha/2}$, we reject the null hypothesis and accept the alternative hypothesis. Thus, HCD has a significant impact on poverty reduction.
- For AGR, $t_{cal} > t_{\alpha/2}$, we reject the null hypothesis and accept the alternative hypothesis. This means that AGR has a significant impact on POV.
- For EDX, $t_{cal} > t_{\alpha/2}$, we reject the null hypothesis and accept the alternative hypothesis. This means that EDX has a significant impact on POV.
- For SQX, $t_{cal} > t_{\alpha/2}$, we reject the null hypothesis and accept the alternative hypothesis. This means that SQX has a significant impact on POV.

3.5. Summary of Findings

From the result of the OLS, it was observed that human capital development, government expenditure on agriculture, education and skill acquisition have negative impacts on poverty reduction in Nigeria. Thus, increases in human capital development, government expenditure on agriculture, education, and skill acquisition will bring about a decline in the poverty rate; decreases in these areas will lead to an increase in poverty in Nigeria.

Human capital development, government expenditure on agriculture, education, and skill acquisition are statistically significant in determining poverty reduction in Nigeria.

The F-test conducted in the study shows that the model has a goodness of fit and is statistically different from zero. In other words, the dependent and independent variables have a significant impact on the model.

The study also revealed that both R^2 and adjusted R^2 showed that the explanatory power of the variables is moderately high and/or strong in explaining poverty reduction in Nigeria. The standard errors showed that all the explanatory variables were low. The low values of the standard errors in the result showed that some level of confidence can be placed on the estimates.

4. Conclusion

This study explored the influence of public spending on education, agriculture, and skill acquisition as components of human capital development in reducing poverty in Nigeria. The findings reveal that while government investment in these areas holds significant potential for poverty alleviation, their impact has been undermined by widespread corruption and institutional inefficiencies. In particular, the mismanagement of funds and lack of accountability in the education and agricultural sectors, as well as ineffective implementation of skill acquisition programs, have limited the reach and effectiveness of these interventions. Without addressing these governance issues, increased budgetary allocations alone may not translate into meaningful poverty reduction. The study, therefore, concludes that tackling corruption and improving transparency in the management of public resources are critical. It calls for a national commitment by both the government and the citizenry to ensure that public investments in education, agriculture, and skill development yield tangible results in the fight against poverty.

Recommendations

The following recommendations are made.

The Nigerian government should significantly raise the budgetary allocation to the education sector and ensure that such funds are strategically targeted at improving infrastructure, teacher training, curriculum relevance, and access to learning materials—especially in rural and underserved communities

The government should scale up funding for rural roads, irrigation systems, research institutes, and modern farming tools. These investments will boost agricultural productivity and income, particularly for smallholder farmers who represent a large portion of the poor.

The government should invest more in building and equipping vocational institutes across the country, particularly in areas with high youth unemployment. This will provide practical skills that are relevant to the labour market.

4.1. Contribution to Knowledge

- This study contributes to the existing body of knowledge by providing empirical evidence on how public investment in education, agriculture, and skill acquisition influences poverty reduction in Nigeria. Unlike general studies on poverty alleviation, this research isolates and analyses the effects of specific components of human capital development, offering more targeted insights for policy formulation.
- The study advances academic understanding by adopting a sectoral approach to human capital development, thereby highlighting the differential impacts of investments in education, agriculture, and vocational training. This disaggregated analysis helps identify which sectors offer the greatest potential for lifting individuals and households out of poverty.
- This research offers a foundational framework for future studies interested in exploring the nexus between government spending, human capital, and poverty in other sub-Saharan African countries. It also paves the way for comparative analyses across states or regions within Nigeria, enabling a broader understanding of what works and why.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] Azolike, N. N., & Onyema, O. (2023). Skill acquisition: A sustainable poverty reduction strategy in Nigeria (1990–2023). *International Journal of Public Administration and Development,* 4(2), 8–20

[2] Babagana, A. (2022). Skill acquisition as a panacea for poverty alleviation in Nigeria: A review. Zenodo. https://doi.org/10.5281/ZENODO.7384566

[3] Campbell, O & Ogunro, T. (2022). Human Capital Development and Poverty Alleviation in Nigeria: Evidence from the ARDL Model, Lead City Journal of the Social Sciences (LCJSS), Lead City University. 7(1), 112-123

[4] Chinelo, S.N., Okechukwu, K.I., &Victor, A.U. (2023). Government Expenditure on Critical Infrastructure and Economic Growth in Nigeria: Implication to Education and Health Sectors. International Journal of Business Diplomacy and Economy, 2(9), 16-27.

[5] Dankumo, A. M., Shido-Ikwu, S. B., Ibrahim, J., & Auta, Y. (2024). Impact of health and education expenditures on poverty reduction in Nigeria. Journal of Economics and Allied Research, 9(2), 45–62.

[6] Eteng, F. O., Opara, I. J., Ezikeudu, C. C., Adie, H., Ogar, J. I., Ozumba, L., & Bassey, U. S. (2025). High poverty rate amidst empowerment programmes: The impact of skills acquisition on poverty reduction in rural Cross River State, Nigeria. Global Journal of Social Sciences, 24(2), 165–175.

[7] Ezeanokwasa, F.N., Nwagbala, S.C., & Nwachukwu, R. (2023). Assessing Change Management and Performance of Selected Banks in Anambra State, Nigeria. *International Journal on Economics, Finance and Sustainable Development,* 5(9), 109-120.

[8] Ihim, M. C., Kekeocha, E. M., & Stella, C. N. (2024). Digital Business Models, Entrepreneurship and Supply Chain Management in Selected Small and Medium Enterprises in Anambra State, Nigeria. *Academic Journal of Current Practice in Business and Management,* 9(5), 87-104.

[9] Kwode, I. E. (2024). Government spending and poverty reduction in Nigeria: Trend and impact analysis. World Journal of Advanced Research and Reviews, 24(2), 2136–2148. https://doi.org/10.30574/wjarr.2024.24.2.3536

[10] Marsinta, A. A., Ario, B., & Ramadhan, AL. (2020). "Impact of Education on Poverty and Health: Evidence from Indonesia." *Economics Development Analysis Journal* 9 (1): 87–96

[11] Matthew, C. & Weil, D. N. (2020). The Effect of Increasing Human Capital Investment on Economic Growth and Poverty: A Simulation Exercise." *Journal of Human Capital* 14 (1): 43–83.

[12] Moyo, C., Mishi, S., & Ncwadi, R. (2022). Human capital development, poverty and income inequality in the Eastern Cape Province. *Development Studies Research*, *9*(1), 36–47

[13] Nabena, D., Eze, C., Rowe, C., Mohammed, A. M., & Oni, A. A. (2024). Education sector expenditure and institutional review: A sub-national report. Nigeria Governors' Forum Publishing.

[14] Nwagbala, S.C., Ezeanokwasa, F. N. & Aziwe, N. I. (2023). Effect of Knowledge Management on Employee Performance in First Bank Plc, Awka, Anambra State. *Journal of the Management Sciences,* 60 (1), 186-199.

[15] Ogundipe, M. A. & Lawal, N. A. (2013). Health, poverty reduction and human capital development in Nigeria. *International Journal of Management Sciences and Business Research*, 2(12), 159-166.

[16] Ogunleye, O.O., Owolabi, O.A., Sanyaolu, O.A & Lawal, O.O. (2017). 'Human Capital Development and Economic Growth in Nigeria'. Journal of Business Management, 3(8); 17-37.

[17] Omede, P. I. & Adamu, M. B. (2021). Empirical Analysis of Poverty and Human Capital Development in Nigeria. *Jalingo Journal of Social and Management Sciences*. 3 (4): 13-21

[18] Oparah, P. C., Nwagbala, S.C., & Iloanya K.O. (2023). Impact of Government Policy on the Growth of Small and Medium Enterprises in Nigeria. *Central Asian Journal of Innovations on Tourism Management and Finance*, 4(9), 63-74.

[19] Psacharopoulos, G., & Patrinos, H. A. (2018). Returns to investment in education: A decennial review of global literature. Education Economics, 26(5), 445–458.

[20] Rafael, A., Giménez, G. & Sánchez, L. (2016). Impact of Education on Poverty Reduction in Costa Rica: A Regional and Urban-Rural Analysis. *Contemporary Rural Social Work Journal* 8 (1): 3.

[21] Stella, C. N., Musa, D.E., Samuel, A. E., & Chimamkpa, P.O. (2024). Capacity building and sustainable development efforts of national population commission, Awka, Anambra State. *International Journal of Financial, Accounting, and Management*, (6)3, 399-411.

[22] Ukeje, I.O., Ogbulu, U. and Amaefula, V.C. (2020). Human Capital Intervention and Poverty Reduction. In A. Farazmand (ed.), Global Encyclopedia of Public Administration, Public Policy, and Governance. Springer: Cham

[23] World Bank (2018). Human Capital: A Project for the World. http ://documents1.worldbank.org/curated/en/793421540087227031/pdf/Human-Capital-Project-for-the-World.pdf

[24] World Bank. (2021). Education. https://www.worldbank.org/en/topic/education.

Appendix

- Data for analysis (1991-2015)

Year	POV	HCD	AGX	HEX	EDX	SQX	SME
2000	43.5	0.304	218.68	101.1417	595.7084	13.18068	12.3
2001	42.7	0.311	212.88	104.3653	591.9285	13.72951	12.2
2002	49.0	0.312	255.45	106.4185	622.6362	18.30525	12.4
2003	54.7	0.318	205.94	73.80371	772.6712	36.03251	12.6
2004	60.0	0.351	208.35	92.57865	784.9435	35.99856	13.1
2005	65.5	0.385	310.95	72.8434	6798.88	43.22838	13.4
2006	65.5	0.398	503.93	124.5821	6639.96	56.65923	13.7
2007	69.5	0.391	407.27	118.0406	7823.796	69.68523	14.4
2008	72.0	0.401	637.77	208.6268	9229.027	77.59804	14.8
2009	74.0	0.412	688.93	325.4351	9164.593	146.0613	14.8
2010	83.1	0.415	688.36	862.5475	9841.3	102.7767	14.8
2011	88.0	0.413	526.86	876.4906	10110.02	143.487	14.9
2012	54.4	0.434	569.61	767.066	15580.3	138.7935	15.3
2013	68.1	0.428	129.05	1033.635	22736.58	160.6796	15.3
2014	73.0	0.466	119.51	1404.864	21290.89	170.6745	15.7
2015	71.3	0.458	198.13	1764.995	18996.35	201.1165	15.9
2016	68.6	0.466	127.86	2763.444	22550.12	201.6945	16.2
2017	72.0	0.483	215.87	2210.725	28016.65	244.743	16.4
2018	69.5	0.488	230.76	3811.64	35860.45	325.317	16.7
2019	69.0	0.492	218.52	5109.125	48213.47	523.9603	16.8
2020	70	0.496	259.99	5064.51	47458.02	601.2801	16.9
2021	70	0.500	346.56	4980.239	47751.72	648.6354	15.8
2022	67	0.504	351.18	4926.387	49582.22	704.0135	15.1
2023	72.2	0.514	401.85	5205.872	54728.48	732.9965	17.5
2024	70	0.518	591.49	5800.018	64131.5	780.8972	16.7

Source: National Bureau of Statistics (NBS), National Population Commission (NPC) and World Bank Data Bank.