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Recurrent Expenditure and Human Development in Nigeria.

Ekpo, Esther Bruno
Department of Accounting,
Faculty of Management Science,
Veritas University, Abuja, Nigeria.

Prof. Uwaleke, Uchenna Joseph
Department of Accounting,
Faculty of Management Science,
Veritas University, Abuja, Nigeria.

Prof. Ugwudioha, Mathias Ofili
Department of Accounting,
Faculty of Management Science,
Veritas University, Abuja, Nigeria.

Uchenna, Clems Ozegbe, PhD
ORCID:0009-0000-7377-0231
Department of Accounting,
Faculty of Management Science,
Veritas University, Abuja, Nigeria.

Abstract
Nigeria's increasing recurrent expenditure has not produced commensurate improvements in health, education and living standards, raising concerns about the effectiveness of the functional composition of public spending. This study examined the relationship between recurrent expenditure and human development in Nigeria from 1999 to 2024, with inflation included as a control variable. Human development was measured using the Human Development Index, while recurrent expenditure was disaggregated into social and community services expenditure and economic services expenditure. The study adopted a quantitative ex post facto design and utilised annual secondary data obtained from the Central Bank of Nigeria Statistical Bulletin and United Nations Development Programme Human Development Reports. The data were analysed using descriptive statistics, the Augmented Dickey–Fuller test and the Autoregressive Distributed Lag approach. The unit-root results established a combination of I(0) and I(1) variables. The bounds-test statistic of 13.8949 exceeded the 1% upper-bound critical value of 5.966, confirming cointegration among the variables. Nevertheless, social and community services expenditure had a negative and statistically insignificant long-run relationship with human development ($\beta = -0.0213$, $p = 0.7338$). Economic services expenditure also exhibited a negative and insignificant relationship ($\beta = -0.0734$, $p = 0.1470$), while inflation produced a similarly negative and insignificant coefficient ($\beta = -0.0047$, $p = 0.1172$). The error-correction coefficient was negative and significant ($\beta = -0.0690$, $p < 0.001$), indicating that approximately 6.9% of short-run disequilibrium was corrected annually. The study concludes that the expenditure components and human development share a long-run equilibrium relationship, but neither expenditure category independently generated statistically reliable human-development gains. Recurrent allocations should therefore be linked to measurable service-delivery outcomes, supported by performance-based budgeting and protected from inflationary erosion.

Keywords: *Autoregressive Distributed Lag; economic services; human development; inflation; Nigeria; recurrent expenditure; social and community services.*
JEL Classification: *H50, O15, E31, C22*

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I. INTRODUCTION

Public expenditure is a major instrument through which governments convert fiscal resources into public services, productive opportunities and improvements in citizens' welfare (Sasmal and Sasmal 2016). Its developmental role extends beyond stimulating aggregate demand to financing education, healthcare, social services, agriculture, transportation and communication services that shape people's capabilities (Zouhar et al., 2021). Increasing expenditure, however, does not necessarily produce corresponding improvements in human development (Ranis, et al., 2000). Outcomes depend on the functional composition of spending, implementation efficiency, institutional quality and the real purchasing power of budgetary allocations. Miranda-Lescano et al. (2024) found that social public spending reduced inequality-related losses in human development, although its effectiveness varied across fiscal and institutional settings. Similarly, Sama et al. (2025) reported that public spending did not automatically promote sustainable development across sub-Saharan African countries, while Le et al. (2025) found that the development effect of government expenditure in emerging economies depended partly on institutional quality. These findings suggest that the expenditure–development relationship is determined not only by how much governments spend but also by how resources are allocated and converted into public value.

Human development provides a broader basis for evaluating this relationship than conventional measures of economic growth (Suri, et al., 2011). Gross domestic product captures the market value of economic activity but does not establish whether increased output has improved longevity, educational attainment or household living standards. The capability approach conceives development as the expansion of people's substantive freedoms to live healthy, educated and productive lives (Sen, 1999). The Human Development Index (HDI) operationalises this people-centred perspective by combining achievements in three dimensions: a long and healthy life, access to knowledge and a decent standard of living. These dimensions are measured through life expectancy at birth, expected and mean years of schooling, and gross national income per capita (UNDP, 2025). Although HDI does not capture every aspect of welfare, it offers a more appropriate measure than GDP for assessing expenditure intended to improve people's lives. Economic growth may coexist with poor health outcomes, limited educational opportunities and unequal living standards; hence, fiscal effectiveness should be evaluated partly by the extent to which expenditure expands human capabilities (Rani, et al., 2000).

Recurrent expenditure occupies an important but often misunderstood position in this process. It finances salaries, operating supplies, maintenance and the routine activities of government institutions rather than the direct acquisition of fixed assets (Bandy, 2014). This accounting distinction has encouraged the assumption that recurrent expenditure is consumptive, while capital expenditure is inherently productive (Chiapello, et al.,2007). Such a dichotomy overlooks the complementary relationship between public assets and the recurrent inputs required to make them functional. Schools cannot improve learning outcomes without teachers, instructional materials and maintenance; hospitals cannot improve life expectancy without health professionals, medicines and operating supplies; and agricultural or transport infrastructure cannot remain productive without extension services, regulation and routine maintenance. Recurrent expenditure can therefore convert physical assets into continuously delivered public services. Its developmental effect is nevertheless conditional. Where recurrent budgets are dominated by inefficient overheads, administrative duplication or personnel costs disconnected from frontline service delivery, higher expenditure may produce little improvement in human development (Geqeza, 2025).

The functional allocation of recurrent expenditure consequently provides a stronger analytical basis than its aggregate value. Recurrent expenditure on social and community services supports education, healthcare and related social services that directly influence the health and knowledge dimensions of HDI (Siregar, et al., 2024). It finances the personnel, materials and routine operations through which households access public education and healthcare. Recurrent expenditure on economic services, including agriculture, construction, transportation and communication, operates mainly through productivity, employment, food security, connectivity and income. Magida et al. (2025) demonstrated the importance of sustained public health expenditure to human-capital development, particularly through its long-term effects on population health and productive capacity. Osei et al. (2024) similarly found that government health expenditure reduced under-five mortality and childhood stunting in West African countries in the long run, although its short-run effects were insignificant. These findings indicate that the effect of recurrent expenditure may differ across functions and may require time to materialise in measurable human-development outcomes.

The effectiveness of functionally allocated expenditure also depends on the institutional environment in which services are delivered. Banik et al. (2023), using data from 161 countries, found that governance quality strengthened the effect of healthcare expenditure on human development. Kunawotor et al. (2025) similarly reported that the welfare effect of government size in Africa was conditional on institutional quality, while Dwiputrianti et al. (2025) showed that strategically targeted government expenditure affected human development and regional inequality differently across spending functions. These results challenge the treatment

of recurrent expenditure as a homogeneous fiscal input. Aggregate recurrent expenditure may conceal offsetting effects, as expenditure supporting frontline education, health and productive economic services may improve welfare while inefficient operating obligations weaken the overall relationship.

Nigeria provides an important setting for examining this issue because increases in nominal public expenditure have not translated proportionately into human-development progress. The 2025 Human Development Report recorded an HDI value of 0.560 for Nigeria in 2023, ranking the country 164th out of 193 countries. Life expectancy at birth was 54.5 years, expected years of schooling stood at 10.5 years, mean years of schooling at 7.6 years and gross national income per capita at US$5,569 in 2021 purchasing-power-parity terms. When inequality was considered, Nigeria's HDI declined to 0.379, representing a 32.3% loss in potential human-development achievement (UNDP, 2025). The difference between the unadjusted and inequality-adjusted indices demonstrates that Nigeria's development challenge concerns not only the volume of economic resources but also their distribution and conversion into broadly accessible health, education and income opportunities.

The country's fiscal structure provides a plausible explanation for this weak conversion. The World Bank (2022) estimated that Nigeria's total public expenditure was approximately 12% of GDP and US$220 per person in 2021, placing it among the lowest-spending countries globally. Social sectors received less than one-quarter of national budgetary allocations, while approximately 60% of the limited expenditure was absorbed by salaries, pensions and rising interest payments. Public health spending was approximately US$15 per Nigerian, compared with US$55 per person in Indonesia. These figures reveal a two-sided fiscal problem. Nigeria spends too little relative to its population and development needs, yet a substantial share of the available resources is committed to rigid recurrent obligations. Consequently, increases in aggregate recurrent expenditure may reflect higher wage, pension, interest and operating costs rather than expanded access to quality education, healthcare or productive economic services.

Limited domestic revenue and competing expenditure priorities reinforce this problem. Government revenue was approximately 7% of GDP in 2021, placing Nigeria among the five lowest revenue-generating economies relative to GDP (World Bank, 2022). Low revenue constrains the capacity to sustain social and economic services, while debt servicing and other nondiscretionary obligations reduce the fiscal space available for frontline delivery. Although recent macro-fiscal reforms have improved revenue mobilisation and created additional fiscal space, the World Bank (2025) observed that the resulting gains had not yet translated sufficiently into improved living standards. It therefore emphasised the need to improve expenditure quality and strengthen investment in human capital, social protection and infrastructure. The policy concern is thus not limited to generating additional revenue; it extends to ensuring that recurrent allocations support services capable of improving human development.

The Central Bank of Nigeria classifies federal recurrent expenditure according to functions, including social and community services and economic services (CBN, 2023). Social and community services principally cover education, health and other services included in the official fiscal classification, while economic services comprise agriculture, construction, transport, communication and related economic activities (Gaspar ,et al., 2019). Combining these categories into aggregate recurrent expenditure assumes that they influence human development through similar channels and with comparable effects. Such an assumption is restrictive. Expenditure on teachers and healthcare personnel may affect schooling and longevity directly, whereas expenditure on agriculture and transportation may affect HDI indirectly through productivity, food security, employment and income. Functional disaggregation is therefore necessary to determine which component of recurrent expenditure is more closely associated with Nigeria's human-development outcomes.

Inflation further complicates the interpretation of expenditure growth. When recurrent expenditure is measured in nominal terms, increases may partly reflect higher prices rather than larger quantities or improved quality of public services. Inflation raises the costs of medicines, teaching materials, fuel, transportation, maintenance and other operational inputs, thereby reducing the services that a given allocation can finance. It also weakens household purchasing power, worsens food insecurity and restricts access to healthcare and education. Nigeria's headline inflation increased from 31.7% in February 2024 to 33.2% in March 2024, driven substantially by food and energy prices (IMF, 2024). The World Bank (2025) also observed that high food inflation continued to suppress household welfare notwithstanding improvements in Nigeria's fiscal and external positions. Inflation is therefore included as a control variable to separate the effect of recurrent expenditure from the broader influence of price instability on human development.

Empirical evidence on the relationship remains inconclusive. Onabote et al. (2023), using Nigerian data from 1986 to 2021 and an autoregressive distributed lag model, found no stable short- or long-run relationship between sectoral government expenditure and human development. In contrast, Edeme et al. (2017) found that expenditure on education, health, agriculture, rural development and water resources had positive marginal effects on human development across selected Nigerian states, while expenditure on energy, housing and environmental protection produced decreasing marginal effects. Ajaero et al. (2024) subsequently reported that aggregate recurrent expenditure had an insignificant effect on Nigeria's HDI, whereas capital expenditure

significantly improved human development. The divergent results may reflect differences in expenditure classification, geographical coverage, study period, development measurement and estimation technique. They also indicate that aggregate measures may conceal the distinct effects of the functional components of recurrent expenditure.

Several gaps therefore remain. Much of the Nigerian literature evaluates government expenditure against GDP or per capita income, thereby providing limited evidence on whether fiscal allocations improve health, education and living standards. Studies that employ HDI commonly divide expenditure into broad recurrent and capital categories rather than distinguishing recurrent expenditure on social and community services from recurrent expenditure on economic services. Several sectoral studies also combine recurrent and capital allocations or end before Nigeria's recent period of severe inflation and fiscal adjustment. In addition, static estimation techniques may not adequately distinguish immediate expenditure responses from long-run human-development effects. Consequently, it remains unclear whether routine expenditure devoted specifically to social and community services and economic services has generated sustained improvements in Nigeria's human development after accounting for price instability.

This study addresses these gaps by examining the effects of recurrent expenditure on social and community services and recurrent expenditure on economic services on human development in Nigeria from 1999 to 2024, while controlling for inflation. It replaces the aggregate expenditure–GDP framework with a functional recurrent expenditure–HDI framework that aligns fiscal inputs more closely with people-centred development outcomes. Methodologically, the study employs the autoregressive distributed lag approach to distinguish long-run relationships from short-run dynamics. By doing so, it provides evidence on whether Nigeria's recurrent expenditure pattern has expanded health, education and income capabilities or merely increased nominal government operations without commensurate human-development gains.

II. LITERATURE REVIEW

2.1 Conceptual Review

This section reviews the principal concepts underpinning the study, namely human development, recurrent expenditure on social and community services, recurrent expenditure on economic services, and inflation rate. The review clarifies the meanings and dimensions of these concepts and establishes their relevance to understanding how functionally classified recurrent expenditure influences human development in Nigeria.

2.1.1 Human Development

Human development has evolved from a narrow emphasis on economic growth to a multidimensional conception of development centred on people's capabilities and well-being. Earlier approaches largely evaluated development through increases in gross domestic product or income per capita. However, improvements in national income do not necessarily produce corresponding advances in health, education or living standards, particularly where resources and public services are unevenly distributed. The human-development approach therefore regards people as the ultimate focus of development and income as a means of expanding their opportunities rather than an end in itself (Sen, 1999; UNDP, 2025).

The concept is grounded in the capability approach, which defines development in terms of people's substantive freedoms to achieve valued states of being and doing. Human development consequently extends beyond economic growth, which reflects increases in output, and economic development, which encompasses structural and institutional transformation. It focuses specifically on whether individuals possess meaningful opportunities to live long and healthy lives, acquire knowledge and enjoy decent living conditions. This distinction is important because countries with similar income levels may record different development outcomes due to differences in public-service delivery, institutional effectiveness and income distribution (Sen, 1999; Miranda-Lescano et al., 2024).

The Human Development Index provides a composite measure of average achievement in three basic dimensions of human development: health, education and standard of living. Health is measured by life expectancy at birth, education by mean years of schooling and expected years of schooling, and living standards by gross national income per capita. The normalised dimension indices are combined using a geometric mean to produce a value ranging from zero to one, with higher values indicating greater human-development achievement (UNDP, 2025). The HDI therefore provides a broader assessment of development than GDP because it incorporates direct indicators of people's welfare.

The principal strength of HDI lies in its multidimensional and internationally standardised measurement, which facilitates comparisons across countries and over time. Nevertheless, it reflects average national achievement and may conceal disparities among regions, genders and income groups. It also excludes aspects such as political freedom, personal security, environmental quality and empowerment, while its values may be sensitive to the indicators, normalisation boundaries and aggregation method adopted (Kula et al., 2025;

Naveed, 2024). Notwithstanding these limitations, this study conceptualises human development as the improvement of people's health, knowledge and living standards, measured through HDI. Its use is appropriate because recurrent expenditure on social and community services and economic services is expected to influence these dimensions more directly than aggregate economic output.

2.1.2 Recurrent Expenditure

Recurrent expenditure constitutes the regular spending required to sustain government institutions and deliver public services. It comprises expenditure on personnel, operating supplies, maintenance and other routine activities that do not directly result in the acquisition of fixed assets. Unlike capital expenditure, which creates or acquires assets with benefits extending beyond the fiscal year, recurrent expenditure supports the continuous operation of existing facilities and government programmes (CBN, 2023). Its developmental significance therefore lies in maintaining the personnel and operational inputs through which public assets provide services.

The literature presents competing perspectives on recurrent expenditure. One perspective regards it as consumption-oriented spending that may reduce the fiscal space available for infrastructure and long-term investment, particularly when dominated by excessive administrative costs, inefficient overheads and nondiscretionary obligations. The alternative perspective maintains that recurrent expenditure can be development-enhancing because public facilities cannot produce sustainable benefits without adequate personnel, materials and maintenance. Schools require teachers and instructional materials, healthcare facilities require medical personnel and medicines, while agricultural and transport infrastructure require operational support. Consequently, the developmental effect of recurrent expenditure depends more on its functional composition and efficiency than on its aggregate size (Sama et al., 2025; Le et al., 2025).

In Nigeria, recurrent expenditure has remained a substantial component of government spending, while fiscal constraints have limited resources available for priority social and economic services. The World Bank (2022) reported that salaries, pensions and interest payments absorbed approximately 60% of Nigeria's limited public expenditure, thereby constraining the resources available for effective service delivery. Although recent fiscal reforms have created opportunities to improve expenditure quality, gains in revenue mobilisation have not yet translated sufficiently into improved living standards (World Bank, 2025). This suggests that rising recurrent expenditure does not automatically improve development where allocations are poorly targeted or weakened by implementation inefficiencies.

The Central Bank of Nigeria functionally classifies recurrent expenditure into administration, economic services, social and community services, and transfers (CBN, 2023). This classification recognises that recurrent expenditure components perform different functions and may produce different development outcomes. Accordingly, this study conceptualises recurrent expenditure as government spending on the routine delivery and maintenance of public services. It focuses specifically on recurrent expenditure on social and community services and economic services because these categories are more directly connected with health, education, productivity, income and other dimensions of human development.

2.1.2.1 Recurrent Expenditure on Social and Community Services

Recurrent expenditure on social and community services refers to government spending on the routine delivery of education, health and other related social services. It finances personnel, instructional and medical supplies, maintenance and the daily operation of public institutions within these sectors. Under the Central Bank of Nigeria's functional classification, the category principally comprises recurrent expenditure on education, health and other social and community services (CBN, 2023).

The developmental importance of this expenditure arises from its direct connection with human capabilities. Education expenditure supports teachers, learning materials and school operations, thereby influencing access to knowledge and educational attainment. Health expenditure finances medical personnel, medicines and routine healthcare delivery, with implications for life expectancy, mortality and labour productivity. Magida et al. (2025) emphasised the long-term importance of public health expenditure to human-capital development, while Osei et al. (2024) found that government health expenditure improved child-health outcomes in West African countries over the long run.

Nevertheless, increased expenditure does not automatically guarantee improved social outcomes. Its effectiveness depends on the adequacy of allocations, implementation efficiency, institutional quality and the extent to which resources reach frontline service providers. Banik et al. (2023) found that governance quality strengthened the contribution of healthcare expenditure to human development. This is particularly relevant to Nigeria, where low and inefficient social spending continues to limit the accessibility and quality of education and healthcare services (World Bank, 2022, 2025).

Accordingly, this study conceptualises recurrent expenditure on social and community services as the routine government spending devoted to education, health and other social services reported under the CBN

classification. It is expected to influence human development through improvements in health, knowledge and living conditions.

2.1.2.2 Recurrent Expenditure on Economic Services

Recurrent expenditure on economic services refers to government spending on the routine operation and maintenance of programmes that support productive activities. Under the Central Bank of Nigeria's functional classification, it comprises expenditure on agriculture, construction, transport and communication, and other economic services (CBN, 2023). It finances personnel, maintenance, extension services, regulation and other operating requirements necessary for sustaining government economic programmes and infrastructure.

The developmental relevance of economic-services expenditure arises from its effects on productivity, employment, market access and household income. Agricultural expenditure can support extension services, food production and rural livelihoods, while transport and communication expenditure facilitates the movement of people, goods and information. Routine expenditure on construction and related services can also preserve public infrastructure and improve the environment for productive economic activities. These channels may enhance the standard-of-living dimension of human development and indirectly improve access to health and education.

However, the effectiveness of such expenditure depends on its allocation, implementation and alignment with productive priorities. Weak maintenance, inefficient programmes and poor institutional coordination may limit the developmental benefits of increased spending. Evidence from Nigeria indicates that the effects of sectoral expenditure differ across economic functions, implying that expenditure size alone does not determine development outcomes (Edeme et al., 2017; Onabote et al., 2023). Recent fiscal assessments similarly emphasise that improvements in expenditure quality are necessary for government spending to generate inclusive economic opportunities and better living standards (World Bank, 2025).

Accordingly, this study conceptualises recurrent expenditure on economic services as routine government spending on agriculture, construction, transport and communication, and other economic services reported under the CBN classification. It is expected to influence human development through productivity, employment, food security, connectivity and income.

2.1.3 Inflation Rate

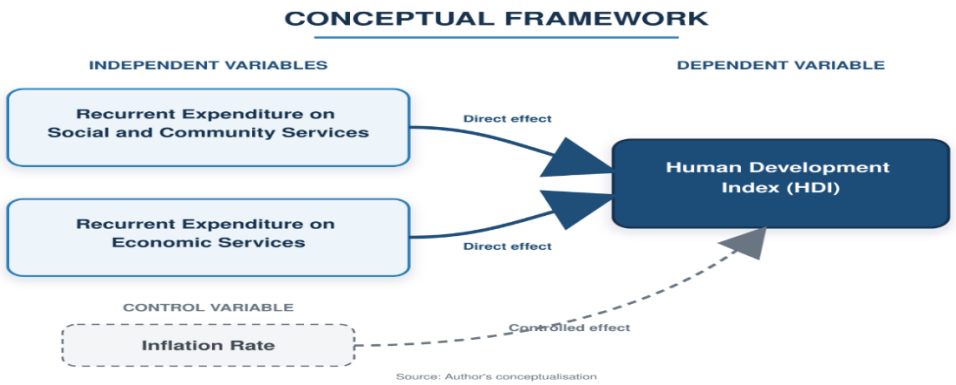
Inflation refers to a sustained increase in the general price level, resulting in a decline in the purchasing power of money. It differs from a temporary increase in the price of a particular commodity because it reflects a broad and persistent rise in the prices of goods and services. Inflation may arise from excessive aggregate demand, increases in production costs or structural constraints affecting supply, distribution and market efficiency. It is commonly measured by the annual percentage change in the Consumer Price Index.

The consequences of inflation extend beyond price instability to household welfare and public-service delivery. Rising prices reduce real income, weaken purchasing power and increase the cost of food, healthcare, education and other basic needs. Inflation can therefore adversely affect the health, education and living-standard dimensions of human development. Its effects are often more severe among low-income households because they allocate a larger proportion of their income to essential consumption.

Inflation also reduces the real value of government expenditure. Where budgetary allocations are stated in nominal terms, rising expenditure may reflect higher prices rather than an expansion in the quantity or quality of public services. Increases in the costs of medicines, instructional materials, fuel, transportation and maintenance can weaken the service-delivery capacity of social and economic expenditure. This concern is particularly relevant in Nigeria, where recent inflationary pressures have been driven substantially by food and energy prices and have continued to weaken household welfare (IMF, 2024; World Bank, 2025).

Accordingly, this study conceptualises inflation rate as the annual percentage change in the Consumer Price Index. It is included as a control variable because it can independently influence human development and the real purchasing power of recurrent expenditure. Its inclusion enables the effects of social and community services expenditure and economic services expenditure on human development to be estimated after accounting for changes in the general price level.

2.1.4 Conceptual Framework



The framework illustrates the direct effects of recurrent expenditure on social and community services and economic services on human development, measured by HDI. The solid arrows represent the hypothesised direct relationships, while the dotted arrow identifies inflation rate as a control variable.

2.2 Theoretical Review

2.2.1 Keynesian Theory of Public Expenditure

The Keynesian Theory of Public Expenditure, developed by Keynes (1936), argues that government expenditure can stimulate aggregate demand, production, employment and household income, particularly when an economy operates below full capacity. Increased public spending generates multiplier effects as the initial expenditure produces successive increases in income and consumption. Beyond stabilising economic activity, recurrent expenditure can support human development by financing the continuous provision of education, healthcare, transportation and other essential public services. In the context of this study, the theory explains how recurrent expenditure on social and community services and economic services can improve health, education and living standards in Nigeria. However, these benefits may be weakened by inflation, fiscal inefficiency, corruption and the diversion of public resources from their intended purposes. The theory therefore provides the principal explanation for the relationship between recurrent expenditure and human development.

2.2.2 Capability Approach

The Capability Approach, advanced by Sen (1999), defines development as the expansion of individuals' substantive freedoms and opportunities to live lives they have reason to value. The approach distinguishes between resources and actual achievements by arguing that income or economic growth alone does not necessarily improve well-being unless individuals can convert available resources into valuable functionings, such as being healthy, educated and adequately housed. This perspective provides the intellectual foundation for the human development framework and the use of the Human Development Index as a broader measure of development. In this study, the Capability Approach explains how recurrent expenditure may expand human capabilities by improving access to healthcare, education, social protection and economic infrastructure. It therefore complements Keynesian theory by shifting attention from the level of government spending to its capacity to produce tangible improvements in people's lives.

Although the Keynesian Theory of Public Expenditure and the Capability Approach examine development from different perspectives, they are complementary rather than competing. Keynesian theory explains how recurrent expenditure influences economic activity and the provision of public services, while the Capability Approach explains how access to those services enhances health, education and living standards. Together, the theories establish the transmission from government recurrent expenditure to human development. Accordingly, the Keynesian Theory of Public Expenditure serves as the primary theoretical foundation for explaining the expenditure–human development relationship, while the Capability Approach complements it by explaining the welfare outcomes represented by HDI.

2.3 Empirical Review

2.3.1 Recurrent Expenditure on Social and Community Services and Human Development

Empirical evidence generally indicates that public expenditure on health, education and social protection can enhance human development by expanding access to essential services and improving health, educational and income outcomes. Using panel data from 82 developed and developing countries, Miranda-Lescano et al. (2024) found that expenditure on health, education and social protection reduced inequality-

induced losses in HDI. Banik et al. (2023) similarly established that healthcare expenditure enhanced human development, although its effectiveness depended substantially on governance quality. These findings suggest that the developmental value of social expenditure is determined not only by its size but also by its composition and institutional management.

Evidence from regional and country-level studies further demonstrates that the effects of social expenditure may differ between the short and long run. Using data from 16 West African countries, Osei et al. (2024) found that government health expenditure reduced under-five mortality and childhood stunting in the long run, while the short-run effects were insignificant. Onabote et al. (2023) similarly reported heterogeneous effects of government sectoral expenditure on human development in Africa, with health expenditure producing more favourable outcomes than some other expenditure components. These results indicate that improvements in human development may require sustained social-sector financing before they become observable.

Evidence from other regions supports this dynamic relationship. Aytemiz et al. (2024), using second-generation cointegration techniques for OECD countries, found that social, educational and health expenditures improved life expectancy in the long run, with health expenditure producing a comparatively stronger effect. Magida et al. (2025), employing ARDL, vector error correction, quantile regression and causality techniques, also found that public health expenditure enhanced human development in South Africa in both the short and long run. The magnitude of the effect varied across development levels, showing that socioeconomic conditions influence the effectiveness of public spending.

Evidence from Nigeria remains mixed. Edeme et al. (2017) found that expenditure on education, health, rural development and water resources produced positive marginal effects on human development across Nigerian states. Earlier GDP-based studies also revealed sectoral differences. Nurudeen and Usman (2010) reported that health expenditure supported economic growth, whereas education expenditure produced a negative effect. Adewara and Oloni (2012) similarly found that health expenditure promoted growth, while education expenditure did not yield the expected outcome. Since these earlier studies measured development with GDP rather than HDI, however, their findings provide only indirect evidence of human development.

More recent Nigerian studies have not resolved the inconsistency. Ajaero et al. (2024) found that aggregate recurrent expenditure had an insignificant effect on HDI between 2003 and 2022, whereas Orshi and Peter (2025) reported a negative short-run effect but a positive and significant long-run effect. The conflicting findings may reflect differences in expenditure aggregation, study periods and estimation techniques. Overall, the evidence suggests that social expenditure can enhance human development, but its effectiveness depends on functional composition, implementation quality, institutional capacity and adjustment time. The limited disaggregation of recurrent expenditure into social and community services therefore justifies examining its short- and long-run relationships with HDI in Nigeria.

2.3.2 Recurrent Expenditure on Economic Services and Human Development

Recurrent expenditure on economic services finances the operation of agricultural, transportation, communication and other productive services. By supporting food production, market access, employment and economic opportunities, such expenditure can improve household income and living standards. However, its developmental effect depends on whether budgetary allocations are effectively converted into functional services and accessible economic opportunities.

Recent empirical evidence indicates that the contribution of government expenditure to development is conditional rather than automatic. Using evidence from developing economies, Le et al. (2025) found that expenditure composition and institutional conditions influenced the extent to which government spending promoted sustainable development. Sama et al. (2025), applying system GMM to 38 Sub-Saharan African countries, similarly found that public spending did not independently enhance sustainable development and that governance quality significantly shaped its effectiveness. These findings indicate that the quality and allocation of expenditure may be more important than its aggregate size.

Subnational evidence reinforces the importance of expenditure targeting. Dwiputrianti et al. (2025) found that strategically directed government spending improved human-development outcomes across districts in Papua, although the effects differed among expenditure functions and locations. This variation suggests that recurrent expenditure on economic services may produce unequal outcomes where infrastructure, institutional capacity and access to public services differ across regions. Consequently, aggregating economic-services expenditure with other government spending may conceal its specific developmental contribution.

Nigerian evidence is also mixed. Edeme et al. (2017) found that expenditure on agriculture and rural development produced positive marginal effects on human development, whereas expenditure on energy generated decreasing marginal effects. Earlier GDP-based studies similarly identified differences among economic-service components. Nurudeen and Usman (2010) reported that transportation and communication expenditure positively affected economic growth, while Adewara and Oloni (2012) found that agricultural expenditure supported growth. Although these studies provide indirect evidence that economic services can improve productive opportunities and living standards, their use of GDP limits direct inference about HDI.

The literature reviewed suggests that expenditure on economic services can promote human development through improved productivity, employment, food security, income and market access. However, most Nigerian studies either combine economic-services expenditure with other public spending or examine individual components against GDP. Limited evidence therefore exists on the short- and long-run relationships between recurrent expenditure on economic services and HDI. This study addresses this limitation by treating recurrent expenditure on economic services as a distinct functional expenditure category.

2.3.3 Inflation and Human Development

Inflation can weaken human development by reducing real household income, increasing the cost of essential goods and restricting access to healthcare, education and adequate living conditions. It may also erode the real value of government expenditure when budgetary allocations do not adjust sufficiently to rising prices. Inflation can therefore influence HDI independently of public expenditure and should be controlled when estimating the expenditure–human development relationship.

International evidence generally indicates an adverse relationship, although its magnitude varies across contexts. Ramadhan and Pertiwi (2025) found that inflation had a negative and significant effect on HDI in Indonesia, attributing the result to declining purchasing power and reduced access to essential services. Using system GMM for 14 Southern African countries, Chipunzaet al (2026) similarly found that inflation constrained human development, although its effect varied across macroeconomic conditions. These findings suggest that sustained price increases can weaken the health, education and income dimensions of HDI.

Nigerian evidence remains mixed. Omodero (2019) reported that inflation had a negative but statistically insignificant effect on HDI, while Dauda and Iwegbu (2022) found a weak positive relationship, with inflation explaining only a small proportion of changes in human development. More recently, Musa et al. (2024), using a vector autoregression framework and annual data for 1991–2023, found that inflation and unemployment significantly influenced poverty and human development in Nigeria.Habib et al. (2025) similarly established that food inflation weakened human-capital development by reducing real household income and limiting households' capacity to invest in health and education. Differences in inflation measures, study periods and estimation techniques may account for these conflicting results.

Overall, the evidence indicates that inflation may affect human development directly through household purchasing power and indirectly through the real value and accessibility of public services. However, the inconsistent Nigerian findings leave its precise effect unresolved. Accordingly, inflation is included solely as a control variable to isolate its independent influence on HDI and obtain more reliable estimates of the relationships between recurrent expenditure and human development; it is not treated as a moderator.

2.4 Research Gap

Existing studies report mixed findings on the relationship between government expenditure and development due to differences in expenditure composition, development measures, study periods and methods. Most Nigerian studies used GDP or per capita income rather than HDI, while HDI-based studies largely employed aggregate expenditure, obscuring the effects of specific recurrent expenditure functions.

Furthermore, limited studies distinguish the short- and long-run relationships between recurrent expenditure on social and community services, economic services and HDI. This study addresses these gaps using the ARDL approach for Nigeria from 1999 to 2024, with inflation included solely as a control variable.

III. METHODOLOGY.

3.1 Research Design

The study adopted a quantitative ex post facto research design. The design was appropriate because the study relied on historical macroeconomic data that had already occurred and could not be manipulated by the researcher. Quantitative research facilitates the objective measurement and statistical estimation of relationships among variables, while an ex post facto design is appropriate where the researcher examines naturally occurring observations without manipulating the explanatory variables (Cohen et al., 2018). The design was therefore suitable for examining the short- and long-run relationships between government recurrent expenditure and human development in Nigeria.

3.2 Population, Sample Size and Sampling Technique

The population comprised annual observations on human development, recurrent expenditure on social and community services, recurrent expenditure on economic services and inflation in Nigeria. The study period was purposively delimited to 1999–2024, providing 26 annual observations for each variable. The period begins with Nigeria's return to civilian rule and the commencement of the Fourth Republic, thereby providing a relatively consistent democratic institutional context for examining government expenditure and human development (Suberu, 2007).All 26 annual observations within the defined period were included; therefore, the

study employed total enumeration (census) rather than selecting a sample. Total enumeration involves examining all available units within a defined population and is appropriate where the accessible population is clearly specified and manageable (Sekaran & Bougie, 2016). Consequently, no probabilistic sampling technique was required.

3.3 Method of Data Collection

The study employed documentary secondary data. Annual HDI data were obtained from the United Nations Development Programme (UNDP, 2024, 2025), while recurrent expenditure and inflation data were obtained from the Central Bank of Nigeria Statistical Bulletin (CBN, 2024). These sources were selected because they are authoritative institutions responsible for publishing internationally comparable human-development statistics and Nigeria's official fiscal and macroeconomic data.Recurrent expenditure on social and community services was measured as the aggregate recurrent expenditure on health and education expressed as a percentage of GDP. Recurrent expenditure on economic services was measured as the aggregate recurrent expenditure on agriculture and transportation and communication expressed as a percentage of GDP (Modebe, et al., 2012; Aigheyisi, 2013). Inflation was measured by the annual percentage change in the Consumer Price Index (Blinder, et al., 1980) and included solely as a control variable.

3.4 Data Analysis Techniques

The data were analysed using descriptive statistics, correlation analysis, unit-root testing and the Autoregressive Distributed Lag (ARDL) technique in EViews 13. Descriptive statistics were used to summarise the distribution and characteristics of the variables, while Pearson correlation analysis examined the direction and strength of their pairwise associations. Variance Inflation Factors (VIFs) were employed to assess possible multicollinearity among the explanatory variables (Hair et al., 2019).

The Augmented Dickey–Fuller (ADF) test was used to determine the order of integration of the variables and minimise the possibility of spurious regression (Dickey & Fuller, 1979, 1981; Granger & Newbold, 1974). The ARDL approach was adopted because it accommodates variables integrated at I(0) and I(1), or a mixture of both, provided that none is integrated at I(2), and is suitable for relatively small samples (Pesaran, et al., 2001; Narayan, 2005). Given the limited number of annual observations, a maximum lag length of one was specified, while the Akaike Information Criterion (AIC) was used to select the optimal lag structure (Akaike, 1974).

The ARDL bounds-testing procedure was used to determine whether a long-run relationship existed among HDI, RESCS, REES and INFLR. The test was conducted under Case 2, with a restricted constant and no trend (Pesaran et al., 2001). The null hypothesis of no levels relationship was rejected when the F-statistic exceeded the upper-bound critical value. Given the small sample, small-sample critical values were also considered (Narayan, 2005). Where cointegration was established, long-run coefficients and an error-correction model were estimated to assess equilibrium effects and short-run dynamics, respectively (Banerjee, et al., 1998; Pesaran, et al., 2001).

Model adequacy was assessed using the Jarque–Bera normality test (Jarque&Bera, 1987), Breusch–Pagan–Godfrey heteroskedasticity test (Breusch & Pagan, 1979), Breusch–Godfrey serial-correlation LM test (Breusch, 1978; Godfrey, 1978) and Ramsey RESET test for functional-form specification (Ramsey, 1969). Parameter stability was assessed using the CUSUM and CUSUM-of-squares tests (Brown, et al., 1975). Statistical decisions were made at the 5% significance level.

3.5 Model Specification

The study specified human development as a function of recurrent expenditure on social and community services, recurrent expenditure on economic services and inflation rate. The functional model is expressed as:

$$\mathbf{HDIt=f(RESCSt,REESt,INFLRt)}$$

The corresponding econometric model is:

$$\boldsymbol{HDIt=\beta0+\beta1RESCSt+\beta2REESt+\beta3INFLRt+\varepsilon t}$$

Where HDIt = Human Development Index; RESCSt = recurrent expenditure on social and community services; REESt = recurrent expenditure on economic services; INFLRt = inflation rate; β0 = intercept; β1−β3 = coefficients of the explanatory and control variables; and εt = error term.

To estimate the short- and long-run relationships, the study employed the Autoregressive Distributed Lag (ARDL) framework. With a maximum lag length of one, the ARDLmodel is specified as:

$$\boldsymbol{HDIt=\alpha0+\phi1HDIt-1+\beta10RESCSt+\beta11RESCSt-1+\beta20REESt+\beta21REESt-1+\beta30\ INFLRt+\beta31\ INFLRt-1+\varepsilon t}$$

The ARDL bounds-testing equation is specified as:

$$\boldsymbol{\Delta HDIt=\alpha0+\gamma1HDIt-1+\gamma2RESCSt-1+\gamma3REESt-1+\gamma4INFLRt-1+\delta1\Delta RESCSt+\delta2\ \Delta REESt+\delta3\Delta INFLRt+\varepsilon t}$$

The null hypothesis is rejected where the calculated F-statistic exceeds the upper-bound critical value. Where a long-run relationship is established, the long-run model is expressed as:

$$HDIt = \theta 0 + \theta 1 RESCSt + \theta 2 REESt + \theta 3 INFLRt + \varepsilon t$$

The short-run error-correction model is specified as:

$$\Delta HDIt = \alpha 0 + \delta 1 \Delta RESCSt + \delta 2 \Delta REESt + \delta 3 \Delta INFLRt + \lambda ECTt - 1 + \mu t$$

Where Δ denotes the first-difference operator, ECTt−1 is the lagged error-correction term, and λ represents the speed of adjustment towards long-run equilibrium. A negative and statistically significant ECTt−1 coefficient indicates convergence towards long-run equilibrium (Banerjee, et al., 1998; Pesaran, et al., 2001).

3.6 Description and Measurement of Variables

The model comprised one dependent variable, two independent variables and one control variable, as presented in Table 1.

Table 1: Variables, Definitions and Measurements

Variable	Symbol	Definition and Measurement	Role	Source
Human Development Index	HDI	Composite index measuring achievements in health, education and standard of living, ranging from 0 to 1	Dependent	UNDP (2025)
Recurrent expenditure on social and community services	RESCS	Aggregate Federal Government recurrent expenditure on social and community services, including health and education, expressed as a percentage of GDP	Independent	CBN (2024);Modebe, et al., 2012; Aigheyisi, 2013Ajaero et al. (2024)
Recurrent expenditure on economic services	REES	Aggregate Federal Government recurrent expenditure on economic services expressed as a percentage of GDP	Independent	Modebe, et al., 2012; Aigheyisi, 2013Ajaero et al. (2024)
Inflation rate	INFLR	Annual percentage change in the Consumer Price Index	Control	CBN (2024); Blinder, et al., 1980).

Source: Author's compilation (2026).

The HDI was selected because it provides a multidimensional measure of human development encompassing health, education and standard of living. Government expenditure was disaggregated into recurrent expenditure on social and community services and recurrent expenditure on economic services to distinguish expenditure associated with social-sector provision from expenditure directed towards economic services. Both expenditure variables were expressed as percentages of GDP to improve comparability across the study period. Inflation was included as a control variable to account for macroeconomic price-level conditions that may influence human-development outcomes independently of government expenditure.

IV. RESULTS AND FINDINGS

4.1 Descriptive Statistics

Descriptive statistics were used to summarise the distribution and variability of the study variables. The results are presented in Table 2.

Table 2: Descriptive Statistic

	HDI	RESCS	REES	INFLR
Mean	0.506038	0.922449	0.480420	13.65040
Median	0.510000	0.853100	0.331312	12.70725
Maximum	0.560000	1.336900	1.604700	33.24166
Minimum	0.425000	0.646000	0.252000	5.386104
Std. Dev.	0.039579	0.192241	0.318664	5.992726
Skewness	-0.528624	0.765453	2.098157	1.410710
Kurtosis	2.277427	2.667323	7.208525	5.686089
Jarque-Bera	1.776545	2.658873	38.26413	16.44011
Probability	0.411366	0.264626	0.000000	0.000269
Sum	13.15700	23.98368	12.49092	354.9104
Sum Sq. Dev.	0.039163	0.923919	2.538661	897.8191
Observations	26	26	26	26

Source: Author's computation using EViews 13

The mean HDI of 0.506 indicates that Nigeria remained within the low human-development category for most of the study period. Its small standard deviation suggests gradual rather than substantial improvement in health, education and living standards. Social and community-services expenditure averaged 0.922% of GDP, almost

twice the 0.480% allocated to economic services. Yet the persistently low HDI raises concerns about the adequacy and implementation of recurrent expenditure.

Economic-services expenditure varied considerably more than social and community-services expenditure, suggesting inconsistent fiscal commitment to productive services that support employment, market access and household income. Although social expenditure was comparatively stable, stability does not necessarily indicate effectiveness.

Inflation averaged 13.650% and reached 33.242%, indicating substantial macroeconomic instability. Persistent inflation may have reduced household purchasing power, increased healthcare and education costs, and weakened the real value of public expenditure, supporting its inclusion as a control variable.

The non-normality of economic-services expenditure and inflation reflects substantial fiscal and macroeconomic fluctuations. However, ARDL requires normally distributed residuals rather than individual variables. Essentially, the results show that low human development coexisted with modest recurrent expenditure and high inflation, justifying further analysis of their short- and long-run relationships.

4.2 Correlation Analysis

Correlation analysis was conducted to examine the direction and strength of the associations among the study variables. The results are presented in Table 3.

Table 3: Correlation Matrix

	HDI	RESCS	REES	INFLR
HDI	1			
RESCS	-0.3894	1		
REES	-0.5682	0.3866	1	
INFLR	0.3981	-0.2298	-0.2613	1

Source: Author's computation using EViews 13.

HDI was moderately and negatively associated with social and community-services expenditure (r=−0.389) and economic-services expenditure (r=−0.568). This suggests that higher expenditure shares did not consistently coincide with improved HDI, possibly due to implementation inefficiencies or changes in GDP. Inflation had a moderate positive association with HDI (r=0.398), but this may reflect their common movement over time rather than a beneficial effect. Correlations among the explanatory variables were below 0.40, indicating no serious multicollinearity concern. These associations do not establish causality or statistical significance; hence, inferential conclusions rely on the ARDL results.

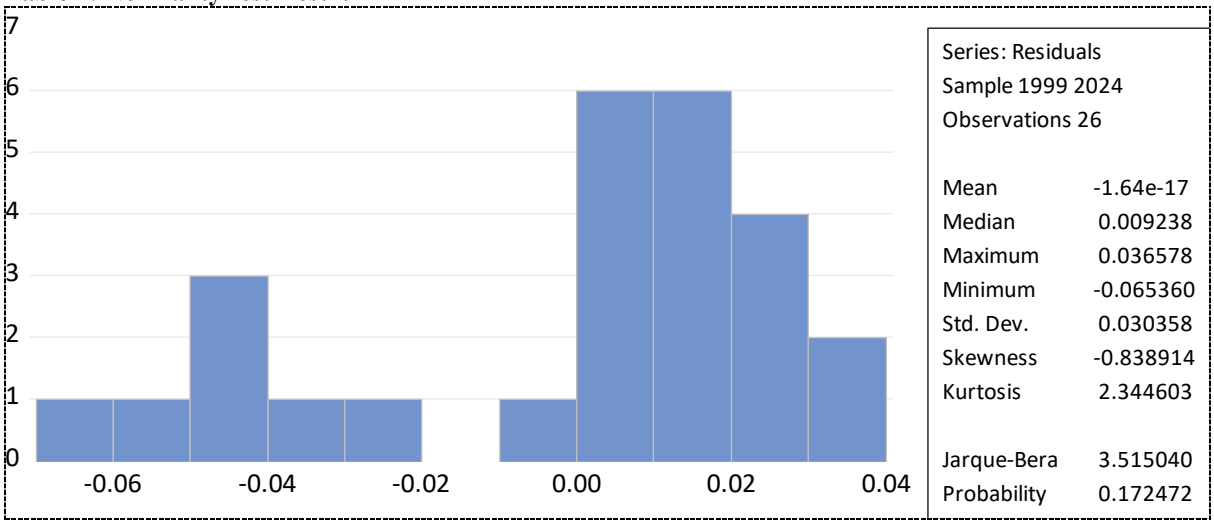
4.3 Diagnostic Tests and Assumption Checks

Before estimating the model, relevant diagnostic tests were conducted to assess the reliability of the results. These included tests for multicollinearity, residual normality, heteroskedasticity, serial correlation, model specification and parameter stability. The results are presented and interpreted in the following subsections.

4.3.1 Normality Test

The normality test was used to determine whether the model residuals followed an approximately normal distribution, thereby supporting the validity of statistical inference.

Table 4: NormalityTest Result



The Jarque–Bera statistic of 3.5155 with a probability value of 0.1725 exceeds the 5% significance level. Therefore, the null hypothesis of normally distributed residuals is not rejected. This indicates that the model residuals are approximately normal and that statistical inference from the estimated coefficients is reliable.

4.3.2 Heteroskedasticity Test

The Breusch–Pagan–Godfrey test was used to determine whether the residual variance remained constant across observations.

Table 5: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity

F-statistic	0.168517	Prob. F(3,22)	0.9165
Obs*R-squared	0.584047	Prob. Chi-Square(3)	0.9001
Scaled explained SS	0.281132	Prob. Chi-Square(3)	0.9635

The probability values of the F-statistic (0.9165) and Obs*R-squared statistic (0.9001) exceed 0.05. Therefore, the null hypothesis of homoskedasticity was not rejected. This indicates that the model is free from heteroskedasticity and that the estimated standard errors are reliable.

4.3.3 Multicollinearity Test

The Variance Inflation Factor was used to determine whether strong linear relationships existed among the explanatory variables. The results are presented in Table 6.

Table 6: Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
RESCS	0.001361	29.95484	1.200811
REES	0.000504	4.106375	1.220754
INFLR	1.28E-06	7.011568	1.096236
C	0.001514	37.58471	NA

Source: Author's computation using EViews 13.

The centred VIF values ranged from 1.096 to 1.221, substantially below the conventional threshold of 5. This indicates that the explanatory variables were not highly correlated and that multicollinearity did not threaten the reliability of their estimated coefficients. The centred values are the relevant statistics because the model contains an intercept (O'Brien, (2007).

4.3.4 Serial Correlation Test

The Breusch–Godfrey LM test was used to determine whether the model residuals were serially correlated up to two lags. The results are presented in Table 7.

Table 7: Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	31.42693	Prob. F(2,20)	0.0000
Obs*R-squared	19.72389	Prob. Chi-Square(2)	0.0001

The probability values of the F-statistic (0.0000) and Obs*R-squared statistic (0.0001) are below 0.05. Therefore, the null hypothesis of no serial correlation is rejected, indicating that the residuals of the preliminary static model are serially correlated. This suggests that current HDI outcomes are influenced by past values not captured by the static specification. The result therefore supports the use of a dynamic ARDL model, which incorporates lagged variables to account for temporal dependence. Serial correlation is subsequently reassessed using the residuals of the final ARDL model.

4.3.5 Model Specification Test

The Ramsey RESET test was used to determine whether the model suffered from functional-form misspecification or omitted nonlinear terms. The results are presented in Table 8.

Table 8: Ramsey RESET Test

	Value	df	Probability
t-statistic	0.486672	21	0.6315

F-statistic	0.236850	(1, 21)	0.6315
Likelihood ratio	0.291601	1	0.5892

Source: Author's computation using EViews 13.

The F-statistic probability of 0.6315 exceeds 0.05; therefore, the null hypothesis of correct functional specification is not rejected. This indicates no evidence of omitted nonlinear terms or functional-form misspecification in the preliminary model.

4.4 Unit-Root Test

The Augmented Dickey–Fuller test was conducted to determine the stationarity properties of the variables and ensure that none was integrated of order two. The results are presented in Table 9.

Table 9: Summary of ADF Unit-Root Results

Variable	ADF statistic	Probability	Decision	Order
HDI	−3.5923	0.0135	Stationary at level	(I(0))
RESCS	−3.2131	0.0311	Stationary at level	(I(0))
REES	−5.3018	0.0002	Stationary at level	(I(0))
INFLR	−4.6971	0.0011	First difference is stationary	(I(1))*

Source: Author's computation using EViews 13.

HDI, RESCS and REES were stationary at level, while inflation became stationary after first differencing. Thus, the variables comprised a mixture of I(0) and I(1), with none integrated of order two. This integration pattern satisfies the basic requirement for applying the ARDL bounds-testing approach.

4.5 ARDL Bounds Test for Cointegration

The ARDL bounds test was conducted to determine whether a long-run relationship existed among HDI, recurrent expenditure and inflation. The null hypothesis stated that no level relationship existed. The results are presented in Table 8.

Table 10: ARDL Bounds-Test Result

Test Statistic	Value
F-statistic	13.894934

Bound Critical Values

	10%		5%		1%	
Sample Size	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
30	2.676	3.586	3.272	4.306	4.614	5.966
Asymptotic	2.370	3.200	2.790	3.670	3.650	4.660

* I(0) and I(1) are respectively the stationary and non-stationary bounds.

The F-statistic of 13.8949 exceeds the upper-bound critical value of 5.966 at the 1% level. Therefore, the null hypothesis of no level relationship is rejected. This confirms cointegration among HDI, social and community-services expenditure, economic-services expenditure and inflation, justifying the estimation of the long-run and error-correction models.

4.6 Long-Run ARDL Results

The levels equation was estimated following confirmation of cointegration to determine the long-run relationships between recurrent expenditure, inflation and HDI. The results are presented in Table 11.

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047829	0.012861	3.718859	0.0014
HDI(-1)*	-0.069036	0.022479	-3.071103	0.0060

RESCS**	-0.001467	0.004320	-0.339651	0.7377
REES**	-0.005069	0.003591	-1.411442	0.1735
INFLR**	-0.000327	0.000136	-2.405890	0.0259

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESCS	-0.021253	0.061638	-0.344795	0.7338
REES	-0.073424	0.048665	-1.508760	0.1470
INFLR	-0.004733	0.002891	-1.637105	0.1172
C	0.692813	0.085035	8.147401	0.0000

EC = HDI - (-0.0213*RESCS -0.0734*REES -0.0047*INFLR + 0.6928)

		Finite Sample: n=30	
Actual Sample Size	25		
		10%	2.676	3.586
		5%	3.272	4.306
		1%	4.614	5.966

Table 11 presents the ARDL long-run estimates and bounds test for the relationship between human development (HDI), recurrent expenditure on social and community services (RESCS), recurrent expenditure on economic services (REES), and inflation rate (INFLR) for the period 1999–2024. The ARDL model was selected based on the Akaike Information Criterion.

The long-run coefficient of RESCS is negative and statistically insignificant ($\beta = -0.0213$, $p = 0.7338$). This implies that recurrent expenditure on social and community services has a negative association with human development in the long run, although the effect is not statistically significant. Similarly, REES has a negative and statistically insignificant long-run relationship with HDI ($\beta = -0.0734$, $p = 0.1470$). This indicates that recurrent expenditure on economic services is inversely associated with human development, but the relationship is not statistically significant.

Inflation rate also exhibits a negative but statistically insignificant long-run relationship with HDI ($\beta = -0.0047$, $p = 0.1172$). Thus, although higher inflation is associated with lower human development, the evidence is insufficient to establish a statistically significant long-run effect at the 5% level.

4.7 ARDL Error Correction Regression Result

The error-correction model was estimated to determine the speed at which short-run deviations in human development return to long-run equilibrium. The results are presented in Table 12.

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)*	-0.069036	0.007561	-9.130696	0.0000

R-squared	0.543185	Mean dependent var	0.004920
Adjusted R-squared	0.543185	S.D. dependent var	0.004915
S.E. of regression	0.003322	Akaike info criterion	-8.537235
Sum squared resid	0.000265	Schwarz criterion	-8.488480
Log likelihood	107.7154	Hannan-Quinn criter.	-8.523712
Durbin-Watson stat	1.335855		

* p-value incompatible with t-Bounds distribution.

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	13.89493	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Table 12 presents the error correction regression for the relationship between human development, recurrent expenditure and inflation. The coefficient of the error correction term, CointEq(-1), is negative and statistically significant (β = −0.0690, t = −9.1307, p = 0.0000). The negative and significant coefficient confirms the existence of an adjustment mechanism through which deviations from the long-run equilibrium are corrected over time.The coefficient of −0.0690 indicates that approximately 6.90% of the disequilibrium from the previous period is corrected in the current period. This suggests that adjustment towards the long-run equilibrium is gradual, with the system correcting about 6.90% of any deviation from equilibrium annually. The statistically significant error correction coefficient also provides further evidence supporting the long-run relationship established by the bounds test in Table 11.The model records an R-squared value of 0.5432, indicating that approximately 54.32% of the variation in changes in HDI is accounted for by the error-correction specification. The Durbin-Watson statistic is 1.3359. Essentially, the results indicate that the variables maintain a stable long-run relationship, with deviations from equilibrium corrected gradually over time.

4.8 Test of Hypotheses

Hypothesis One

H_{01}: *Recurrent expenditure on social and community services has no significant effect on human development in Nigeria.*

The long-run ARDL result indicates that recurrent expenditure on social and community services (RESCS) has a coefficient of −0.021253 and a probability value of 0.7338. Since the probability value is greater than the 5% level of significance, the null hypothesis is not rejected. The study therefore concludes that recurrent expenditure on social and community services has no statistically significant long-run effect on human development in Nigeria.

Hypothesis Two

H_{02}: *Recurrent expenditure on economic services has no significant effect on human development in Nigeria.*

The long-run ARDL result shows that recurrent expenditure on economic services (REES) has a coefficient of −0.073424 and a probability value of 0.1470. Since the probability value exceeds the 5% level of significance, the null hypothesis is not rejected. The study therefore concludes that recurrent expenditure on economic services has no statistically significant long-run effect on human development in Nigeria.

Inflation, included as a control variable, also had no significant long-run relationship with HDI (β=−0.004733, p=0.1172). The bounds test nevertheless confirmed that the variables were jointly cointegrated, while the significant error-correction coefficient showed gradual adjustment towards equilibrium.

4.8 Discussion of Findings

The bounds test established a long-run relationship among recurrent expenditure, inflation and HDI. The negative and significant error-correction coefficient indicates that deviations from long-run equilibrium are corrected at approximately 6.9% annually, suggesting relatively slow adjustment. This is plausible because improvements in health, education and living standards require sustained financing and may take time to be reflected in HDI. However, cointegration indicates joint long-run movement and does not imply that each explanatory variable has a significant individual relationship with human development.

Recurrent Expenditure on Social and Community Services and Human Development

Recurrent expenditure on social and community services had a **negative but statistically insignificant long**-run relationship with HDI (β = −0.021253, p = 0.7338). The evidence therefore does not establish a reliable long-run association between RESCS, measured as a percentage of GDP, and human development in Nigeria.

The finding agrees with Ajaero et al. (2024), who reported that recurrent expenditure did not significantly influence HDI in Nigeria. It also reflects the heterogeneous outcomes reported by Onabote et al. (2023) and earlier Nigerian studies, which found that health and education expenditure did not consistently produce human-development improvements. However, it contrasts with studies reporting positive effects of social expenditure

on HDI, life expectancy and child health (Banik et al., 2023; Miranda-Lescano et al., 2024; Osei et al., 2024; Aytemiz et al., 2024; Magida et al., 2025). It also differs from Edeme et al. (2017) and Orshi and Peter (2025), who found favourable human-development outcomes from social or recurrent expenditure.

The insignificant relationship may reflect a weak transmission from budgetary expenditure to effective service delivery. Recurrent spending may sustain salaries, overheads and administrative operations without necessarily improving the quality or accessibility of healthcare and education. Population growth, implementation weaknesses, fiscal leakages and unequal regional access may further dilute its developmental contribution. Since RESCS is measured as a percentage of GDP, the negative coefficient may also reflect periods in which HDI improved gradually while social expenditure declined relative to the expanding economy, rather than indicating that higher expenditure reduces human development.

The finding provides limited support for the Keynesian expectation that government spending improves welfare through aggregate demand and public-service provision. However, it does not invalidate the theory; rather, it suggests that the fiscal transmission mechanism was weak under Nigeria's institutional conditions. The result is also consistent with the Capability Approach, which distinguishes the availability of resources from their conversion into valuable outcomes. Social expenditure contributes to human development when it effectively enables people to become healthier, better educated and capable of achieving an adequate standard of living.

Recurrent Expenditure on Economic Services and Human Development

Recurrent expenditure on economic services also had a negative but statistically insignificant long-run relationship with HDI ($\beta = -0.073424$, $p = 0.1470$). Thus, variations in REES as a percentage of GDP were not reliably associated with long-run changes in human development in Nigeria.

The finding supports evidence that public expenditure does not independently guarantee development and that outcomes depend on expenditure composition, governance and institutional quality (Le et al., 2025; Sama et al., 2025). It also accords with Edeme et al. (2017), who reported declining marginal human-development outcomes for some economic-service components. However, it contrasts with Dwiputrianti et al. (2025), who found that strategically targeted expenditure improved human development, and with Nigerian evidence linking agriculture, rural development, transportation and communication expenditure to favourable development or growth outcomes (Nurudeen& Usman, 2010; Adewara&Oloni, 2012; Edeme et al., 2017).

Several contextual factors may explain the result. Economic-services expenditure may finance government agencies and routine operations without sufficiently improving agricultural extension, transportation systems, communication access or market connectivity. Its relatively low share of GDP and substantial annual variation may also indicate limited and inconsistent fiscal commitment. Furthermore, aggregation may conceal differences among constituent services, as gains from one component may be offset by inefficiencies in another.

From a Keynesian perspective, the result suggests that the expected multiplier effect may have been weakened by implementation inefficiencies, infrastructure deficiencies and limited linkages between public spending and domestic production. Under the Capability Approach, economic services contribute to human development when they expand employment, income, mobility, food security and market access. The insignificant relationship therefore indicates that recurrent expenditure on economic services did not consistently translate into these capability-enhancing opportunities.

Inflation and Human Development

Inflation had a negative but statistically insignificant long-run relationship with HDI ($\beta=-0.004733$, $p=0.1172$). The negative direction suggests that rising prices may weaken human development, but the evidence was insufficient to establish a statistically reliable long-run association.

The finding agrees with Omodero (2019), who reported a negative but insignificant relationship between inflation and HDI in Nigeria. Its direction is also consistent with studies showing that inflation reduces purchasing power, increases poverty and constrains household investment in health and education (Musa et al., 2024; Ramadhan & Pertiwi, 2025; Habib et al., 2025; Chipunza, 2026). However, its insignificance differs from studies reporting significant adverse relationships and its direction contrasts with the weak positive association reported by Dauda and Iwegbu (2022).

The result may reflect the slow movement of HDI relative to annual inflation fluctuations. Aggregate inflation may also conceal the more direct effects of food, healthcare and education prices on vulnerable households. The negative direction is nevertheless consistent with Keynesian reasoning because inflation can erode real income and the purchasing power of public expenditure. It also supports the Capability Approach, as rising living costs can restrict access to nutrition, education and healthcare. Inflation was therefore relevant as a control variable, even though its individual long-run coefficient was insignificant.

V. CONCLUSION AND RECOMMENDATIONS

This study examined the relationship between recurrent expenditure and human development in Nigeria from 1999 to 2024, with inflation included as a control variable. The findings established a long-run relationship among recurrent expenditure on social and community services, recurrent expenditure on economic services, inflation and HDI. However, recurrent expenditure on social and community services had a negative but statistically insignificant long-run relationship with HDI. Recurrent expenditure on economic services also exhibited a negative and insignificant relationship with HDI. These results indicate that increases in the expenditure categories as percentages of GDP did not translate into statistically reliable improvements in health, education and living standards.Inflation similarly had a negative but insignificant long-run relationship with HDI. Although its adverse direction suggests that price instability may weaken purchasing power and the real value of public services, the evidence was insufficient to establish a significant independent relationship after controlling for recurrent expenditure. The negative and significant error-correction coefficient confirmed convergence towards long-run equilibrium, although the annual adjustment rate of 6.9% indicated that human-development outcomes responded slowly to fiscal and macroeconomic changes.

Based on the findings, the following recommendations are proposed:

i. **Recurrent expenditure on social and community services:** The Federal Ministry of Finance and Budget Office of the Federation should link recurrent allocations for social and community services to measurable health, education and service-delivery outcomes. Emphasis should be placed on expenditure efficiency and implementation rather than merely increasing allocations.

ii. **Recurrent expenditure on economic services:** Relevant ministries and agencies should direct recurrent expenditure towards operational activities that improve agricultural extension, transportation, communication and market access. Stable, performance-based funding should be adopted to ensure that expenditure produces tangible economic opportunities and improvements in living standards.

iii. **Inflation:** The Central Bank of Nigeria and fiscal authorities should strengthen coordinated price-stabilisation measures and incorporate inflation adjustments into essential public-service budgets. This would protect household purchasing power and prevent inflation from eroding the real value of recurrent expenditure.

This study is limited by its reliance on 26 annual national observations and broad functional expenditure categories, which may conceal differences among their individual components. The use of expenditure as a percentage of GDP may also reflect changes in both expenditure and economic size. In addition, the 2024 functional expenditure observations were harmonised estimates, while the retained 2024 HDI value may introduce measurement uncertainty. As an observational time-series analysis, the study establishes dynamic relationships but does not independently prove causality.

Future studies should examine disaggregated expenditure components and employ state-level or regional panel data to capture variations in fiscal capacity, institutional quality and service delivery. Further research could apply structural-break, nonlinear ARDL or causality techniques and conduct sensitivity analyses excluding estimated observations. Incorporating expenditure efficiency, governance quality and budget implementation rates would also provide deeper insight into the conditions under which recurrent expenditure improves human development.

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