HUMAN CAPITAL DEVELOPMENT AND ITS IMPACT ON NIGERIA'S SECTORAL PRODUCTIVITY

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Abstract

This study examines the sectoral impact of human capital development on the Nigerian economy from 1989 to 2024, focusing on the Agricultural, Industrial, and Service sectors. Human capital, measured through investment in education (government recurrent expenditure on education and secondary school enrolment) and health (government recurrent expenditure on health and infant mortality rate), is analyzed for its effects on sectoral output. Using the Autoregressive Distributed Lag (ARDL) bounds testing approach, the study finds cointegration among variables across all three sectors, indicating long-run relationships. The results reveal that in the long run, investment in education positively and significantly influences the Agricultural, Industrial, and Service sectors, while investment in health shows a negative or insignificant impact across sectors. The error correction terms indicate that 38% of shocks to the Agricultural sector, 62% to the Industrial sector, and 20% to the Service sector are corrected annually. Diagnostic tests confirm the models are free from serial correlation and heteroscedasticity, with stable coefficients. The study rejects the null hypotheses that human capital development has no significant impact on each sector, confirming that human capital formation plays a crucial role in sectoral growth. However, the effectiveness of health investment remains limited, suggesting the need for policy reorientation. The findings underscore the importance of targeted human capital policies tailored to the unique needs of each sector to foster sustainable economic development in Nigeria.

Keywords: Human Capital Development, Agricultural Sector, Industrial Sector, Service Sector, Economic Growth

1.1 Background to the Study

The state of a nation's economic performance can be hinged on the prowess of its human resources. How developed the human resources of that nation are depends on how much the nation invests in human capital development. Human resources play a crucial role in the development of any economy.

Human capital is an instrument for competitive advantage since it consists of the process of training, knowledge acquisition (education), initiatives, and so on, all of which are geared towards skill acquisition, which is needed to induce productivity. The development of human resources was seen as an issue in the past, as issues that are only attributed to the industrialized nations. After different attempts at development failed in Nigeria, renewed attention was then directed towards developing the human resource and not only passive natural resources (Olusanya, 2016). Human capital refers to a country's human resources' abilities and capabilities, whereas human capital formation refers to the process of obtaining and expanding the number of people with the skills, education, and experience necessary for a country's economic growth and development. For this purpose, effective human capital investment is a critical component of long-term economic growth and increased productivity (Okumoko, Omeje, & Udoh, 2018).

Human capital has effects on economic growth through at least three channels: firstly, it increases labour productivity, which leads to an increase in output. Secondly, it increases labour demand, which leads to an increase in output because the number of employed workers increases; and thirdly, it leads to an increase in human capital stock, which attracts physical capital from other countries, i.e., foreign investment (Amadeo, 2016). Human capital is mainly divided into two components: education and health. While health improves the efficiency and

effectiveness of human capital, education enhances the quality of human capital. The great importance cannot be overemphasized because it supports the other elements of human capital; being healthy sets the ground for the improvement of the education level.

1.2 Statement of the Problem

One of the reasons for Nigeria's high unemployment, poverty, and unsustainable growth is that technological know-how and skills, which are accompanied by foreign physical capital, are insufficient to meet Nigeria's wide and varied growth and development needs. Developing countries, including Nigeria, are characterized by economic backwardness, which manifests itself in low labour efficiency, factor immobility, and limited specialization in occupations, a lack of entrepreneurship, and traditional values and social institutions that reduce the incentives for economic change.

Furthermore, the population's economic quality remained low when there was little awareness of available natural resources and when alternative production techniques, requisite skills, entrepreneurship supply, and other changes to support growth and development were insufficient. In reality, no growth can be made without an improvement in the quality of people or human elements. Schooling, learning, on-the-job training, advances in health, and a rising pool of economic information, all of which appear to be in short supply in Nigeria. Moreover, despite the government's enormous efforts to improve the quality of people's lives and to expand their human skills, the desired results have not been achieved, owing to a lack of funding and policy reversals. Although there has been an increase in investment in education at all levels in recent years, the returns have been low due to a lack of entrepreneurship. The paradox accompanying this belief is that, despite the huge investment in education, there exists no strong evidence of growth-promoting externalities of education in Nigeria, but rather, education

expansion has further deepened social inequality and inculcated negative social changes such as cultism, rent-seeking, sexual harassment, sorting, result from racketeering, industrial disputes, brain drain among other social vices in the Nigerian school system and the society at large.

According to World development indicators (WDI, 2020) stated that the reason for the low human capital formation in the Agricultural sector could be attributed to mechanized farming system, WDI, 2020 showed that the actively employed human capital in Agricultural sector 50.57% in 1991 which fell to 49.93% in 1996 this fall continued incessantly to 40.58% in 2011 and 34.97% in 2019 and also output in in Agricultural sector was seen to be 35.70 billion naira in 1986 this increased to 123.24 billion naira in 1991, 1,070.51 billion naira in 1996, 13,048.89 billion naira in 2010 and 37,241.61 billion naira in 2020. The employment in the industrial sector has also been an issue of concern, WDI, (2020) shows that in 1991 the industrial sector of the Nigeria economy assumed only 13% of its total employment this fell to 10.86% in 2007 and rise to 12% in 2019, this is quite very worrisome, output in the industrial sector have been seen to be increasing over the year from 65.05 billion Naira in 1986 to 2,388.83 billion Naira in 2000, to 13,826.43 in 2010 and finally 43,530.78Billion Naira in 2020. As employment in the other two sectors experienced a drastic reduction, the services sector kept experiencing an increase in its employment. The employment rate in the services sector in 1991 was 36.7% this increased to 43.61% in 2005 and 53.03% in 2019. What could be the reason for this increase?. Also, output in the service sector was seen to be on an increase from 95.42 billion Naira in 1986 to 3,093.38 billion Naira in 2000, to 27,736.94 billion Naira in 2010, and finally 71,551.68 billion Naira in 2020

1.3 Research Questions

Based on the issues raised above, the following research questions have been generated to guide this study.

i. What effect does human capital development have on the Agricultural sector in Nigeria?

ii. What effect does human capital development have on the Industrial sector in Nigeria?

iii. What effect does human capital development have on the Service sector in Nigeria?

1.4 Objectives of the Study

This study aims to determine the relationship between the development of human capital and its effect on different sectors in Nigeria from 1989 to 2024. The study will evaluate the following specific objectives:

i. To determine the effect of human capital development on the Agricultural sector in Nigeria.

ii. To ascertain whether human capital development has any significant influence on the industrial sector in Nigeria.

iii. To investigate the effect of Human capital development on the Service sector in Nigeria.

1.5 Hypotheses of the Study

The following Hypotheses are tested in the study.

H_1 Human capital development has no significant impact on the Agricultural sector in Nigeria.

H_2 Human capital development has no significant impact on the Industrial Sector in Nigeria.

H_3 Human capital development has no significant impact on the Service Sector in Nigeria.

1.6 Significance of the study `

The study is significant to economists, development planners, policy makers, researchers and students as the findings of the study will include firstly: the impact of human capital development on the Agricultural sector which will enable development planners and policymakers put in place necessary tools that will further enhance the level of human capital accumulation and development and at the same time increases output in the Agricultural sector.

Secondly, the impact of human capital development on the industrial sector will enable development planners and policy makers, employers, and employees in the industrial sector to put in place effective machinery that will further improve the level of human capital accumulation and growth rate in the industrial sector.

Thirdly, this study is significant to stakeholders, development planners, employers, employees, and policy makers in the service sector, so that the needed apparatus will enhance the human capital accumulation and productivity of the service sector.

Finally, the study will be significant to researchers and students in the broad field of development economics, as the findings of the study would not only serve as an addition to existing knowledge on the impact of human capital development on different sectors in Nigeria's economy, but the findings of the study could also help form a basis for further research in the area.

1.7 Scope of the study

This study is based on secondary data from the World Development Indicator and CBN Statistical Bulletin, which covers a period of 35years (1989-2024), to achieve a comprehensive analysis of the impact of human capital development on different sectors of the Nigerian economy.

1.8 Limitations of the study

This data set, used in the empirical analysis of this study, constitutes the main limitation of the study. The data were entirely secondary data, obtained from World Development Indicators and CBN statistical bulletin as against primary data. Annual data were used in the course of this study because quarterly data were not available for the data used. The non-availability of quarterly data is also a limitation faced in the course of this study. To this end, the results obtained depend on the quality of the data applied.

2.1 Conceptual issues.

This subsection deals with the explanations of the subject matter of the study, which includes: Human capital development and the Nigerian economy. A working definition is very fundamental for a subject matter, which gives a clear direction for an in-depth understanding of the work.

2.1.1 The Concept of Human Capital.

Human capital, as a phrase, was made popular by Theodore W. Shultz in 1960; ever since then, this phrase has gained the attention of many. According to Gary Becker (1964), human capital is a physical means of production. Organizations invest in human capital via education, training, and health.

2.2.2 Human Capital Development

Todaro and Smith (2011) state that human capital development is the productive investments embodied in human persons, including skills, abilities, ideas, health, and locations, often resulting from expenditures on education, on – the – job training programmes, and medical care. Becker (1967) refers to it as the abilities and qualities of people that make them productive. Knowledge to him is the more important of these, although other factors like a sense of punctuality and the state of someone's health also matter. As construed by the Organization for Economic Co-operation and Development (OECD), it is the aptitude, abilities, versatility, and other features encapsulated in people that are noteworthy to productive activities (OECD, 1998).

2.2.3 Human Capital Development in Nigeria.

In economies that want to achieve sustainable growth, the necessity of investing in education and health is well understood. The quality of a country's development is determined by its personnel. Nigeria is classified as 'less developed' by international criteria, hence achieving economic growth is a priority. Indeed, since the filing of the Ashby report in September 1960, the importance of a primary sector such as education has been emphasized in Nigeria. Dr. J.O. Sanusi, the former governor of the Central Bank, stressed the importance of human capital development for Nigeria during his keynote address in 2002, saying that the Nigerian economy must be efficient and competitive in the new world order, where national borders no longer act as barriers to human, material, and capital flows. He stated that one of the most significant challenges confronting Nigeria in this millennium is the issue of capacity building to increase productivity in the economy.

2.2.4 Education and human capital development in Nigeria.

To educate is to systematically affect people's knowledge, skills, and attitudes. Education is the pursuit of a wide range of activities, organized and managed for the benefit of a community and its members. Education must embrace the contemporary realities of today's world in order to be effective in any culture. This is done to avoid or prevent mediocrity and its negative impact on national development. According to Nyere (1967), education is the transmission of a society's acquired wisdom, knowledge, skills, values, and attitudes from one generation to the next.

2.2.5 Health and human capital development in Nigeria.

Health is one of the most important human capital measures that has made a significant contribution to development (OECD & UNDP, 2017). It is critical for increased productivity and societal performance. Investment in health and education, according to the World Bank, "improves labor force productivity, including innovative potential," and "healthier and better educated people are more likely to participate in opportunities created by economic growth." This explains why various economies around the world invest heavily in health facilities and services, allocating a larger share of their budgets to this area. However, Nigeria's financial allocation to the health sector has been very low (4.50 percent in 2020, which has been further decreased drastically in the revised budget owing to COVID-19) and, in most cases, deteriorating (CBN, 2020), falling short of the African Union's recommendation of 15 percent (see Federal Republic of Nigeria 2001).

2.3 Theoretical review

2.3.1 Human Capital Theory

In the world of the labour market, people bring different levels of education, knowledge, skill, and abilities, as well as their expectations to the workplace. According to James (2021), “a more educated, better-trained person is capable of supplying a larger amount of useful productive effort than one with less education and training. The value of human capital theory is widely accepted in order to increase organizational performance, so an organization relies on employees’ skills, knowledge, and ability as a key concept of value creation. In the eighteenth century, Adam Smith (1973) initiated an improvement in human capability that is important to production, and the term " human capital” was introduced by Theodore W. Schultz (1961 published in the American Economic Review, which refers to investment in human capital. Human capital was widely used after Gary Becker won the Nobel Prize. The “human capital theory” states that a different level of education and training contributes to a different level of wages and salaries; the more knowledge, skill, and ability, the more likely to get a better job (Blair, 2012) and the overall increase in workers’ earnings.

2.3.2 Schultz's Theory of Human Capital

Schultz, in his theory of Human Capital, posits that both knowledge and skill are forms of capital, and that this capital is a product of "deliberate investment." Schultz highlights Western countries and explains their increase in national output as a result of investment in human capital. He also makes a direct link between an increase in investment in human capital. Firstly, Schultz argued that economists have been afraid to relate to human beings as capital.

Schultz believes that the concept of human capital has negative connotations that arise from the American experience of slavery, and that society is hypersensitive towards anything that serves as a reminder of that system

2.3.3 Mincer's theory of Human capital

Jacob Mincer (1922-2006) is one of the most important economists of the second half of the twentieth century. In an attempt to address the issues, human capital plays a very significant role in shaping contemporary labour economics. Mincer, in his theory, sees human capital as capacities that are developed through formal and informal education at school and at home, and through training, experience, and mobility in the labor market (Kai-Joseph, 2007). The central idea is that whether deliberate or not, these activities involve costs and benefits and can, therefore, be analyzed as economic decisions, private or public.

2.3.4 Becker's Theory of Human Capital

Becker's theory on Human capital included an explanatory framework for the shape of age-earning profiles, the concentration of human capital investment at earlier ages, and the personal distribution of income, on the basis of the process of accumulation of human capital. As indicated in his 1962 paper. Becker (1962) started his analysis slightly overlooked on-the-job training, which was the main focus of others. He therefore tried to investigate the economic decision-making process regulating the quantity of and time spent in training. Becker, in his theory, introduced a classic distinction between specific and general human capital. To him, the latter type of training increased the marginal product of the worker in other firms; the firm would have no incentive to bear any of its costs and would pass it to the worker. The latter was willing to take it because this training increased future earnings, regardless of the firm they

were working with. Hence, they accepted wages below their current opportunity level to cover the costs of their training.

2.3.5 The Solow Neoclassical Growth Model

This theory was propounded by Robert Solow of the Massachusetts Institute of Technology. This theory is also known as the Solow growth model or exogenous growth model. The theory seeks to understand the determinants of long-term economic growth through the accumulation of factor inputs such as physical capital and labour. They revealed a significant contribution from technical progress, which is defined as an exogenous factor.

2.3.6 Endogenous Growth Theory

The controversies surrounding the performance of the neoclassical theories in shedding more light on the sources of long-term economic growth have led to dissatisfaction with traditional growth theory. Any increase in economic growth that cannot be attributed to short-term adjustments in the stock of either labour or capital is ascribed to a third category, commonly known as the Solow residual. This residual is seen to be responsible for half of the historical changes in the industrial nations of today. The neoclassical theory credits this bulk of growth to an exogenous or completely independent process of technological progress. Hence, it was impossible to determine and analyze the determinants of technological advancement because it is completely independent of the decisions of economic agents. This dilemma led to the development of the endogenous growth theory or the new growth theory.

2.3.6.1 The Romer Model

Romer's model of *Endogenous Technical Change* of 1990 identifies a research sector specializing in the production of ideas. This sector invokes human capital alongside the existing stock of knowledge to produce ideas and new knowledge. To Romer, ideas are more important than natural resources. New knowledge enters the production process through three channels. A new design is used in the intermediate goods sector for the production of a new intermediate input. In the final sector, labour, human capital, and available producer durables produce the final product.

2.4 Empirical Review

To review empirically related studies on this subject matter, different literatures were reviewed, domestic, international, and cross-country literatures, so as to give us a better understanding of human capital development. This literatures are as follows; Dayo and Jimoh, (2021) examined the role that human capital plays in the relationship between industrialization process and growth in Nigeria between 1980 to 2016, the two- stage least squares was adopted, It was shown from the result that the industrialization process is germane for economic growth, and likewise, male literacy rates can complement the industrial process to improve growth. In the same vein, stable growth facilitates the process of industrialization while human capital variables also play a relevant role in the same process.

Saheed, Tunde, and Abiodun (2021) examined the idea supporting the relationship between public expenditure and the economy in Nigeria between 2000 and 2016 using Autoregressive Distributed Lag (ARDL) estimation techniques. It was evident from the result that there exists a long-run relationship between public health expenditure and economic growth. The Granger-causality test results indicate neither a unidirectional nor a bidirectional

relationship between public health expenditure and GDP. But health expenditure as a share of total government expenditure and population has a unidirectional causal relationship with real GDP. As a result, public spending pushes public health spending. It was found that, while there is no causal relationship between public health expenditure and GDP, there is evidence of a long-run association between the two. To mobilize more resources for the health sector, health insurance should be expanded to cover more people. These factors may result in the necessary impact of healthcare spending on Nigeria's economic growth.

Ifunanyachukwu *et al* (2019) researched Education, Health Expenditure, and the Quality of Life in Nigeria between 1980 and 2017. Using the Autoregressive Distributed Lag Model estimation technique, the study discovered that in the Long-term, health spending was effective in stimulating per capita income growth; hence, more funds should be devoted to the sector. Furthermore, education spending has a negative and non-significant association with per capita income, implying that government education spending cannot transfer into improved quality of life. The policy implications of this study include that the Nigerian government should restructure and give more funds to education and health expenditure in its annual budget, based on the above.

Okumoko, Omeje, Udoh (2018) studied The Dynamics of Human Capital Development and Industrial Growth in Nigeria, using Time series data spanning the 1976-2016 period. Relevant variables were analyzed using both descriptive and econometric techniques. The results reveal that in the long run, the variables got closer to equilibrium. The findings also demonstrate that recurrent education and health expenditures have a negative influence on industrial growth. The goodness of fit was encouraging. This article claims that strict adherence to graduate skill acquisition programs, as well as adherence to the UNESCO-mandated

minimum financial allocation of 26% for education, will have a favorable impact on industrial growth.

Matthew's (2018) study explores the relative impact of human capital formation on economic growth in Nigeria from 1981 to 2014 using time series data of thirty-four (34) years. The study examined the existence of long-run and short-run dynamic links between human capital formation and economic growth in Nigeria using ARDL bound estimation techniques. The findings reveal that in Nigeria, there is a long-run dynamic link between human capital accumulation and economic growth. As a result, it is recommended that, in order to achieve economic growth, policymakers increase not only the amount of money spent on education but also the percentage of total spending allocated to the sector. Furthermore, improving healthcare personnel development and ensuring adequate distribution of healthcare facilities within the federation are critical.

Paul and Akindele (2016) examined the impact of human capital development on economic growth in Nigeria using time series data spanning from 1980 to 2013. The study employed ARDL Co-integration analysis to estimate the relationship among the variables used in the study. The study established long-run co-integration among the variables. The findings from the study revealed that there is a positive long-run relationship among secondary school enrolment, public expenditure on education, life expectancy rate, gross capital formation, and economic growth, but it is statistically insignificant. The results also showed that there is a negative long-run relationship among primary, tertiary school enrolment, public expenditure on health, and economic growth. In line with the findings, the study recommended that the government should put in place the required education and training policy that would guarantee

quality schooling for primary and tertiary education. The government should also commit more funds to the health sector to enhance human capital development.

Popoola, Alege, Gershon, and Ashley (2019) studied Human capital channels and productivity growth in Nigeria, from 1980 to 2017, using the Vector Error Correction Model to examine the joint short- and long-run causality, as well as the long-run behaviour of human capital channels on productivity. The results of the joint short-run and long-run causality demonstrate that there is no long-run causation, but joint short-run causality was observed in the basic channel, while both joint short- and long-run causality were detected in the advanced channel. Primary school enrollment/secondary school enrollment has little influence on productivity growth in the long run; tertiary institution enrollment and government education spending have a favorable effect on productivity growth. However, the combined contribution of both impacts is less than 1%, indicating that the inputs are not very responsive to productivity. As a result of this finding, Nigerian productivity has not increased as a result of human capital building through education and investment in research and development. It is critical to invest in research and development in order to boost productivity and improve the skills required to adapt and disseminate new technology.

Ogunleye, Owolabi, Sanyaolu, and Lawal (2017) examined the impact of human capital development on the economic growth of Nigeria, using annual time series data from 1981 to 2015. The empirical findings indicate that human capital development has a significant impact on economic growth, as measured by GDP. According to theory, the indicators of human capital development, such as secondary school enrolment, tertiary school enrolment, total government expenditure on health, and total government expenditure on education, have a positive and statistically significant impact on Nigeria's economic growth, implying that these indicators are

critical to the country's economic growth. However, life expectancy and primary school enrollment indicate a negative and statistically insignificant impact on the economic growth of Nigeria. According to the findings, the Nigerian government should ensure that appropriate resources are allocated to the development of human capital to boost the country's economic growth. The study also recommended that, in the future, the government and policymakers increase total education spending, ensure adequate budgetary allocation for health spending, and establish a standard across all secondary and tertiary institutions in the country to ensure that proper human capital is required for any individual to become productive, and economic growth is boosted.

James (2021) studied the relationship between Human Capital Development, National Security, and Agricultural Sector Growth in Nigeria from 1981 to 2017. The Autoregressive Distributed Lag (ARDL) model was used to estimate the relationship between the variables in this investigation. The investigation discovered that there is no long-term link between the variables. According to the study's findings, life expectancy is a major determinant of the agriculture sector growth in Nigeria. The study recommends that the government should improve access to healthcare for all Nigerians by strengthening and expanding the National Health Insurance Scheme's operations, increasing funding for alternative medicine research, expanding nutrition, diet, and hygiene education extension programs, and ensuring adequate security for lives and property in the country.

Obasanjo and Idogun (2020) investigated the influence of human capital development on real-sector growth in Nigeria, utilizing time series data spanning 1990 to 2018 and the Error Correction Mechanism (ECM). The outcome of the Johansen Cointegration test reveals that there is a long-term relationship between human capital development and production growth in

the two sectors studied. The findings found that current government spending on education and health resulted in a rise in output for Nigeria's Petroleum and Natural Gas sector, but not for the agricultural sector. Research and development (R&D) spending also had a significant impact on output growth in both industries. It was suggested that the federal government make an effort to raise its budget. It was suggested that the federal government boost its education spending in order to improve the quality of education infrastructure required in schools.

Ethem and Merve (2021) looked into the effects of health spending on economic growth in Turkey. Using data from Turkey's time series from 1975 to 2018. In addition, control variables such as household consumption, life expectancy at birth, trade, and foreign direct investments were included. The Vector Error Correction Mechanism (VECM) was used as the estimation technique, and cointegration analysis was used to see if all variables were cointegrated over time. In the short term, the causality test was successfully used to study the relationship between health expenditure and economic growth. The obtained results revealed that the results of the Johansen Cointegration test suggest the long-term existence of cointegration among all variables. Furthermore, the Granger causality test results show unidirectional causality in the short run between health expenditure and economic growth. The importance of investments in health care services in Turkey is demonstrated by the existence of a long-term relationship among related variables and a short-term relationship between health spending and economic growth. As a result, investments in the health sector should be promoted, and the government's budget allocation for health expenses should be increased in Turkey.

Xuewei, Zong, and Xiao (2020) studied the effects of Government Healthcare Expenditure on Economic Growth in 31 provinces in China, gathered from 2005 to 2017. The panel data were analyzed by constructing a spatial Durbin model; the result from the analysis shows that Government healthcare expenditure in China significantly and positively affects economic growth under three spatial weight matrices. The spatial weight of economic distance influences economic growth more significantly compared with the 0–1 spatial weight and the spatial weight of geographical distance. The total and the direct effects of government healthcare expenditure are significantly positive. Furthermore, the direct effects are significant, whereas the indirect effects show different degrees of significance. Conclusion: The total effect of government healthcare expenditure on economic growth is significant and positive, with direct effects exceeding the indirect ones. Hence, China's government must continue to increase financial investment in public health services to promote high-quality economic growth in the country.

Lloyd's (2016) study investigated government spending on education and economic growth in West African countries. The data used covered the period 1990 to 2016 for 15 selected ECOWAS countries. The estimation techniques used were the Unit root, cointegration analysis, and the causal test. Findings from the study include that government expenditure on education and economic growth in West African countries were positively and significantly related. Long-term Granger causality exists, while there is no evidence of short-run Granger causality from government educational expenditure to economic growth. This means that in the long run, government educational spending, through its impact on human capital, significantly and positively influences economic growth. Thus, in the region, such expenditures on education should be encouraged in the public sector. Collaboration amongst the countries will allow

resources to be concentrated, and knowledge to be shared across the countries in the region and subsequently boost economic growth is a way to encourage it.

Sajjad, Maryam, and Naser (2019) examined the empirical relationship between the knowledge-based economy and economic growth in MENA countries, using the GMM-DIFF robust two-step estimation techniques from the period of 2010 015. Institutions, human capital, research, infrastructure, and business sophistication were seen as the pillars of a knowledge-based economy, as they were found to have a significant and positive economic growth in MENA nations, according to empirical results collected using the generalized method of moments dynamic panel. The recommendation was that governments in this region should pursue knowledge-related policies as a means of speeding up the transition to a knowledge-based economy and increasing economic performance.

2.5 Gaps in the existing Literature.

The Sectorial impact of Human capital development on the Service, Agricultural, and Industrial sectors of the Nigerian economy is lacking to the best of the researcher's knowledge. The Agricultural, Industry, and the Service Sector are the main contributors to the Gross Domestic Product (GDP). Human capital, being the active factor of production, should not only be sustained but also improved continually in order to be competitive in the current knowledge-driven global economy (Obasuyi, 2019). Most of the studies on human capital development and its impact on the Nigerian economy have either considered human capital development on individual sector or on the Nigeria economy like Dayo and Jimoh, (2021) who examined the role that human capital plays in the relationship between the industrialization process and growth in Nigeria, Okumoko, Omeje, and Udoh, (2018) studied The Dynamics of Human Capital Development and Industrial Growth in Nigeria. Other studies, like James (2021),

studied the relationship between Human Capital Development, National Security, and Agricultural Sector Growth in Nigeria. While some studies like Ifunanyachukwu, (2019) researched Education, Health Expenditure, and the Quality of Life in Nigeria, Matthew, (2018), Paul and Akindele, (2016), Jaiyeoba (2015), Popoola, Alege, Gershon, and Ashley, (2019), Ogunleye, Owolabi, Sanyaolu, and Lawal, (2017) all examined the impact of human capital development on the economic growth of Nigeria within different time frame.

Some cross-country analyses have also been carried out by different researchers on the subject matter, like Lloyd (2016), who investigated government spending on education and economic growth in West African countries. Fuhmei, (2015), studied the impact of health care expenditure in a growing economy in OECD, Serdar and Ebru (2016) studied Health Expenditures and Economic Growth in G8 Countries, Xuewei, Zong and Xiao,(2020) studied the effect of Effects of Government Healthcare Expenditure on Economic Growth in 31 provinces in China, Ethem and Merve (2021) looked into the effects of health spending on economic growth in Turkey, Serge and Julius,(2017) in their paper comparatively analyze the impact of health expenditure between countries in the CEMAC sub-region and five other African countries. Also, studies like Ifunanyachukwu et al, 2019; Matthew (2018); Paul and Akindele, (2016); Popoola, Alege, Gershon, and Ashley, (2019); Ogunleye, Owolabi, Sanyaolu, and Lawal, (2017); Obasanjo and Idogun (2020); Jaiyeoba (2015) tried to capture the impact of human capital development on the economy as a whole.

None of the studies listed above has been able to capture the impact of human capital (education and health investment) on individual sectors (Agricultural, services, and industrial) of Nigeria's Economy. None of the above-listed studies were able to identify whether the human development needs of each sector differ or not. Hence, there seems to be insufficient

information about the impact of human capital development on the different sectors of the Nigerian economy, such as Agriculture, industries, and Services. It will be appropriate and informative to investigate the extent to which different sectors of the Nigerian economy have been improved through investing in health and education (human capital). To this end, the study aims to investigate the contribution of human capital development on different sectors of the Nigerian economy between 1989 and 2024, as a way of contributing to existing literature on the link between human capital development and different sectors of Nigeria's economy.

3.1 Theoretical framework

The Endogenous Growth Theory is the theoretical foundation for this research. Endogenous growth models, unlike neoclassical models, openly embrace technology and aim to recognize that technological change, like capital accumulation, is dependent on economic decisions. In these endogenous specifications, technical change is most typically linked to the stock of human capital, which is explicitly described in terms of educational investments. The inclusion of technological change and knowledge dissemination into the neoclassical framework is rendered difficult because of the underlying competitive assumptions, which do not allow for the possibility of increasing returns to scale. Economic growth can be sustained indefinitely in endogenous models because returns on investment in a broad class of both physical and human capital goods do not necessarily reduce over time. Knowledge spillovers among producers and external benefits from increased human capital are both part of this process since they counteract diminishing returns. Growth frameworks have also incorporated research and development concepts, as well as imperfect competition (Romer, 1986; Barro & Sala-I-Martin, 1995). A large number of endogenous growth specifications have been put forward. A typical specification for analysing growth across several countries follows Barro (1997):

$$\Delta y = f (y, y^*) \quad \ldots\ldots (1)$$

$$y^* = f (Z) \quad \ldots\ldots (2)$$

where Δy is the growth rate of per capita output, y is the current level of per capita output, and y^* is the long-term or steady state level of per capita output. For a given value of y, the growth rate rises with y^*, which is determined by a wide set of economic, policy, and environmental variables. These factors vary per study, but Z in equation (2) often includes

variables that measure population (fertility and life expectancy), labor supply, government expenditure and investment, terms of trade, inflation, and, most importantly for this discussion, educational variables.

3.2 Model Specification

This study institutes an econometric model to illustrate the relationship between human capital development and different sectors in Nigeria. In analyzing the relationship between the variables by incorporating the Autoregressive Distributed Lag (ARDL), the following linear specifications, as adapted from the empirical work of James (2021), are shown.

AGRI = f (SSE, MR, GOVEDU, GOVHLT, LFR) ---------- (3.1)

SERC = f (SSE, MR, GOVEDU, GOVHLT, LFR) ---------- (3.2)

INDL= f (SSE, MR, GOVEDU, GOVHLT, LFR) ---------- (3.3)

From equations (3.1), (3.2), (3.3), SSE and GOVEDU capture investment in education, while MR and GOVHLT capture investment in health; hence, the above stated variables capture both arms of human capital, which are the variables of interest.

Specifying in econometric terms and taking logarithms where large variables are expected, avoiding the problem of extremely large variable coefficients, the model is re-specified as follows;

$LAGRC = \alpha_0 + \alpha_1 SSE + \alpha_2 MR + \alpha_3 LGOVEDU + \alpha_4 LGOVHLT + \alpha_5 LFR + \mu_t$ ------- (3.4)

$LSERC = \alpha_0 + \alpha_1 SSE + \alpha_2 MR + \alpha_3 LGOVEDU + \alpha_4 LGOVHLT + \alpha_5 LFR + \mu_t$----- (3.5)

$LINDL = \alpha_0 + \alpha_1 SSE + \alpha_2 MR + \alpha_3 LGOVEDU + \alpha_4 LGOVHLT + \alpha_5 LFR + \mu_t$----- (3.6)

From the foregoing, the Autoregressive Distributed Lag form of the version of the estimated model study can be estimated as follows;

$$D(LAGRI)_t = \beta 0 + \gamma t + \alpha_0 LAGRC_{t-1} + \alpha_1 SSE_{t-1} + \alpha_2 MR_{t-1} + \alpha_3 LGOVEDU_{t-1}$$

$$+\alpha_4 LLGOVHLT_{t-1} + \alpha_5 LFR + + \sum_{i=0}^{p} \pi i\, D(SSE)_{t-1} + \sum_{i=0}^{q} \pi i\, D(MR)_{t-1} \sum_{i=0}^{r} \upsilon i$$

$$D(LGOVEDU)_{t-1} + \sum_{i=0}^{s} \tau i\, D(LGOVHLT)_{t-1} + \sum_{i=0}^{u} \rho i\, D(LFR)_{t-1} +$$

$$\kappa t \ldots\ldots\ldots (3.7)$$

$$D(LSERC)_t = \beta 0 + \gamma t + \alpha_0 LAGRC_{t-1} + \alpha_1 SSE_{t-1} + \alpha_2 MR_{t-1} + \alpha_3 LGOVEDU_{t-1}$$

$$+\alpha_4 LLGOVHLT_{t-1} + \alpha_5 LFR + + \sum_{i=0}^{p} \pi i\, D(SSE)_{t-1} + \sum_{i=0}^{q} \pi i\, D(MR)_{t-1} \sum_{i=0}^{r} \upsilon i$$

$$D(LGOVEDU)_{t-1} + \sum_{i=0}^{s} \tau i\, D(LGOVHLT)_{t-1} + \sum_{i=0}^{u} \rho i\, D(LFR)_{t-1} + \kappa t \ldots\ldots\ldots (3.8)$$

$$D(LINDL)_t = \beta 0 + \gamma t + \alpha_0 LAGRC_{t-1} + \alpha_1 SSE_{t-1} + \alpha_2 MR_{t-1} + \alpha_3 LGOVEDU_{t-1} + \alpha_4 LLGOVHLT$$

$$_{t-1} + \alpha_5 LFR + + \sum_{i=0}^{p} \pi i\, D(SSE)_{t-1} + \sum_{i=0}^{q} \pi i\, D(MR)_{t-1} \sum_{i=0}^{r} \upsilon i\, D(LGOVEDU)_{t-1}$$

$$+ \sum_{i=0}^{s} \tau i\, D(LGOVHLT)_{t-1} + \sum_{i=0}^{u} \rho i\, D(LFR)_{t-1} + \kappa t \ldots\ldots\ldots (3.9)$$

The D is the first difference operator; t is the years 0; p, q, r, s, and u are the maximum lag orders, and κt is the error term.

Table 3.1 Description of Variables

Variables	Description	Measurement	Expected sign	Source of data
AGRC	Agricultural sector	Contribution of Agricultural Sector to GDP (₦ Billion)		CBN statistical Bulletin (2021)
SERC	Service Sector	Contribution of Service Sector to GDP (₦ Billion)		CBN statistical Bulletin (2021)
INDL	Industrial sector	Contribution of Industrial Sector to GDP (₦ Billion)		CBN statistical Bulletin (2021)

SSE	Secondary school Enrolment	School enrollment, tertiary (% gross)	Positive	World development indicators
GOVEDU	Government Expenditure on Education	Federal Government Recurrent Expenditure (₦' Billion)	Positive	CBN statistical Bulletin (2021)
GOVHLT	Government Health Expenditure	Federal Government Recurrent Expenditure on Heath (₦' Billion)	Positive	CBN statistical Bulletin (2021)
LFR	Labour force	LFR (Total)	Positive	World development indicators (2021)
MR	Infant mortality rate	Mortality rate, infant (per 1,000 live births)	Negative	World development indicators (2021)

Table 4.1.1: Descriptive statistics for Agricultural Sector Model

	AGRI	GOVEDU	GOVHLT	LFR	MR	SSE
Mean	8792.303	92.54093	154.3326	59.34143	101.1514	35.63829
Median	4585.926	34.20000	76.50000	59.99000	100.8000	33.85099
Maximum	37241.61	388.3671	593.4385	62.93626	124.8000	56.20540
Minimum	35.70264	0.041315	0.225005	53.91000	72.20000	23.55180
Std. Dev.	10255.93	115.3454	181.3858	2.450659	19.18792	8.647285
Skewness	1.148908	1.147143	1.054648	-0.894483	-0.032585	0.535027
Kurtosis	3.394761	3.140648	2.892593	2.815400	1.389678	2.303464
Jarque-Bera	7.927195	7.705151	6.505140	4.716943	3.787853	2.377344
Probability	0.018995	0.021225	0.038675	0.094565	0.150480	0.304625
Sum	307730.6	3238.932	5401.641	2076.950	3540.300	1247.340
Sum Sq. Dev.	3.58E+09	452355.4	1118627.	204.1948	12517.99	2542.368
Observations	35	35	35	35	35	35

Source: Author's compilation from Eviews version 10.

From table 4.1.1, all the variables were positively skewed except for labour force participation rate (LFR) and Mortality rate (MR). From the result also only Industrial sector (INDL) and Government expenditure on education (GOVEDU) were found to be normally distributed i.e. Mesokurtic, The Government expenditure on health (GOVHLT), Secondary school enrolment

rate (SSE), Labour force participation rate (LFR), Mortality rate (MR) were observe to be lower than the kurtosis value, suggestive of platykurtic distribution.

The Jarque-Bera test, as well as the corresponding probability value, shows that Industrial sector (INDL), Government expenditure on education (GOVEDU), and Government expenditure on health (GOVHLT) were the only variables that were normally distributed, given their probability values.

The dependent variable Agriculture sector (AGRI) has a maximum growth value of 37241.61 and a minimum growth value of 35.70264, and a standard deviation of about 10255.93, which shows that the variable was highly dispersed from the mean. An average value of 8792.303 over the period of 35 years, ranging from 1989 to 2024, was seen. Government expenditure on education (GOVEDU) has a maximum value of 388.3671, a minimum value of 0.041315. The standard deviation of the (GOVEDU) is about 115.3454, which shows that the variable government expenditure is clustered around the mean, with the mean being about 92.54093. Government expenditure on health has a maximum value of 593.4385 and a minimum value of 0.225005, an average (mean) of about 154.3326 and a standard deviation of about 181.3858 the standard deviation value shows that Government expenditure on health is clustered around its mean value, Labour force participation rate (LFR) has a maximum of 62.93626 and a minimum of 53.91000, a mean of 63187.76 and a standard deviation of about 2.450659, Infant Mortality rate (MR) has the maximum value is 124.8000 and the minimum value is 72.20000, with a mean of 101.1514 and a standard deviation of 19.18792. Secondary School Enrolment (SSE) is in percentage. The SSE has a maximum value of 56.20540 and a minimum value of 23.55180, with a standard deviation of 8.647285. This shows that the secondary school enrolment rate is clustered around its mean value and a mean of 35.63829.

Table 4.1.2: Descriptive statistics for Industrial Sector

	INDL	GOVEDU	GOVHLT	LFR	MR	SSE
Mean	9761.997	92.54093	154.3326	59.34143	101.1514	35.63829
Median	3525.141	34.20000	76.50000	59.99000	100.8000	33.85099
Maximum	43530.78	388.3671	593.4385	62.93626	124.8000	56.20540
Minimum	65.04538	0.041315	0.225005	53.91000	72.20000	23.55180
Std. Dev.	11973.45	115.3454	181.3858	2.450659	19.18792	8.647285
Skewness	1.336526	1.147143	1.054648	-0.894483	-0.032585	0.535027
Kurtosis	3.926676	3.140648	2.892593	2.815400	1.389678	2.303464
Jarque-Bera	11.67241	7.705151	6.505140	4.716943	3.787853	2.377344
Probability	0.002920	0.021225	0.038675	0.094565	0.150480	0.304625
Sum	341669.9	3238.932	5401.641	2076.950	3540.300	1247.340
Sum Sq. Dev.	4.87E+09	452355.4	1118627.	204.1948	12517.99	2542.368
Observations	35	35	35	35	35	35

Source: Author's compilation from Eviews version 10.

From Table 4.1.2, all the variables were positively skewed except for labour force participation rate (LFR) and Mortality rate (MR). From the result also only Industrial sector (INDL) and Government expenditure on education (GOVEDU) were found to be normally distributed i.e. Mesokurtic, The Government expenditure on health (GOVHLT), Secondary school enrolment rate (SSE), Labour force participation rate (LFR), Mortality rate (MR) were observe to be lower than the kurtosis value, suggestive of platykurtic distribution.

The Jarque-Bera test, as well as the corresponding probability value, shows that Industrial sector (INDL), Government expenditure on education (GOVEDU), and Government expenditure on health (GOVHLT) were the only variables that were normally distributed, given their probability values.

The dependent variable Industrial sector (INDL) has a maximum value of 43530.78 and a minimum value of 65.04538, a standard deviation of about 11973.45, and the variable was highly dispersed from the mean, with an average value of about 9761.997 over the period. Government expenditure on education (GOVEDU) has a maximum value of 388.3671, a minimum value of 0.041315. The standard deviation of the (GOVEDU) is about 115.3454,

which shows that the variable government expenditure is clustered around the mean, with the mean being about 92.54093. Government expenditure on health has a maximum value of 593.4385 and a minimum value of 0.225005, an average (mean) of about 154.3326 and a standard deviation of about 181.3858 the standard deviation value shows that Government expenditure on health is clustered around its mean value, Labour force participation rate (LFR) has a maximum of 62.93626 and a minimum of 53.91000, a mean of 63187.76 and a standard deviation of about 2.450659, Infant Mortality rate (MR) has the maximum value is 124.8000 and the minimum value is 72.20000, with a mean of 101.1514 and a standard deviation of 19.18792. Secondary School Enrolment (SSE) is in percentage. The SSE has a maximum value of 56.20540 and a minimum value of 23.55180, with a standard deviation of 8.647285. This shows that the secondary school enrolment rate is clustered around its mean value, with a mean of 35.63829.

Table 4.1.3: Descriptive statistics for the Service Sector

	SERV	GOVEDU	GOVHLT	LFR	MR	SSE
Mean	19947.55	92.54093	154.3326	59.34143	101.1514	35.63829
Median	5306.947	34.20000	76.50000	59.99000	100.8000	33.85099
Maximum	72426.66	388.3671	593.4385	62.93626	124.8000	56.20540
Minimum	95.42116	0.041315	0.225005	53.91000	72.20000	23.55180
Std. Dev.	24712.99	115.3454	181.3858	2.450659	19.18792	8.647285
Skewness	1.013699	1.147143	1.054648	-0.894483	-0.032585	0.535027
Kurtosis	2.529592	3.140648	2.892593	2.815400	1.389678	2.303464
Jarque-Bera	6.316950	7.705151	6.505140	4.716943	3.787853	2.377344
Probability	0.042490	0.021225	0.038675	0.094565	0.150480	0.304625
Sum	698164.2	3238.932	5401.641	2076.950	3540.300	1247.340
Sum Sq. Dev.	2.08E+10	452355.4	1118627.	204.1948	12517.99	2542.368
Observations	35	35	35	35	35	35

From the table. 4.1.3 All the variables were positively skewed except for labour force participation rate (LFR) and Mortality rate (MR). From the result, only Government

expenditure on education (GOVEDU) was found to be normally distributed, i.e., mesokurtic. The Government expenditure on health (GOVHLT), Secondary school enrolment rate (SSE), Labour force participation rate (LFR), and Mortality rate (MR) were observed to be lower than the kurtosis value, suggestive of platykurtic distribution.

The Jarque-Bera test, as well as the corresponding probability value, shows that the Service sector (SERV), Government expenditure on education (GOVEDU), and Government expenditure on health (GOVHLT) variables were normally distributed, given their probability values.

The dependent variable Service Sector (SERV) has a maximum value of 72426.66 and a minimum value of 95.42116, a standard deviation of about 24712.99, and the variable was highly dispersed from the mean, with an average value of about 19947.55 over the. Government expenditure on education (GOVEDU) has a maximum value of 388.3671, a minimum value of 0.041315. The standard deviation of the (GOVEDU) is about 115.3454, which shows that the variable government expenditure is clustered around the mean, the mean being about 92.54093. Government expenditure on health has a maximum value of 593.4385and a minimum value of 0.225005, an average (mean) of about 154.3326 and a standard deviation of about 181.3858 the standard deviation value shows that Government expenditure on health is clustered around its mean value, Labour force participation rate (LFR) has a maximum of 62.93626 and a minimum of 53.91000, a mean of 63187.76 and a standard deviation of about 2.450659, Infant Mortality rate (MR) has the maximum value is 124.8000 and the minimum value is 72.20000, with a mean of 101.1514 and a standard deviation of 19.18792. Secondary School Enrolment (SSE) is in percentage. The SSE has a maximum value of 56.20540 and a minimum value of

23.55180, with a standard deviation of 8.647285. This shows that the secondary school enrolment rate is clustered around its mean value and a mean of 35.63829.

4.2.2 Analysis of the Pairwise Correlation Statistics

The Correlation matrix is presented in the Tables below. The result reveals the pairwise relationship among the variables, and this tends to reveal the presence of multicollinearity.

Table 4.2.1 Correlation Matrices for Agriculture Sector Model

	AGRI	GOVEDU	GOVHLT	LFR	MR	SSE
AGRI	1	0.68	0.68	-0.80	-0.89	0.85
GOVEDU	0.68	1	0.69	-0.79	-0.87	0.85
GOVHLT	0.68	0.69	1	-0.81	-0.89	0.87
LFR	-0.80	-0.79	-0.815	1	0.80	-0.78
MR	-0.89	-0.87	-0.89	0.80	1	-0.84
SSE	0.85	0.85	0.87	-0.78	-0.84	1

Source: Author's compilation from Eviews version 10.

From the table above, the explanatory variable of equation 1.3, the Agricultural sector model, is tested for the presence of multicollinearity; the result shows that government expenditure on education has a positive relationship with the Agricultural sector; the two variables were not highly positively correlated. Government expenditure on health and Government expenditure on education are also positively related but not highly related. Government expenditure on education has been seen to have a negative relationship with both the labour force participation rate and the infant mortality rate. Government expenditure on education was seen to have a positive relationship with the secondary school enrolment rate. Labour force participation and infant mortality rate were also seen to have a positive relationship. Labour force participation rate and secondary school enrolment rate were seen to have a high negative relationship. Lastly, the Infant Mortality rate and Secondary school enrolment have a high negative relationship. From the relationships that exist between the explanatory variables, none of the variables were

seen to be perfectly correlated or near perfectly correlated, hence we can conclude that there is no multicollinearity in the Model.

Table 4.2.2 Correlation Matrices for Industrial Sector Model

	INDL	GOVEDU	GOVHLT	LFR	MR	SSE
INDL	1	0.68	0.68	-0.77	-0.86	0.85
GOVEDU	0.68	1	0.69	-0.79	-0.87	0.85
GOVHLT	0.68	0.69	1	-0.81	-0.89	0.87
LFR	-0.77	-0.79	-0.81	1	0.80	-0.78
MR	-0.86	-0.87	-0.89	0.80	1	-0.84
SSE	0.85	0.85	0.87	-0.78	-0.84	1

Source: Author's compilation from Eviews version 10.

From the table above, the explanatory variable of equation 2.3, the Industrial sector model, is tested for the presence of multicollinearity. The result shows that government expenditure on education has a positive relationship with the Industrial sector; the two variables were not highly positively correlated. Government expenditure on health and Government expenditure on education are also positively related but not highly related. Government expenditure on education has been seen to have a negative relationship with both the labour force participation rate and the infant mortality rate. Government expenditure on education was seen to have a positive relationship with the secondary school enrolment rate. Labour force participation and infant mortality rate were also seen to have a positive relationship. Labour force participation rate and secondary school enrolment rate were seen to have a high negative relationship. Lastly, the Infant Mortality rate and Secondary school enrolment have a high negative relationship. From the relationships that exist between the explanatory variables, none of the variables were seen to be perfectly correlated or nearly perfectly correlated, hence we can conclude that there is no multicollinearity in the Model.

Table 4.2.3 Correlation Matrices for Service Sector Model

	SERV	GOVEDU	GOVHLT	LFR	MR	SSE
SERV	1	0.67	0.67	-0.87	-0.88	0.85
GOVEDU	0.67	1	0.69	-0.79	-0.87	0.85
GOVHLT	0.67	0.69	1	-0.81	-0.89	0.87
LFR	-0.87	-0.79	-0.81	1	0.80	-0.78
MR	-0.88	-0.87	-0.89	0.80	1	-0.84
SSE	0.85	0.85	0.87	-0.78	-0.84	1

Source: Author's compilation from Eviews version 10.

From the table above, the explanatory variable of equation 3.3, the Service sector model, is tested for the presence of multicollinearity; the result shows that government expenditure on education has a positive relationship with the Service sector; the two variables were not highly positively correlated. Government expenditure on health and Government expenditure on education are also positively related but not highly related. Government expenditure on education has been seen to have a negative relationship with both the labour force participation rate and the infant mortality rate. Government expenditure on education was seen to have a positive relationship with the secondary school enrolment rate. Labour force participation and infant mortality rate were also seen to have a positive relationship. Labour force participation rate and secondary school enrolment rate were seen to have a high negative relationship. Lastly, the Infant Mortality rate and Secondary school enrolment have a high negative relationship. From the relationships that exist between the explanatory variables, none of the variables were seen to be perfectly correlated or nearly perfectly correlated, hence we can conclude that there is no multicollinearity in the Model.

4.3 Unit Root Test

The unit root test is the test for Stationarity of the variables used in the models. In testing for a unit root in the study, the Augmented Dickey Fuller (ADF) test was adopted. The result is presented in the table below:

Table 4.3.1: Unit Root Test for Variable in Level

Variable	ADF Test Statistic	ADF Critical Values (5% level)	Remark
AGRI	1.284223	-3.552973	Non stationary
INDL	1.590988	-4.309824	Non stationary
SERV	-2.566819	-1.952066	Stationary
GOVEDU	0.631048	-3.587527	Non Stationary
GOVHLT	-0.935553	-3.548490	Non Stationary
MR	-8.416913	-3.552973	Stationary
LFR	-3.885764	-3.562882	Stationary
SSE	-2.618742	-3.548490	Non stationary

Source: Author's compilation from Eviews version 10.

The Table above presents the Augmented Dickey Fuller (ADF) test result for the unit root in the selected variable in levels. The result was based on 5% significant level. From the results, AGRI, INDL, GOVEDU, GOVHLT, and SSE all have a unit root. This shows that none of the above-listed variables were stationary in levels. SERV, MR, LFR was seen to have no unit root, hence they are stationary at levels.

Table 4.3.2: Unit Root Test for Variable in First Difference

Variable	ADF Test Statistic	ADF Critical Values (5% level)	Remark
AGRIC	-3.671518	-3.552973	Stationary
INDL	-6.939180	-3.574244	stationary
GOVEDU	-3.934693	-3.587527	Stationary
GOVHLT	-4.476065	-3.574244	Stationary
SSE	-6.252032	-3.552973	Stationary

Source: Author's compilation from Eviews version 10.

The table above presents the Augmented Dickey-Fuller (ADF) test result for the unit root in the selected variables in first difference. The result was based on 5% significant level. From the result, AGRI, INDL, GOVEDU, GOVHLT, and MR are integrated in Order I(1), i.e., they are integrated at first difference.

4.4 Bound test for Cointegration

The autoregressive distributed lag (ARDL) bounds test of cointegration of the three models specified in this study is given in Table 4.4.1below.In the bounds test of cointegration, a null hypothesis of no cointegration among the variables in a model is rejected if the F-statistic is greater than the 5 percent upper bound value.

Table 4.4.1: ARDL Bounds Test of Cointegration Results

Model	5% Lower Bound	5% Upper Bound	F Statistic	Degree of Freedom
AGRI	2.62	3.79	5.71	5
INDL	2.39	3.38	8.31	5
SERV	2.62	3.79	7.30	5

Source: Author's compilation from Eviews version 10.

Table 4.4.1 showed that there was cointegration among the variables in the Agricultural sector model. A null hypothesis of no cointegration among the Agricultural sector model was rejected since the F-statistic value of 5.71was greater than the 5 percent upper bound value of 3.79. The existence of cointegration among variables in this model implied that long-run and short-run ARDL estimations can be performed.

The result further indicated that there was no cointegration among variables in the Industrial sector model. The F-statistic value was 8.31, which was also greater than the 5 percent critical value of 3.38. This suggested that a null hypothesis of no cointegration among variables in the Industrial sector model was rejected. Similarly, the existence of a long-run relationship was established.

The result also indicated that there was no cointegration among variables in the Service Sector model. The F-statistic value was 7.30, which was also greater than the 5 percent critical value of 3.79. This suggested that a null hypothesis of no cointegration among variables in the Service sector model was rejected. Similarly, the existence of a long-run relationship was established. The short- run and the long-run ARDL models can all be estimated for this model.

4.5 Optimal Lag Length Selection for ARDL Models

The results of the optimal lag selection are adequate for the estimation of the ARDL models using different selection criteria. The selection criteria were sequentially modified LR test statistic (each test at 5% level), final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SIC), and Hannan-Quinn information criterion (HQ). Hence, the Akaike information criterion (AIC) will be used for the lag selection criteria for this model.

Table 4.5.1: Optimal Lag Length Selection for the Agricultural Sector Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-9.144243	NA	0.151545	0.946515	1.221341	1.037612
1	20.74768	46.70613*	0.024974	-0.859230	-0.538600*	-0.752950
2	22.03930	1.937422	0.024612*	-0.877456*	-0.511022	-0.755994*
3	22.06685	0.039606	0.026279	-0.816678	-0.404440	-0.680033

Source: Author's compilation from Eviews version 10.

Table 4.5.1 shows the results of the different lag selection criteria considered in this study for the real Agricultural Sector model. From the table, using the Akaike lag selection criteria, it indicated that the optimal lag length for the Agricultural sector model is two lags. Thus, the Agricultural sector model was estimated using an optimal lag length of two in the ARDL estimation.

Table 4.5.2: Optimal Lag Length Selection for the Industrial Sector Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-6.044478	NA	0.124854	0.752780	1.027605	0.843877
1	14.00974	31.33471*	0.038052	-0.438109	-0.117479*	-0.331829
2	14.35027	0.510803	0.039798	-0.396892	-0.030458	-0.275430
3	17.01240	3.826803	0.036042*	-0.500775*	-0.088537	-0.364129*

Source: Author's compilation from Eviews version 10.

Table 4.5.2 also displays the results of the various lag selection criteria for the Industrial sector model. From the table, The Aikaike lag selection criteria indicated that the optimal lag length for this model was three lags. The results suggested that the Industrial sector model was estimated using an optimal lag length of three in the ARDL estimation.

Table 4.5.3: Optimal Lag Length Selection for the Service Sector Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1.114116	NA	0.091744	0.444632	0.719458	0.535729
1	34.25895	55.27042*	0.010734	-1.703684	-1.383055*	-1.597405
2	35.85251	2.390340	0.010380*	-1.740782*	-1.374348	-1.619319*
3	35.97474	0.175711	0.011018	-1.685922	-1.273683	-1.549276

Source: Author's compilation from Eviews version 10.

Table 4.5.3 shows the results of the different lag selection criteria considered for the Service sector model. This table showed that using the Akaike lag selection criteria indicated that the optimal lag length for the model is two lags. Thus, the Service sector model was estimated using an optimal lag length of two in the ARDL estimation.

4.6 Estimated ARDL Results

Table 4.6.1.1: Estimated Short-Run Result of Agricultural Sector Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.492094	0.053663	9.170078	0.0000
D(LFR)	0.081921	0.029074	2.817661	0.0100
D(LNGOVEDU)	0.110522	0.081268	1.359978	0.1876
D(LNGOVEDU(-1))	-0.117331	0.037119	-3.160985	0.0045
D(LNGOVHLT)	0.018460	0.072193	0.255699	0.8006
CointEq(-1)*	-0.376379	0.058018	-6.487243	0.0000

Source: Author's compilation from Eviews version 10.

From the result of the short-run Agricultural Sector Model, Labour force participation rate (LFR) has a positive and significant impact on Agricultural Sector (Agri), an increase in labour force participation (LFR) by 1% will to an increase in labour participation rate by 8%, Government expenditure on education has a positive but insignificant impact Agricultural sector growth, however its first difference was seen to have a negative significant impact on Agricultural sector growth. 1% increase in government expenditure leads to 11% decrease in the Agricultural Sector performance. Infant mortality rate (MR), Labour force participation rate (LFR), and Secondary school enrollment rate (SSE) were systematically eliminated by the process. The Coefficient of the error correction term is negative (correctly signed), and it shows that 38% percent of the previous year shocks in the agricultural sector are offset every 12months.

Table 4.6.1.2: Estimated Long-Run Result of Agricultural Sector Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFR	0.012585	0.042028	0.299443	0.7674
LNGOVEDU	1.602922	0.416322	3.850197	0.0009
LNGOVHLT	-0.775315	0.408791	-1.896603	0.0711
MR	0.035656	0.017511	2.036180	0.0539
SSE	0.028596	0.014020	2.039620	0.0536

Source: Author's compilation from Eviews version 10.

From the result of the long-run Agricultural sector model, Labour force participation rate (LFR) was seen to have a positive impact on the Agriculture sector growth; however, the impact was seen to be insignificant. The trend of government expenditure on education has shown to have a positive and long-run significant impact on the Agriculture sector growth, as 1% increase in government expenditure on education leads to 160% increase in agricultural sector growth in the long run. Government expenditure on health has been seen to have a negative but insignificant impact on the growth of the agricultural sector in the long run. The Infant Mortality rate in the long-run was seen to have a positive impact on the Agricultural sector growth. 1% increase in the infant mortality rate will lead to 4% increase in agricultural sector growth in the long run. Secondary School enrolment rate was seen to have a positive and significant impact on the agricultural sector growth in the long run, as 1% increase in secondary school enrolment will lead to 3% increase in the agricultural sector growth in the long run.

Table 4.6.1.3: Diagnostics results of the Estimated Agricultural Sector Model

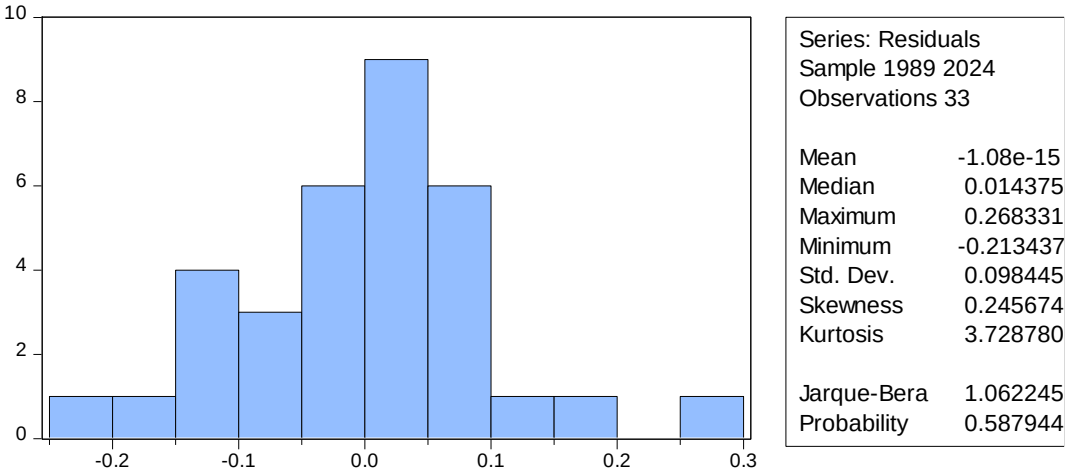
Test	F Stat	DF	Pob
Breusch-Godfrey Serial Correlation LM Test	1.951963	(2,20)	0.1681
Heteroskedasticity Test: Breusch-Pagan-Godfrey	1.619158	(10,22)	0.1661

Source: Author's compilation from Eviews version 10.

Diagnostics of the estimated Agricultural sector growth model were displayed in Table 4.6.1.3. From the table, the estimated model had a residual series that had no serial correlation. This was revealed by the Breusch-Godfrey Serial Correlation LM Test, with an F-statistic value of 1.951963, which was not significant at 5%. It meant that a hypothesis of no serial correlation in the residual series cannot be rejected. Hence, there is no serial correlation in the model since the probability value of 16% is greater than 5% level of significance. The Breusch-Pagan-Godfrey heteroskedasticity test showed that the F-statistic value 1.619158was not significant.

This implied that there was no problem of heteroskedasticity in the Agricultural sector model estimated.

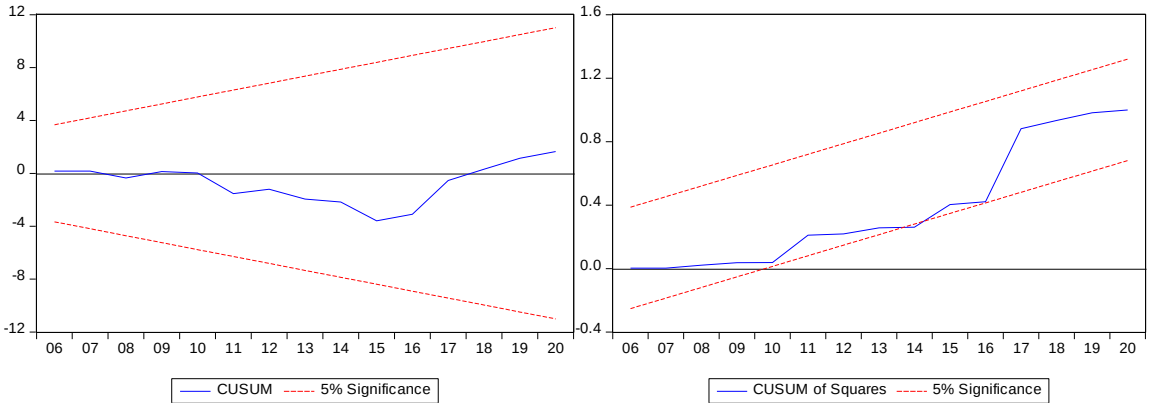
Figure 4.6.1.1 Normality test Agricultural sector model



Source: Author's compilation from Eviews version 10.

The residual normality test of the estimated Agricultural sector was displayed in Figure 4.6.1 above, the Probability 0.587944, which is grater that 5% level of significance, shows that the residuals are normally distributed.

Figure 4.6.1.2 Stability test Agricultural Sector Model



Source: Author's compilation from Eviews version 10.

Figure 4.6.1.2 shows the stability test for the Agricultural sector model, the result from the Cumulative Sum and Cumulative sum of the Square of Recursive Residuals (Cusumsq) Tests for the Agricultural sector model. We observe that the coefficients of both the Agricultural sector growth models are stable because the blue line usually lies between both red lines. Hence, we can say with full confidence that our estimated models are stable. Hence, our findings are robust and can be analyzed without caution; inferences drawn from these models can be relied on.

Table 4.6.2.1: Estimated Short-Run Result of Industrial Sector Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNINDL(-1))	0.306496	0.100374	3.053549	0.0065
D(LFR)	0.182480	0.031535	5.786674	0.0000
D(LNGOVEDU)	-0.167537	0.079174	-2.116070	0.0478
D(LNGOVEDU(-1))	-0.213829	0.042060	-5.083877	0.0001
D(LNGOVHLT)	0.211135	0.072161	2.925901	0.0087
D(SSE)	0.009404	0.005384	1.746537	0.0969
D(SSE(-1))	-0.016578	0.005665	-2.926423	0.0087
CointEq(-1)*	-0.616834	0.070472	-8.752925	0.0000

Source: Author's compilation from Eviews version 10.

The result of the industrial sector model is given in Table 4.6.2.1 above. From the result, the first lag of the Industrial sector is seen to be positive and significant in its contribution to the industrial sector growth. Labour force participation rate (LFR) was seen to have a significant and positive impact on industrial sector growth in the short run; a one percent increase in labour force participation rate leads to an eighteen percent increase in industrial sector growth in the short run. Government expenditure on education (GOVEDU) was seen to have a negative and significant impact of industrial sector growth as one percent increase in government investment in education leads to seventeen percent decrease in industrial sector growth, also the first lag of government expenditure on education shows that one percent increase in government

expenditure leads to twenty one percent (21%) fall in industrial sector growth in the short-run. Government expenditure on health in the short run was seen to have a positive but insignificant impact on industrial sector growth. Secondary school enrolment rate in the short run was seen to have a positive but insignificant effect on industrial sector growth. However, its first lag was seen to have a negative and significant impact on industrial sector growth in the short-run. The Coefficient of the error correction term is negative (correctly signed), and it shows that 62% percent of the previous year shocks in the Industrial sector are offset every 12months.

Table 4.6.2.2: Estimated Long-Run Result of Industrial s Sector Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFR	0.081771	0.038515	2.123093	0.0471
LNGOVEDU	0.813561	0.207541	3.919994	0.0009
LNGOVHLT	-0.148967	0.205556	-0.724704	0.4775
MR	0.010327	0.009595	1.076245	0.2953
SSE	0.057941	0.012715	4.556859	0.0002
C	-1.363216	2.932357	-0.464888	0.6473

Source: Author's compilation from Eviews version 10.

The result of the long-run Industrial Sector model is shown in Table 4.6.2.2. Above, from the result, the labour force participation rate (LFR) in the long run has a positive and significant impact on industrial sector growth. A one percent increase in labour force participation rate will lead to an eight percent increase in industrial sector growth. Government expenditure on education was seen to have a positive and significant impact on industrial sector growth. One percent increase in government expenditure in the long-run leads to an eighty-one percent increase in industrial sector growth. Government expenditure on health has a negative and insignificant impact on industrial sector growth. Also, the infant mortality rate was seen to have a positive and insignificant impact on industrial sector growth in the long-run. Secondary school enrolment rate has a positive and significant impact on industrial sector growth. A one

percent increase in secondary school enrolment rate will lead to a six percent increase in industrial sector growth in the long-run.

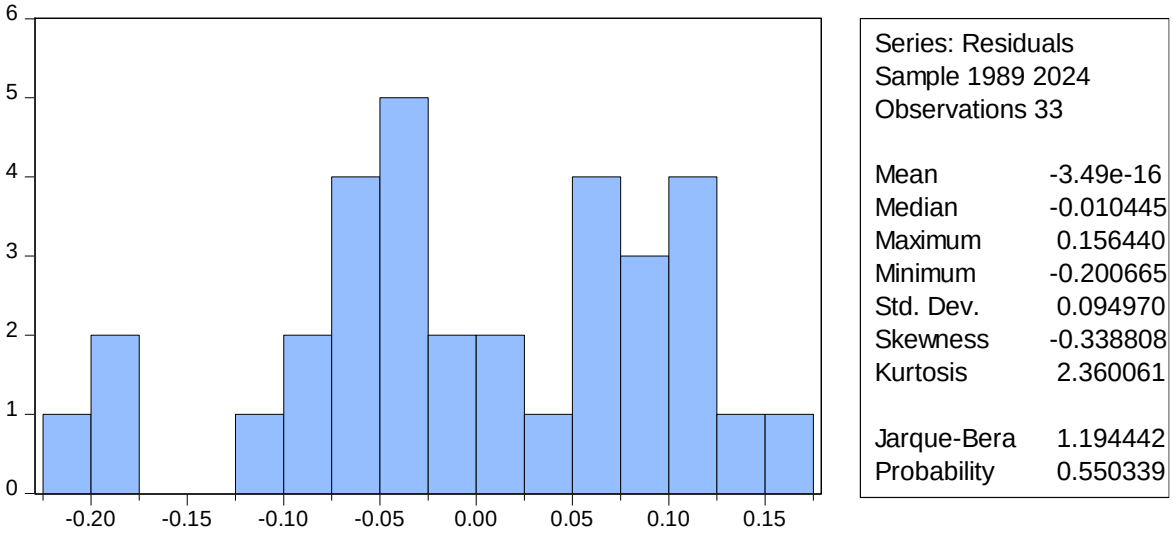
Table 4.6.2.3: Diagnostics result of the Estimated Industrial Sector Model

Test	F Stat	DF	Pob
Breusch-Godfrey Serial Correlation LM Test	1.4148461	F(2,17)	0.2702
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.639093	F(13,19)	0.7935

Source: Author's compilation from Eviews version 10.

Diagnostics of the estimated Industrial sector growth model were displayed in Table 4.6.2.3. From the table, the estimated model had a residual series that had no serial correlation. This was revealed by the Breusch-Godfrey Serial Correlation LM Test, with an F-statistic value of 1.4148461, which was not significant at 5%. It meant that a hypothesis of no serial correlation in the residual series cannot be rejected. Hence, there is no serial correlation in the model since the probability value of 27% is greater than 5% level of significance. The Breusch-Pagan-Godfrey heteroskedasticity test showed that the F-statistic value 0.639093was not significant. As the probability value 75% greater than the 5% level of significance. This implied that there was no problem of heteroskedasticity in the Industrial sector model estimated.

Figure 4.6.2.1 Normality test for Industrial sector model



Source: Author's compilation from Eviews version 10.

The residual normality test of the estimated Industrial sector was displayed in Figure 4.6.2 above, the Probability 0.550339, which is grater that 5% level of significance, shows that the residuals are normally distributed.

Figure 4.6.2.2 Stability test for Industrial Sector Model

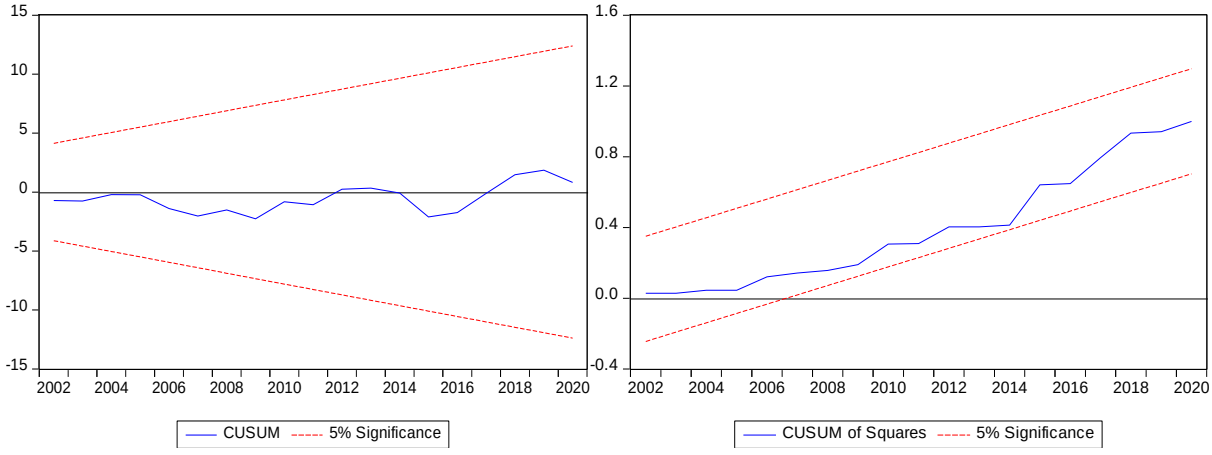


Figure 4.6.2.2 shows the stability test for the Industrial sector model, the result from the Cumulative Sum and Cumulative Sum of the Square of Recursive Residuals (Cusumsq) Tests for the Industrial sector model. We observe that the coefficients of both the Industrial sector

growth model are stable because the blue line usually lies between the two red lines. Hence, we can say with full confidence that our estimated models are stable. Hence, our findings are robust and can be analyzed without caution; inferences drawn from these models can be relied on.

Table 4.6.3.1: Estimated Short-Run Result of Service Sector Model.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.473857	0.046536	10.18269	0.0000
D(LNGOVEDU)	0.046834	0.055516	0.843614	0.4094
D(LNGOVEDU(-1))	-0.145671	0.050789	-2.868163	0.0098
D(LNGOVHLT)	-0.064599	0.050013	-1.291647	0.2120
D(LNGOVHLT(-1))	-0.095057	0.042828	-2.219522	0.0388
D(MR)	0.040186	0.013555	2.964667	0.0080
D(SSE)	0.000127	0.003266	0.039029	0.9693
D(SSE(-1))	-0.009862	0.003599	-2.739757	0.0130
CointEq(-1)*	-0.196699	0.026443	-7.438543	0.0000

Source: Author's compilation from Eviews version 10.

Table 4.6.3.1 above shows the short-run result of the service sector model. Government expenditure on education shows a positive and insignificant impact on its effect on the service sector in the short run; its first lag shows a negative and significant impact on service sector growth in the short run. One percent increase in government expenditure on education will lead to a fifteen percent decrease in service sector growth. Government investment in health was seen to have a negative and insignificant effect on service sector growth in the short run; its first lag was also seen to be negative but significant in the short run, as a one percent increase in government investment in health will lead to a nine percent decrease in service sector growth. Infant mortality was seen to have a negative and significant impact on service sector growth. A one percent increase leads to a four percent decrease in service sector growth in the short run. Secondary school enrolment rate has a positive but insignificant effect in the short run; however, the first lag of secondary school enrolment rate was seen to have a negative and

significant impact on service sector growth in the short run. A one percent increase in the secondary school enrolment rate leads to a one percent decrease in the service sector growth. The Coefficient of the error correction term is negative (correctly signed), and it shows that 20% percent of the previous year shocks in the Service Sector growth are offset every 12 months.

Table 4.6.3.2: Estimated long-run Result of Service Sector Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFR	0.058207	0.082710	0.703744	0.4901
LNGOVEDU	2.256775	0.908699	2.483521	0.0225
LNGOVHLT	-1.850429	0.923586	-2.003526	0.0596
MR	0.013290	0.031460	0.422447	0.6774
SSE	0.068166	0.030802	2.213056	0.0393

Source: Author's compilation from Eviews version 10.

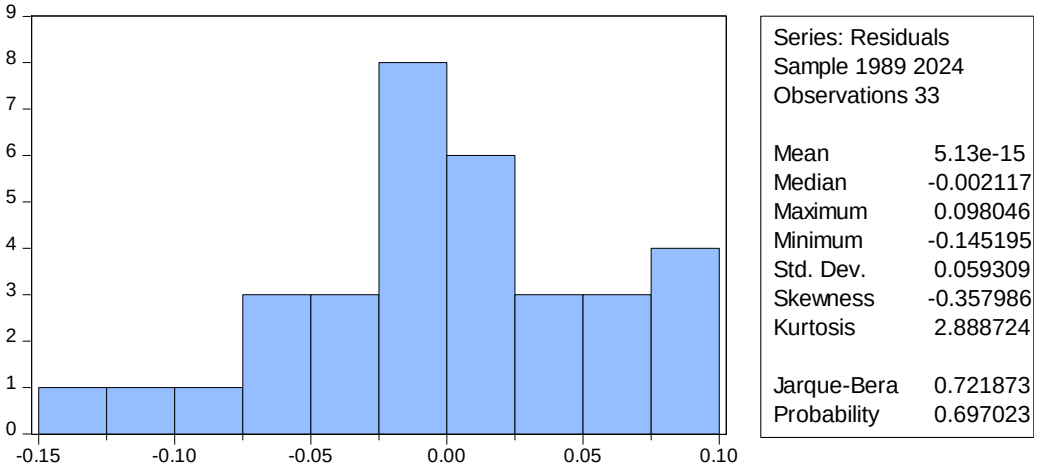
Table 4.6.3.2 above shows the long-run result of the service sector model, from which the result of the labour force participation rate has a positive and insignificant impact on service sector growth in the short-run. Government investment in education was seen to have a positive and significant impact on service sector growth in the long run. A one percent increase led to a two hundred and twenty-five percent increase in service sector growth in the short run. Government investment in health has a negative and significant impact on service sector growth in the long-run. One percent increase in government investment in health leads to a one hundred and eighty-five percent decrease in service sector growth in the long-run. The infant mortality rate was seen to have a positive and insignificant impact on service sector growth in the long-run. Secondary school enrolment rate was seen to have a positive and significant impact on service sector growth in the long run, as a one percent increase in secondary school enrolment leads to a seven percent increase in service sector growth in the long run.

Table 4.6.3.3: Diagnostics result of the Estimated Service Sector Model

Test	F Stat	DF	Pob
Breusch-Godfrey Serial Correlation LM Test	2.743577	F(2,17)	0.0928
Heteroskedasticity Test: Breusch-Pagan-Godfrey	1.127809	F(13,19)	0.3953

Diagnostics of the estimated Service se sector growth model were displayed in Table 4.6.3.3. From the table, the estimated model had a residual series that had no serial correlation. This was revealed by the Breusch-Godfrey Serial Correlation LM Test F-statistic value 2.743577, which was not significant at 5%. It meant that the hypothesis of no serial correlation in the residual series cannot be rejected. Hence, there is no serial correlation in the model since the probability value of 27% is greater than 5% level of significance. The Breusch-Pagan-Godfrey heteroskedasticity test showed that the F-statistic value of 1.127809 was not significant. As the probability value of 39% greater than the 5% level of significance. This implied that there was no problem of heteroskedasticity in the Industrial sector model estimated.

Figure 4.6.3.1 Normality test for the Service Sector model.



Source: Author's compilation from Eviews version 10.

The residual normality test of the estimated Service sector was displayed in Figure 4.6.3 above, the Probability 0.667023, which is grater that 5% level of significance, shows that the residuals are normally distributed.

Figure 4.6.3.2 Stability test for Service Sector Model

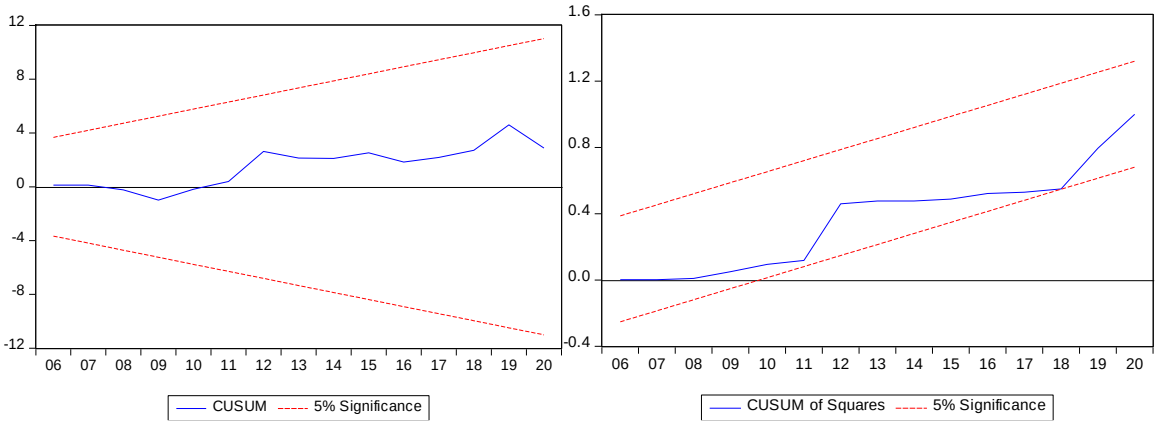


Figure 4.6.3.2 shows the stability test for the Service sector model, the result from the Cumulative Sum and Cumulative sum of the Square Of Recursive Residuals (Cusumsq) Tests for the Service sector model. We observe that the coefficients of both the Service sector growth models are stable because the blue line usually lies between both red lines. Hence, we can say with full confidence that our estimated models are stable. Hence, our findings are robust and can be analyzed without caution; inferences drawn from these models can be relied on.

4.7 Test of Hypotheses

The hypothesis of the study was based on the results obtained from the Agricultural Sector Model, Industrial Sector Model, and Services Sector Model regression analysis.

Hypothesis one:

H_1 Human capital development has no significant effect on the agricultural sector in Nigeria.

From the Agricultural Sector empirical result, the short-run result shows that government investment in education had a negative and significant impact on the Agricultural sector growth. In the long run, Government investment in Education and Secondary School Enrolment rate both had a positive and significant impact on Agricultural Sector growth. The short-run result negates existing theories; however, the long-run is in line with theoretical postulation. From theory, it was seen that as a country invests in Education Increases, the human capital and the productivity of its human resources also increase.

Government investment in health was seen to have a negative and significant impact on the agricultural sector growth in the short term. In the long run, the infant mortality rate was seen to have a positive and significant impact on agricultural sector growth. Both government investment in health and the Infant Mortality rate represent the healthiness of human capital in the Agricultural sector. These two variables are not in line with theoretical postulation from both the short-run and long-run results. From theory, it is seen that as the government increases its investment in health, there should be an increase in the Agricultural sector growth, also for infant mortality rate an increase in supposed to lead to a decrease in the Agricultural sector growth. On the whole, the result shows that the impact of Human capital development on the Agricultural sector is statistically significant. Hence, the null hypothesis, which states that there is no significant impact of human capital development on Agricultural sector growth in Nigeria, is rejected, while the alternative hypothesis is accepted.

Hypothesis two:

H_2 Human capital development has no significant effect on the industrial sector in Nigeria.

From the industrial sector empirical result, the short-run result shows that government investment in education had a negative and significant impact on the industrial sector growth. In the long run, Government investment in Education and Secondary School Enrolment rate both had a positive and significant impact on Industrial Sector growth. The short-run result was not in line with theoretical postulation, the long-run was in line with theoretical postulation. From theory, it was seen that as a country's investment in education increases, the human capital and the productivity of its human resources also increase.

Government investment in health was seen to have a negative and significant impact on the industrial sector growth in the short run. Government investment in health represents the healthiness of human capital in the industrial sector. Both the short-run and the long-run results have been seen to negate theoretical postulation. From theory, it is seen that as the government increases its investment in health, there should be an increase in the industrial sector growth. On the whole, the result shows that the impact of Human capital development on the industrial sector is statistically significant. Hence, the null hypothesis, which states that human capital development has no significant impact on Industrial sector growth in Nigeria, is rejected while the alternative hypothesis is accepted.

Hypothesis three:

H_3 Human capital development has no significant effect on the service sector in Nigeria.

From the service sector empirical result, the short-run result shows that government investment in education and secondary school enrolment had a positive but insignificant impact on service sector growth. In the long run, Government investment in Education and Secondary

School Enrolment rate both had a positive and significant impact on Service Sector growth. The short-run result was not in line with theoretical postulation, the long-run was in line with theoretical postulation. From theory, it was seen that as a country invests in education, the human capital and the productivity of its human resources also increase.

Government investment in health was seen to have a negative and significant impact on Service sector growth in the short run, and the infant mortality rate was seen to have a negative and significant impact on service sector growth. In the long run, the result was also seen to be negative. Government investment in health represents the healthiness of human capital in the service sector. This is in line with theoretical postulation. The short-run and long-run results show that investment in health has a negative impact on the service sector. This is not in line with the theory. From theory, it is seen that as the government increases its investment in health, there should be an increase in the service sector growth. On the whole, the result shows that the impact of Human capital development on the Industrial sector is statistically significant. Hence, the null hypothesis, which states that trade has no significant impact on Service sector growth in Nigeria, is rejected while the alternative hypothesis is accepted.

4.8 Policy Implications of the Findings

From the estimation result of the Agricultural Sector Growth, the variable (Government recurrent Investment in education and Secondary School enrolment rate; shows government expenditures on Education) in the short-run, a negative impact on Agricultural sector growth was seen, while in the long-run, there was a positive impact on Agricultural growth. (Government recurrent expenditure on health and infant mortality rate shows the government's overall expenditure on health.) In the long run, the result shows a negative impact on the agricultural sector growth. The implication of this on the Agricultural sector is that for the

desired level of agricultural sector growth to be achieved in the short run, investment in education should be increased. Because the current investment in education is not quite enough to bring about the desired growth rate in the Agricultural sector. However, in the long run, investment in education was seen to have a positive impact on the agricultural sector growth.

The investment in Health in the long run was seen to have a negative though insignificant impact on Agricultural sector growth. The implication of this is that the current investment in health is not a driver of agricultural sector growth, both in the short-run and long run. On the whole, the Policy implication of this is the need to increase the level of human capital formation through deliberate investment in education and health to achieve the desired level of Agricultural sector growth.

Also, the estimation result of the Industrial Sector Growth Model, the variable (Government recurrent Investment in education and Secondary School enrolment rate shows that government expenditures on education have a negative impact on Industrial sector growth in the short run, while in the long run, there is a positive impact on Industrial Sector growth. (Government recurrent expenditure on health and infant mortality rate shows the government's overall expenditure on health.) In the short run, Government Expenditure on health was seen to have a positive and significant impact on Industrial sector growth, while in the long run, the result shows a negative impact on Industrial s sector growth.

The implication of this on the Industrial sector is that for the desired level of Industrial sector growth to be achieved, investment in education should be increased. Because the current investment in education is not quite enough to bring about the desired growth level in the Industrial sector in the short-run. Though in the long run, investment in education was seen to have a positive impact on the Industrial sector growth. The investment in Health was seen to

have a positive and significant impact on industrial sector growth, while in the long run, it was seen to have a negative and insignificant impact on Industrial sector growth. The implication of this is that the current investment in health is not enough to bring about the desired change in Industrial Sector growth in the long-run. On the whole, the Policy implication of this is the need to increase the level of human capital formation through deliberate investment in education and health to achieve the desired level of Industrial sector growth.

Finally, the estimation result of the Service Sector Growth Model, the variable (Government recurrent Investment in education and Secondary School enrolment rate), shows that) in the short-run a negative and significant impact on Service sector growth, while in the long run, there was a positive impact on Service Sector growth. The implication of this on the service sector is that for the desired level of service sector growth in the short run to be achieved, investment in education should be increased.

The government's overall expenditure on health (Government recurrent expenditure on health and infant mortality rate) shows that, in the short run, Government Expenditure on health was seen to have a negative and significant impact on service sector growth; also, in the long run, the result shows a negative impact on Service sector growth. The implication of this on the Service sector is that for the desired level of Service sector growth, the current investment in health is not a driver of service sector growth as shown from the short-run and long-run. On the whole, the Policy implication of this is the need to increase the level of human capital formation through deliberate investment in education and health so as to achieve the desired level of Industrial sector growth in the long run.

5.2 Summary of Findings

This Study has been able to expose several findings on the Sectorial growth analysis on the impact of human capital development in Nigeria during the period under review. However, the major findings of this study are enumerated as follows.

From the Agricultural sector growth model, it was seen that investment in education had both short-run and long-run government recurrent expenditure on education and secondary school rate positive and significant impact on Agricultural sector growth, while investment in both infant mortality rate and government recurrent expenditure in health was seen to have no positive impact on Agricultural sector growth. The coefficient of the error correction term in the short-run was properly signed and indicates that about 38% of the previous shocks in the Agricultural sector growth are offset every 12 months.

Also, the Industrial Sector model showed that investment in Education, such as government recurrent expenditure on education and secondary school enrolment rate, had a negative and significant impact on industrial sector growth in the short run. While in the long run, the impact of government expenditure on education was seen to be positive. Government investment in health, as shown by government recurrent expenditure on health and infant mortality rate in the short run, showed a negative and significant impact on industrial sector growth. In the long run, government investment in health was seen to be negative and significant.

Lastly, the Service Sector growth model showed that investment in human capital development had a negative impact on service sector growth, as shown by the coefficient of both investments in health and education variables. While in the long run, only investment in health was seen to have a negative impact on service sector growth, investment in education

was seen to have a positive impact on service sector growth. The coefficient of the error correction term in the short-run was properly signed and indicates that about 62% of the previous shocks in the Agricultural sector growth are offset every 12 months.

5.3 Recommendations

Considering the significant relationship between the Agricultural sector, Industrial sector, Service Sector, and observed variables in the study, the study recommends the following for the Agricultural sector.

i. The government should encourage the participation of the populace in the agricultural sector through its policies, as the labour force participation rate in the agricultural sector leads to the growth of the agricultural sector.

ii. Since the current level of Investment in education negates short-run growth of the Agricultural sector, Budgetary allocations to education should be increased to erode the negative effect of current investment on education on the Agricultural sector, thereby paving the way for an instant effect on increasing the output of the Agricultural sector both in the short-run and long-run for more sustainable agricultural sector growth.

The uniqueness in human capital development needs of the industrial sector of the Nigerian Economy was shown from the result. Hence, the following recommendations were made.

i. The current level of investment in education and secondary school rate shows a negative impact on industrial sector growth, hence to have a positive impact on the industrial sector, the government should not only increase its investment in education but also in technological knowledge from the secondary school level.

ii. From the result, the industrial sector shows that it needs a different unique set of labour force skills to drive it. On this, investment in technical education and institutes is needed to boost the industrial sector growth.

The service sector result shows that the sector needs highly quality human capital development, as investment in education shows a negative impact on the economy in the short run. On the note, the study recommends that;

i. Quality investment in human capital development policies, especially in education, will help increase the productivity of the industrial sector, hence leading to industrial sector growth.

ii. For long-run in industrial sector to be achieved, increase in investment in health is highly needed for industrial sector growth to be achieved.

5.5 Conclusion

The study investigated sectoral growth analysis of the impact of human capital development in Nigeria. The Autoregressive distributed lag (ARDL) model was estimated to distinguish the short-run from the long-run impact of human capital development on the major sectors, namely (Agricultural, Industrial, and Service) of the Nigerian Economy. The Agricultural Growth model shows that investment in education in the short run did not follow its a priori sign expectation, while in the long run, investment in health did not follow its a priori sign expectation. However, education as a component was seen to be very impactful on the agricultural sector growth. The Coefficient of the error correction term is negative (correctly signed), and it shows that 38% percent of the previous year's shocks in the Agricultural sector are offset every 12 months in the short run.

The Industrial sector model shows that showed that investment in education in the short-run negatively impacts Industrial Sector growth, as it doesn't conform with its aprior sign expectations, the labour force participation rate was found to be significant both in the short-run and long-run, the investment in health which was found to be positive and significant in the short-run was seen to have a negative and insignificant impact in the long-run. On the whole, the human development needs of the industrial sector are yet to be met with the current level of investment in health and education. The Coefficient of the error correction term is negative (correctly signed), and it shows that 38% percent of the previous year's shocks in the Industrial sector are offset every 12 months in the short run.

Service Sector growth model showed that in the short run, human capital development has a negative impact on sector growth, as all the components of human capital development negate their a priori sign expectations. While in the long-run, only investment in health was seen to have a positive and significant impact on service sector growth, investment in health was seen to have a negative and significant impact on the service sector. Both the infant mortality rate and labour force participation rate were seen to be insignificant in the impact on service sector growth.

The study, therefore, calls for proper investment in human capital development through an increase in budgetary allocation to education and health, so as to bring about the needed growth in the Agricultural, Industrial, and Service sectors.

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