Analyzing Sectorial Growth and the Influence of Human Capital Development on Achieving Sustainable Development Goals in Nigeria

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Abstract

This research investigates the correlation between sectorial growth and the efficacy of human capital development initiatives in Nigeria within the context of Sustainable Development Goals (SDGs). The study employs the autoregressive distributed lag cointegration framework, using annual data over the period 1986 to 2020. The study's goal was to ascertain how Nigeria's many sectors were affected by the growth of human capital. Nigeria's economy was divided into three sectors: the agricultural, industrial, and service sectors. Government spending on education and the secondary school enrollment rate was found to have a substantial and favorable long-term influence on the expansion of the agricultural sector. In the short term, investments in education were seen to have a negative impact on the industrial sector, but over time, both education and secondary school enrollment were shown to positively impact the growth of the industrial sector. Last but not least, investments in education were perceived to have a negative short-term impact but a positive long-term effect in the services sector. The report suggests raising government spending on health and education to benefit the agricultural, industrial, and service sectors over the long and short terms. As the results of the diagnostic test demonstrate that the estimate produced is genuine, our conclusions are solid and trustworthy.

Key Words: *Sustainable Development Goals (SDGs), Sectorial Growth, Human Capital Development, Nigeria, Economic Growth, Education*

Background to the Study

Since human capital includes projects, education, training, and other processes focused on developing the skills necessary to increase production, it may be used as a tool for competitive advantage. The development of human resources was formerly thought to be a problem exclusive to developed nations. However, after several attempts at development in Nigeria failed, there was a renewed focus on developing human resources rather than just passive natural resources (Olusanya, 2016). Human capital refers to a country's human resources, abilities, and capabilities. In contrast, human capital formation refers to 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 et al., 2018).

Human capital affects 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. Health's great importance cannot be overemphasized because it supports the other elements of human capital; being healthy sets the ground for the improvement of education level.

Statement of the Problem

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

Investing in our people, Nigeria lags in the significant global socio-economic indicators for health, education, nutrition, and jobs. According to WDI analysis of data from 2012 to 2017, Nigeria is ranked 137 on infant mortality out of 140 countries, 53% Proportion of infant mortality and maternal deaths attributable to malnutrition, 54% Primary net enrolment ratio in Nigeria, 52 Years of life expectancy in Nigeria, 24% Proportion of children under the age of 5 that are underweight, 10mn School-age children that are out of school, 59% Proportion of births attended by skilled health personnel 17.6mn number of unemployed/underemployed youths, At the same time, economic growth has not been inclusive; today more Nigerians live in poverty than ten years ago. Nigeria's performance on key health indicators, as reviewed by the 2015 Millennium Development Goals Report and Global Competitiveness Report 2016–2017, shows that Nigeria's health system does not provide the level of service required to meet the needs of its population. The prevalence of infectious diseases remains high. Nigeria ranks poorly on the incidence of tuberculosis

(128 out of 138 countries) and the prevalence of HIV (123 out of 138 countries). On under-five child mortality, there are 89 deaths per 1,000 live births, a level far above the target of 64 deaths per 1,000 live births set in the UN Sustainable Development Goals (SDGs). Some progress has been made over the last 20 years. The maternal mortality rate in 2014 was 576 deaths per 100,000 live births compared to 1,000 deaths per 100,000 live births in 1990. However, Nigeria has a long way to go to meet the United Nations Sustainable Development Goals (SDG) of 70 deaths per 100,000 live births by 2030.

There are several reasons for the poor performance of our healthcare services. These include insufficient financing, inadequate and inequitable access, weak supply chain management, limited human resource capacities and insufficient coordination, cohesion and accountability. To grow and develop the economy sustainably, it is imperative to invest in the Nigerian people, especially its youth. The shifts in the global economy, the emergence of new sectors, and the digital revolution have changed the skills required of the workforce. Nigeria has to reposition its education sector to prepare its young people to cope with the changing technological and economic environment. As things stand, in Nigeria, limited access to primary education and science and technology courses coupled with insufficient capacity and sub-standard infrastructure at the tertiary level means that the workforce needs more critical skills to develop the economy. Indeed, many employers cite a lack of skills as a significant obstacle to hiring personnel. Some of the most pressing challenges include limited access to and quality of primary education, limited provision of science, technology, engineering, and mathematics (STEM) education, inadequate facilities at all levels of education, especially at the tertiary level, and lack of structured and quality programs for technical and vocational education and training. Other constraints are inadequate financing, insufficient number of skilled teachers and lecturers, and outdated educational policies and practices; the 2015 MDG report on performance on crucial education indicators shows that Net School enrolment was still 54%, primary six completion, Literacy, all these indicators show a poorly performing education sector.

Research Questions

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

1. What effect does human capital development have on the Agricultural sector in Nigeria?
2. What effect does human capital development have on the Industrial sector in Nigeria?
3. What effect does human capital development have on the Service sector in Nigeria?

Objectives of the Study

The aim of this study is to determine the relationship between the development of human capital and its effect on different sectors in Nigeria from 1981 to 2020. The study will evaluate the following specific objectives:

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

2. To ascertain whether human capital development has any significant influence on the Industrial sector in Nigeria.
3. To investigate the effect of Human capital development on the Service sector in Nigeria.

Hypotheses of the Study

The following Hypotheses are tested in the study.

H1 Human capital development has no significant impact on the Agricultural sector in Nigeria.

H2 Human capital development has no significant impact on the Industrial Sector in Nigeria.

H3 Human capital development has no significant impact on the Service Sector in Nigeria.

Scope of the study

This study is based on secondary data from the World Development Indicator and CBN Statistical Bulleting, which covers a period of 35 years (1986-2020); this is to achieve a comprehensive analysis of the impact of human capital development on different sectors of the Nigerian economy.

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 against primary data. Annual data was used during this study because quarterly data were not available for the data used. The non-availability of quarterly data is also a limitation faced in this study. To this end, the results obtained depend on the data quality applied.

The Concept of Human Capital

Human capital as a phrase was made popular by Theodore W. Schultz in 1960; ever since then, this phrase has gained the attention of many. According to Gary Backer (1964), human capital is a physical means of production. Organizations invest in human capital via education, training, and health. Later, Thomas Davenport (1999) advanced that "the component of human capital consisted of abilities, knowledge, skill, personal talent, behaviour, and effort when those three components plus time.

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 to the state of someone's health also matter. As construed by the Organization of 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).

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. According to Ogujiuba and Adeniyi (2005), the government in Nigeria predominantly regulates education.

Education and human capital development in Nigeria

To educate is to affect people's knowledge, skills, and attitudes systematically. 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.

People's understanding of themselves and the world is enriched by education. It raises people's awareness of themselves and their surroundings, improving their quality of life. It improves their quality of life and has many social advantages for individuals and society. Education increases people's productivity and creativity, as well as entrepreneurship and technical advancement, as Malaysia, Bolivia, and China have proved (World Bank, 1999).

Health and human capital development in Nigeria.

Health is one of the most critical human capital measures that has significantly contributed 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 labour 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 worldwide 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 meager (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).

The Challenge of Human Capital Development in Nigeria

According to Aluko and Aluko (2012), Nigeria is ranked 151 out of 177 nations in the Human Development Report from 2004. Malaysia is number 59, Thailand number 76, Tunisia number 92, South Africa number 119, India number 127, and Ghana number 131. According to one perspective, Nigeria is only better off than 26 other countries regarding measurable human development indices (HDI) and, as a result, citizens' quality of life. Economic performance (GDP, GNP, and per capita income), life expectancy, literacy rates, water, nutrition, sanitation status, health hazards, and technology dissemination and use are among the primary criteria considered in the ranking.

Theoretical Review

Human Capital Theory

In the world of the labour market, people bring different levels of education, knowledge, skill, and abilities, as well as their expectancy, to the workplace. According to James (2021): "a more educated, better-trained person is capable of supplying a more significant amount of practical, productive effort than one with less education and training. The value of human capital theory is widely accepted to increase organizational performance, so an organization relies on employees' skills, knowledge, and ability as a critical concept of value creation.

Schultz's Theory of Human capital

Schultz, in his theory of Human Capital, posits that both knowledge and skill are a form of capital and that this capital is a product of "deliberate investment." Schultz highlights Western countries and explains their increase in national output due to investment in human capital. He also makes a direct link between an increase in investment in human capital.

Mincer's theory of Human capital

Jacob Mincer (1922-2006) is one of the most influential economists of the second half of the twentieth century; to address the issues of human capital played 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 home and through training, experience, and mobility in the labour 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.

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 based on the accumulation of human capital. As indicated in his 1962 paper. Becker (1962) started his analysis by slightly overlooking on-the-job training, which was the focus of others.

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 by accumulating factor inputs such as physical capital and labour.

Endogenous Growth Theory

The controversies surrounding the performance of the neoclassical theories clarifies 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 stock of either labour or capital is ascribed to a third category, the Solow residual. This residual is seen to be responsible for half of the historical changes in the industrial nations of today.

The Lucas endogenous growth model

Lucas assumes that investing in education leads to the production of human capital, which is an essential determinant in the growth process. He buttresses his stands by distinguishing between the internal effect of human capital, where the individual worker undergoing training becomes more productive, and the external effect, which causes spillover and increases the productivity of capital and other workers in the economy. It is the investment in human capital rather than physical capital that causes the spillover effect, which increases the level of technology.

The Romer Model

Romer's model of *Endogenous Technical Change* of 1990 identifies a research sector specializing in producing 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.

Empirical Review

Dayo and Jimoh (2021) examined the role that human capital plays in the relationship between the industrialization process and growth in Nigeria between 1980 and 2016. The two-stage least squares were 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 play a relevant role in the same process.

Saheed et al. (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 uni-directional nor bi-directional relationship between public health expenditure and GDP. However, health expenditure as a share of total government expenditure and population has a uni-directional causal

relationship with real GDPAs. 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 1980-2017. 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 to 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 et al. (2018) studied The Dynamics of Human Capital Development and Industrial Growth in Nigeria, using Time series data spanning the 1976-2016 period on relevant variables analyzed using 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 favourable impact on industrial growth.

Matthew (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 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; 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 a negative long-run relationship between primary and 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 et al. (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 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 primary channel, while both joint short- and long-run causality was detected in the advanced channel. Primary school enrollment/secondary school enrollments have little influence on productivity growth in the long run. However, tertiary institution enrolment and government education spending have a favourable effect on productivity growth. However, the combined contribution of both impacts is less than 1%, indicating that the inputs could be more responsive to productivity. As a result of this finding, Nigerian productivity has remained the same due to human capital building through education and investment in research and development. It is critical to invest in research and development to boost productivity and improve the skills required to adapt and disseminate new technology.

Ogunleye et al. (2017) examined the impact of human capital development on the economic growth of Nigeria, using an annual time series date 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 significant determinant of 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 Co-integration 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 try to raise their budget. It was suggested that the federal government boost its education spending to improve the quality of education infrastructure required in schools.

Jaiyeoba (2015) investigates the relationship between investment in education, health, and economic growth in Nigeria, Using time series data from 1982 to 2011. Trend analysis, Johansen co-integration, and the ordinary least square technique were used in this study. However, empirical studies suggest that government spending on education, health, and economic growth have a long-term relationship. Health and education spending, secondary and tertiary enrolment rates, and gross fixed capital creation all show encouraging signs and are statistically significant (except government expenditure on education and primary enrolment rate). The conclusions of this study have significant consequences for education and health policies, which are currently the subject of heated debate in the country. As a result, this study suggests that to boost growth and lift Nigerians out of poverty, the government should implement policies that encourage major infrastructure and personnel investment in the education and health sectors.

Shahjahan et al. (2016), studied the relationship between human capital development and economic growth, Using annual data between 1981-2014 in Bangladesh, gross domestic product (GDP) as proxy for economic growth, total government expenditure on education and health, and the enrolment pattern of tertiary education, secondary and primary schools as proxy for human capital, this study is an attempt to investigate the long run, short-run and causal relationship among the variables by applying recent advantages in econometric methods such as co-integration and error correction mechanism, Unit root test results show that the variables are integrated of order one and positive long-run relationship between human capital development and economic growth is confirmed by co-integration test result, result from the study shows that the illiteracy rate in Bangladesh is 29% still high compared to others SAARC country and many workers are unskilled, leading to their low productivity; consequently, this study gives an idea about the significance of human capital development to the growth of the economy, the result emphasis on the significance of human capital development as it contribute to economic growth . Thus, policymakers and stakeholders should formulate more realistic policies to develop human capabilities since it is seen as a vital apparatus for economic growth in Bangladesh.

Ethem and Merve (2021) investigated 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. Vector Error Correction Mechanism (VECM) was used as the estimation technique, and co-integration 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 Johansen Co-integration test suggests the long-term existence of co-integration among all variables.
Furthermore, the Granger causality test results show uni-directional causality in the short run between health expenditure and economic growth. The importance of investments in health care services in Turkey is demonstrated by 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 et al. (2020) studied the effect 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.

Gaps in the existing Literature.
Most of the studies on human capital development and its impact on the Nigerian economy have either considered human capital development in individual sectors 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 et al. (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 Ifeanyichukwu (2019) researched Education, Health Expenditure, and the Quality of Life in Nigeria, Matthew (2018), Paul and Akindele (2016), Jaiyeoba (2015), Popoola et al. (2019), and Ogunleye et al. (2017) all examined the impact of human capital development on the economic growth of Nigeria within the different time frame.
Different researchers on the subject matter have also carried out some cross-country analyses. Ayşen and Hakan (2014) analyzed the relationship between economic growth and human capital for the period between 1990 and 2011 in 15 MENA (the Middle East and North Africa) countries (Lloyd, 2016) whose studies investigated government spending on education and economic growth in West African countries. Fuhmei (2015) studied the impact of healthcare expenditure in a growing economy in OECD; Serdar and Ebru (2016) studied Health Expenditures and Economic Growth in G8 Countries; Xuewei et al. (2020) studied the effect of Effects of Government Healthcare Expenditure on Economic Growth in 31 provinces in China, Ethem and Merve (2021) investigated the effects of health spending on economic growth in Turkey,

None of the studies listed above have been able to capture the impact of both the impact of Human capital (education and health investment) on individual sectors (Agricultural, services, Industrial) of Nigeria's Economy. Even none of the above-listed studies were able to identify if the human development need of each sector differs or not. Hence, there is insufficient information about the impact of human capital development on the different sectors of the Nigerian economy (agriculture, industries, and Services). It will be appropriate and informative to investigate how 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 to different sectors of the Nigerian economy between 1981 and 2020 as a way of contributing to the existing Literature on the link between human capital development and different sectors of Nigeria's economy.

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, explicitly described in terms of educational investments. Including 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 physical and human capital goods do not necessarily reduce over time. Knowledge spillovers among producers and external benefits from increased human capital are 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). Many endogenous growth specifications have been put forward. A typical specification for analyzing growth across several countries follows Barro (1997):

$\Delta y = f (y, y^*)$ ……(1)

$y^* = f (Z)$ ……(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), labour supply, government expenditure and investment, terms of trade, inflation, and, most importantly, for the purposes of this discussion, educational variables. The following sections explore measurement challenges related to educational variables. According to Barro (2000), any increase in the steady-state level y* will raise the per capita growth rate, y, over a transition period in this model. So, if the government, for example, improves the business climate by raising spending or increases education investment by increasing secondary school enrolment rates, the target level y* will rise, and y will rise. As actual per capita output

rises, diminishing returns will eventually bring the growth rate back to the long-term pace of technological progress. Improved policy has a long-term impact on the level of per capita output rather than just its growth rate. Long-term transitions, on the other hand, can take a long time, and the growth impacts of changes in government policy can last a long time.

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 are the linear specifications as adapted from Okumoko et al. (2018); James (2021); Ifunanyachukwu (2019) 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 equation (3.1), (3.2), and (3.3), SSE and GOVEDU capture investment in Education while MR and GOVHLT capture investment in health; hence, the above-stated variables captures both arms of human capital, which are the variables of interest.

Specifying in econometric terms and taking logarithm where significant variables are expected, avoiding the problem of substantial variable coefficient, the model is re-specified as thus;

$LAGRC = \alpha 0 + \alpha 1SSE + \alpha 2\ MR + \alpha 3\ LGOVEDU + \alpha 4LGOVHLT + \alpha 5LFR + \mu t$ ------- (3.4)

$LSERC = \alpha 0 + \alpha 1SSE + \alpha 2\ MR + \alpha 3LGOVEDU + \alpha 4LGOVHLT + \alpha 5LFR + \mu t$----- (3.5)

$LINDL = \alpha 0 + \alpha 1SSE + \alpha 2\ MR + \alpha 3LGOVEDU + \alpha 4LGOVHLT + \alpha 5LFR + \mu t$----- (3.6)

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

$D(LAGRI)t = \beta 0 + \gamma t + \alpha 0LAGRCt{-}1 + \alpha 1SSE\ t{-}1 + \alpha 2MR\ t{-}1 + \alpha 3LGOVEDU\ t{-}1 + \alpha 4LLGOVHLT\ t{-}1 + \alpha 5LFR{+}{+}\ \pi i\ D(SSE)\ t{-}1 + \pi i\ D(MR)\ t{-}1\ \upsilon i\ D(LGOVEDU)\ t{-}1 + \tau i\ D(LGOVHLT)\ t{-}1 + \rho i\ D(LFR)\ t{-}1 + \kappa t$……(3.7)

$D(LSERC)t = \beta 0 + \gamma t + \alpha 0LAGRCt{-}1 + \alpha 1SSE\ t{-}1 + \alpha 2MR\ t{-}1 + \alpha 3LGOVEDU\ t{-}1 + \alpha 4LLGOVHLT\ t{-}1 + \alpha 5LFR{+}{+}\ \pi i\ D(SSE)\ t{-}1 + \pi i\ D(MR)\ t{-}1\ \upsilon i\ D(LGOVEDU)\ t{-}1 + \tau i\ D(LGOVHLT)\ t{-}1 + \rho i\ D(LFR)\ t{-}1 + \kappa t$……(3.8)

$D(LINDL)t = \beta 0 + \gamma t + \alpha 0LAGRCt{-}1 + \alpha 1SSE\ t{-}1 + \alpha 2MR\ t{-}1 + \alpha 3LGOVEDU\ t{-}1 + \alpha 4LLGOVHLT\ t{-}1 + \alpha 5LFR{+}{+}\ \pi i\ D(SSE)\ t{-}1 + \pi i\ D(MR)\ t{-}1\ \upsilon i\ D(LGOVEDU)\ t{-}1 + \tau i\ D(LGOVHLT)\ t{-}1 + \rho i\ D(LFR)\ t{-}1 + \kappa t$……(3.9)

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

Estimation Method

This study adopted the Auto-Regressive Distributed Lag (ARDL) model-bound testing approach (Dickey & Fuller, 1979). This model was developed by Pesaran et al. (2001) and

is an OLS model applicable for both non-stationary time series and time series with mixed order of integration. It helps in predicting the current values of a dependent variable based on the current values as well as lagged values of the explanatory variables.

Sources of Data

The relevant data used for this study will be obtained from the Central Bank of Nigeria's annual reports, Statistical Bulletins and World Development Indicators covering the 45 years between 1986 and 2020. This is to achieve a comprehensive disaggregate analysis of the impact of Human Capital development on different sectors of the Nigerian economy.

Table 4.1.1: Descriptive Statistics for the 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, only the 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 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 Industrial sector (INDL), Government expenditure on education (GOVEDU), and government expenditure on health (GOVHLT)only variables were generally distributed given their probability values.

The dependent variable, the agriculture sector (AGRI), has a maximum growth value of 37241.61 and minimum growth value of 35.70264, a standard deviation of about 10255.93, shows that the variable was highly dispersed from the mean, an average value of 8792.303 over 35 years ranging from 1986-2020 was seen. Government expenditure on education (GOVEDU) has a maximum value of 388.3671 and 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 is 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; the 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. The minimum value is 72.20000, with a mean of 101.1514 and a standard deviation 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 the 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, only the 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), 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 the Industrial sector (INDL) and government expenditure on education (GOVEDU). The Government expenditure on health (GOVHLT)only variables were typically distributed given their probability values.

The dependent variable, the Industrial sector (INDL), has a maximum value of 43530.78 and a minimum value of 65.04538, with a standard deviation of about 11973.45. The variable was highly dispersed from the mean, with an average value of about 9761.997 over 35 years ranging from 1986-2020. Government expenditure on education (GOVEDU) has a maximum value of 388.3671 and 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 is 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; the 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) the maximum value is 124.8000. The minimum value is 72.20000, with a mean of 101.1514 and a standard deviation 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 4.1.3: 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 table. 4.1.3 All the variables were positively skewed except for the 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), 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 the Service sector (SERV), Government expenditure on education (GOVEDU), and government expenditure on health (GOVHLT)only variables were typically 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 24712.99the variable was highly dispersed from the mean, an average value of about 19947.55 over 35 years ranging from 1986-2020. Government expenditure on education (GOVEDU) has a maximum value of 388.3671 and 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 is 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; the Infant Mortality rate (MR) has a maximum value of 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, and the two variables were not highly positively correlated. Government expenditure on health and education are also positively related but not highly related. Government expenditure on education has been seen to have a negative relationship with 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 highly negative relationship. From the relationships between the explanatory variables, none were seen to be perfectly correlated or nearly perfectly correlated; hence, we can conclude that there is no multicollinearity in the model.

Table 4.2.2 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 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 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 highly negative relationship. From the relationships between the explanatory variables, none 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 highly negative relationship. From the relationships 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 4.3.1: 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 a unit root in the selected variables in the first difference. The result was based on a 5% significant level. From the result, AGRI, INDL, GOVEDU, GOVHLT, and MR are integrated of Order I(1), i.e. they are integrated at first difference.

Bound test for Co-integration

Table 4.4.1: ARDL Bounds Test of Co-integration Results

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.

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

The result further indicated no co-integration among variables in the Industrial sector model. The F-statistic value was 8.31, which was also more significant than the 5 percent critical value of 3.38. This suggested that a null hypothesis of no co-integration 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 co-integration among variables in the Service Sector model. The F-statistic value was 7.30, greater than the 5 percent critical value of 3.79. This suggested that a null hypothesis of no co-integration 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 be estimated for this model.

Optimal Lag Length Selection for ARDL Models

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. The table, using the Akaike lag selection criteria, indicated that the optimal lag length for the Agricultural sector model is two lag. 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 displayed 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 lag. 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 lag. Thus, the Service sector model was estimated using an optimal lag length of two in the ARDL estimation.

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, the Labour force participation rate (LFR) has a positive and significant impact on the Agricultural Sector (Agri); an increase in labour force participation (LFR) by 1% will result in 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. A 1% increase in government expenditure leads to an 11% decrease in the Agricultural Sector performance. Infant mortality rate (MR), Labour force participation rate (LFR), 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's shocks in the Agricultural sector are offset every 12 months.

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, the Labour force participation rate (LFR) was seen to have a positive impact on 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 Agriculture sector growth, as a 1% increase in government expenditure on education leads to a 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 Agricultural sector growth in the long. The Infant Mortality rate, in the long run, was seen to have a positive impact on Agricultural sector growth. A 1% increase in infant mortality rate will lead to a 4% increase in agricultural sector growth in the long run. Secondary School enrolment rate was seen to have a positive and significant impact on Agricultural sector growth in the long run, as a 1% increase in secondary school enrolment will lead to a 3% increase in Agricultural sector growth in the long run.

Table 4.6.1.3: Diagnostics result of Estimated of 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 F-statistic value 1.951963, which was not significant at 5%. It meant that a hypothesis of no serial correlation in the residual series could not be rejected. Hence, there is no serial correlation in the model since the probability value of 16% is greater than the 5% level of significance. The Breusch-Pagan-Godfrey heteroskedasticity test showed that the F-statistic value 1.619158 was not significant. This implied that there was no problem of heteroskedasticity in the Agricultural sector model estimated.

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 leg of the Industrial sector is seen to be positive and significant in its contribution to industrial sector growth. The 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 the 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 on industrial sector growth, as a one percent increase in government investment in education led to a seventeen percent decrease in industrial sector growth. Also, the first leg of government expenditure on education shows that a one percent increase leads to a 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), showing that 62% percent of the previous year's shocks in the Industrial sector are offset every 12 months.

Table 4.6.2.2: Estimated Long-Run Result of Industrial 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. One percent increase in the 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 impact and a significant impact on industrial sector growth. A one percent increase in government expenditure, in the long run, leads to 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 rates have a positive and significant impact on industrial sector growth.
A one percent increase in the 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 Estimated of 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 F-statistic value 1.4148461, which was not significant at 5%. It meant that a hypothesis of no serial correlation in the residual series could not be rejected. Hence, there is no serial correlation in the model since the probability value of 27% is greater than the 5% significance level. The Breusch-Pagan-Godfrey heteroskedasticity test showed that the F-statistic value 0.639093 was not significant as the probability value is 75% greater than the 5% level of significance. This implied that there was no problem of heteroskedasticity in the Industrial sector model estimated.

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; from the result, government expenditure on education shows a positive and insignificant impact in its effect on the service sector in the short-run; however, 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 on service sector growth in the short run. However, its first lag was also 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. One percent increase leads to four decreases in service sector growth in the short run. The secondary school enrolment rate is positive but insignificant 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's shocks in Service Sector growth is 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 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, with a one percent increase leading 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.

The 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 Estimated of 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, which was not significant at 5%. It meant that the hypothesis of no serial correlation in the residual series could not be rejected. Hence, there is no serial correlation in the model since the probability value of 27% is greater than the 5% significance level. The Breusch-Pagan-Godfrey heteroskedasticity test showed that the F-statistic value of 1.127809 was not significant as the probability value of 39% is greater than the 5% level of significance. This implied that there was no problem of heteroskedasticity in the Industrial sector model estimated.

Test of Hypotheses

H1 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 Agricultural sector growth. In the long run, Government investment in Education and Secondary School enrollment rates 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's investment in Education Increases, the human capital and the productivity of its human resource also increases.

Government investment in health was seen to have a negative and significant impact on Agricultural sector growth in the short. 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 Infant Mortality rate represents 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, as the government increases its investment in health, there should be an increase in Agricultural sector growth. Also, for the infant mortality rate, an increase is supposed to lead to a decrease in Agricultural sector growth. Overall, 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:

H2 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 Industrial sector growth. In the long run, Government investment in Education and Secondary School enrollment rates both had a positive and significant impact on Industrial Sector growth. The short-run result was not in line with theoretical postulation. However, 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 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, as the government increases its investment in health, there should be an increase in 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:

H3 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 enrollment rates both had a positive and significant impact on Service Sector growth. The short-run result was not in line with theoretical postulation. However, 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 increases.

Government investment in health was seen to have a negative and significant impact on Service sector growth in the short run. Also, 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 theory. From theory, as the government increases its investment in health, there should be an increase in Service sector growth. Overall, 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.

Policy Implication of Finding

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 had a negative impact on Agricultural sector growth, 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 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 Agricultural sector growth.

The investment in health in the long run was seen to have a negative though the 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. Overall, 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 Agricultural sector growth.

Also, in the estimation result of the Industrial Sector Growth Model, the variable (Government recurrent Investment in education and Secondary School enrolment rate

shows government expenditures on education) in the short-run had a negative impact on Industrial sector growth, while in the long-run was 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 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. However, in the long run, investment in education was seen to have a positive impact on 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 is that more than the current investment in health is needed 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 so as to achieve the desired level of Industrial sector growth.

Finally, in the estimation result of the Service Sector Growth Model, the variable (Government recurrent Investment in education and Secondary School enrolment rate; shows government expenditures on education) in the short-run, a negative and significant impact on Service sector growth was seen 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 in the short-run and long-run. Overall, 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 in the long run.

Summary of Findings

This study has exposed 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 signed correctly and indicates that about 38% of the previous shocks in Agricultural sector growth are offset every 12 months.

Also, the Industrial Sector model showed that investment in education says 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. In the long run, only investment in health was seen to have a negative impact on service sector growth, while 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 signed correctly and indicates that about 62% of the previous shocks in Agricultural sector growth are offset every 12 months.

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.

1. 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.
2. Since the current level of investment in education negates short-run growth of the Agricultural sector, Budgetary allocations to education should be increased so as to erode the negative effect of current investment in education on the Agricultural sector, thereby paving the way for an instant effect on the 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

Conclusion

The study investigated sectorial 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 (Agricultural et al.) of the Nigerian economy. The Agricultural Growth model shows that investment in education in the short run did not follow its apriori sign expectation, while in the long run, investment in health did not follow its apriori sign expectation. However, education as a component was seen to be very impactful on 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 investment in education in the short-run negatively impacts Industrial Sector growth, as it does not conform with its prior sign expectations. The labour force participation rate was found to be significant both in the short run and long run, and 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 need of the industrial sector is yet 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.

The service sector growth model showed that in the short term, human capital development has a negative impact on sector growth, as all the components of human capital development negate their apriori sign expectations. While in the long run, only investment in health was seen to have a positive and significant impact on services sector growth, investment in health was seen to have a negative and significant impact on the service sector; both Infant mortality rate and labour force participation rate was seen to be insignificant in the impact on services sector growth.
The study, therefore, calls for proper investment in human capital development through increment in budgetary allocation to education and health to bring about the needed growth in the Agricultural, Industrial and Service sectors.

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