

**Trade Liberalization, Human Capital Development and Economic Growth in Sub-Saharan African (SSA) Countries**

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**Being a Viva Presentation to the Department of Economics & Development Studies,  
Faculty of Management & Social Sciences, Lead City University, Ibadan, Oyo State,  
Nigeria**

**In Partial Fulfillment of the Requirements for the Award of Doctor of Philosophy Degree  
(PhD) in Economics**

**2025**

### Certification

This is to certify that this thesis titled “Trade Liberalization, Human Capital Development and Economic Growth in Sub-Saharan African countries” was carried out by Bolanle Rahmon ADEROJU with matriculation number of LCU/PG / 002590 in the Department of Economics, Faculty of Management and Social Sciences, Lead City University, Ibadan, under my supervision and that this work has not been previously submitted.

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## **Dedication**

This research is unconditionally dedicated to Almighty GOD who endowed me with divine strength, wisdom, guidance, knowledge and sound health for its successful completion.

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## Acknowledgements

I would like to express my profound appreciation to the Management of Lead City University for the opportunity given to me to pursue my Postgraduate Studies with the laudable university. My profound gratitude goes to the school library and the school of Postgraduate Studies for the necessary corrections and guidance made to enhance the quality of the thesis.

I would also like to express my deepest gratitude to my thesis supervisor, Professor Campbell, Omolara A. for her unwavering guidance, insightful critiques and constant encouragement throughout this project despite her busy schedule. The assistance provided by other supporting personnel through vital information and materials that were utilized for the thesis is highly appreciated. My profound gratitude goes to the Head of Department, Dr. T. Ogunro and other lecturers in the department of economics, Prof. Akerele, W. O., Dr. Oyaromade, R., Dr. Ogunjinmi, O. O., Dr. Emiola, T. O., Dr. Alimi, O. Y., Dr. Adesina, O. O., Dr. Aderinto Esther, Dr. Raheem, M., Mrs. Oduyoye-Ejumedia A., Mrs. Ayodeji-Famuti, F. V. and Mr. Ayoola, O. for their commitment and hardwork. I would also like to appreciate all the non-academic staff in the Department. My sincere appreciation also goes to the Tertiary Education Trust Fund (TET Fund) for providing the financial impetus for this doctoral research. My immeasurable thanks go to my family members, especially my children, Aderoju Zainab Yetunde, Aderoju Quayyum Adeola, Aderoju Ibrahim Adebayo, for their endless patience, understanding and encouragement. I sincerely appreciate my colleagues and friends for their contributions towards the accomplishment of this thesis.

## Abstract

This study investigates the effect of trade liberalization and human capital development on economic growth of Sub-Saharan African countries from 2000 to 2022. Cross-sectional and time series data on total trade to GDP ratio (TLIB), human capital development index, export, import, net foreign direct investment, gross capital formation, net migration, net official development assistance, population, labour force, government total expenditure on education, government total expenditure on health, primary school enrolment rate, secondary school enrolment rate, infant mortality rate, life expectancy rate and inflation rate obtained from World Development Indicators (WDI) were utilized for the study. Pooled Ordinary Least Squares (POLS), Fixed Effects Model (FEM) and Two Step Difference Generalized Method of Moments (TSDGMM) were the econometric techniques employed in estimating the parameters of the four models developed for the study. Empirical findings for (Model 1) revealed that trade liberalization has a statistically significant positive impact on human capital development. Imports and gross capital formation variables exerted statistically significant positive impacts while net foreign direct investment, net migration and net official development assistance influenced human capital development positively but insignificant. The empirical results for (Model 2) showed that trade liberalization has statistically significant positive effect on economic growth of SSA countries. Exports, net foreign direct investment and population impacted economic growth positively and significantly while import, gross capital formation and labour force had negative contributions. Moreover, the empirical results for (Model 3) indicated that human capital development has a statistically significant positive impact on economic growth of SSA countries. Other explanatory variables of the model influenced economic growth negatively and significantly with the exception of secondary school enrolment rate that had significant positive impact. The results for (Model 4) showed that the interactive effect of trade liberalization and human capital development on economic growth for SSA countries was negative and statistically significant. Government total expenditure on education, government total expenditure on health, exports and imports had negative and significant influence on economic growth while gross capital formation, labour force, secondary school enrolment rate and infant mortality rate made insignificant positive contributions. Other independent variables of the model like net foreign direct investment, primary school enrolment rate and life expectancy rate influenced economic growth positively and significantly. Based on the estimated results, governments of Sub-Saharan African countries should invest massively in education and skills development, particularly in areas related to the needs of a more open and globally integrated economy; there should be implementation of complementary policies that address potential challenges and enhance the benefits of trade liberalization like strengthening of domestic revenue mobilization, investing in infrastructure, and providing targeted support for small and medium enterprises (SMEs) to mitigate the negative impacts of increased competition; and there should also be prioritization of investments in quality education and skills development. In addition, governments should also prioritize trade liberalization alongside investments in quality education and skills development; and finally massive investments should be made in trade infrastructure and technology to reduce logistic costs, enhance trade efficiency and promote regional connectivity.

**Keywords:** Trade liberalization, human capital development, economic growth, generalized method of moments, Sub-Saharan Africa.

**Word Count:** 490

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## **Chapter One**

### **Introduction**

#### **1.1 Background to the Study**

The achievement of high and sustainable economic growth is key to raising the standard of living of the citizens of any country in the world. Trade liberalization and human capital development are considered as some of the key variables through which economic growth rates of different countries in the world can be enhanced. The concept of Human capital refers to a combination of factors, including knowledge, skills, health, living conditions, employment opportunities and others, which enable individuals to realize their full potential and to be more productive members of society, increasing economic outputs on personal, corporate and state levels. On the other hand, the concept of “Human capital development” refers to the process of acquiring and enhancing the knowledge, skills, and abilities of individuals to increase their productivity and economic value. It involves investments in people through education, training, healthcare, and other initiatives that improve their overall well-being and employability.

Human capital development is germane for the promotion of economic growth and development of Sub-Saharan African countries. This is because a skilled and knowledgeable workforce is essential for driving economic growth and competitiveness; and engendering social progress by contributing to a more equitable and just society through the provision of opportunities for individuals to improve their lives and contribute to the well-being of their countries. Human capital development initiatives include quality education, vocational training programs, healthcare programs, mentorship and coaching, and skills-based training, to improve productivity and foster inclusive growth. There are several types of human capital development which can be

broadly categorized into technical skills, soft skills, intellectual capital, institutional knowledge, and organizational capital. All these variants focus on investment in people to enhance their skills, knowledge and capabilities which is crucial for organizations and countries to thrive in a competitive global environment. Sub-Saharan African countries face significant human capital development challenges, scoring the lowest globally on the World Bank's human capital index. The average human capital index (HCI) score for the region is 0.4, with a global average of 0.57 indicating a significant gap in human capital development compared to the global average. The region's human capital development is characterized by low education and health outcomes, and inadequate investment in skills development. The COVID-19 pandemic exacerbated these issues, leading to school closures, reduced healthcare access, and economic disruptions, resulting in learning losses, increased poverty and malnutrition.

There are several channels through which trade liberalization affects human capital development in Sub-Saharan African countries. These channels are foreign direct investments channel, knowledge transfer channel, technology transfer channel, export opportunities channel, importation of intermediate products channel, and public foreign capital inflow. These channels are often linked to economic growth, which itself can provide the resources to invest in human capital. However, achieving these benefits is not automatic and depends on SSA countries' capacity to absorb new technologies and commitment to investing in education.

Foreign direct investment channel can influence human capital development through trade liberalization by encouraging higher education enrolment, promoting skill premiums, and creating knowledge spillovers, although the net effect depends on the type of FDI, host country conditions, and the specific policies in place. Trade liberalization, by expanding access to global markets, makes investment in human capital more appealing to firms seeking skilled labour, and

it can spur demand for educated workers in export-oriented industries. This channel can be subdivided into technology transfer channel and knowledge transfer channel. Regarding the technology transfer channel, the adoption of trade liberalization by SSA countries can expose these economies to gain access to new technologies and skills from advanced nations, which boost productivity and growth, leading to higher incomes that can be invested in human capital development like education, health and skill-based training. The physical presence of multinational corporations in Sub-Saharan African countries can create a positive indirect effect on human capital formation in the SSA region via productivity spillovers. The transmission mechanisms of productivity spillovers from foreign direct investment can occur through three channels, which are demonstration channel, competition channel and labour mobility channel<sup>7</sup>.

The second channel is knowledge transfer channel which significantly impacts human capital development in SSA countries by increasing access to education through information and communication technologies (ICT) and enabling technology adoption through foreign direct investment and domestic policies. However, the effectiveness of this channel depends on complementary investments in human capital, institutional quality, and a conducive domestic environment. Concerning the export opportunities channel, trade liberalization directly facilitates increased exports by reducing artificial barriers such as tariffs, quotas, and non-tariff regulations. The increased opportunities to export goods that are "high-skill-intensive" by SSA countries raise the demand for skilled labour, leading to higher wages for educated workers. The increased financial incentive motivates individuals to pursue more education and training, especially in fields that are in high demand in the global market, thus resulting in human capital development. Simply put, export growth under trade liberalization can influence human capital development by increasing demand for skilled labour, encouraging skill upgrading, and

promoting investment in education. The fourth channel is importation of intermediate capital goods, which suggests that trade liberalization can contribute to economic growth, which in turn provide governments of SSA countries with more financial resources to fund human capital development programs. In order to fully leverage trade liberalization, SSA countries must invest in education, especially higher education, to create a workforce with the skills needed to benefit from integration into the global economy. The fifth channel through which trade liberalization directly affects human capital development in SSA countries is public foreign capital inflow. Government revenues through taxes can increase via public foreign capital injection into the economies of SSA, which can then be invested in education, health and social programs, leading to better human capital development. In addition, public foreign capital can also influence human capital development through trade liberalization by providing resources for education and health, facilitating the transfer of skills and technology, and promoting economic growth. Some economic growth theorists acknowledge human capital development as the driving force of economic growth<sup>2,3</sup>. Similarly, the classical and endogenous growth theories emphasize the importance of technological progress as an engine for achieving sustainable economic growth<sup>4,5</sup>.

Economic growth is defined as an increase in the quantity and quality of the economic goods and services that a society produces. It also refers to an increase in the size of a country's economy over a period of time. The size of an economy is typically measured by the total production of goods and services in the economy, which is called gross domestic product. Sub-Saharan Africa economic growth is characterized by significant fluctuations and varying growth rates among countries. While the region has witnessed periods of strong growth, it has also faced challenges like declining growth rates, periods of stagnation, and a dependence on a few key sectors. Many SSA countries heavily rely on natural resources, especially oil and minerals, for

export revenue<sup>12</sup>. This can lead to vulnerability to price shocks and limit diversification of the economy. Agriculture plays a notable role in many SSA countries, but it also encounters challenges like low productivity, climate change impacts, and a reliance on traditional farming methods. The region's predicaments to sustained growth include resource dependence, huge infrastructure deficits, high population growth, inadequate human capital, regional inequality, limited structural transformation, external shocks, institutional weaknesses and political instability. The role of trade in economic growth is of great importance.

The Classical and Neo-classical economists attributed great importance to international trade in a region's development that they considered it as an 'engine of growth'. International trade increases savings and investments, advances technological capacity, reduces unemployment and under-employment, facilitates greater backward and forward linkages in the economy and ensures a larger inflow of factor inputs into the economy and outflow of goods and services. Trade liberalization has been defined as the elimination or reduction of tariff and non-tariff barriers to free flow of goods and services across national borders and is generally regarded as the major driving force behind globalization. Since the early 1980s, several international organizations such as International Monetary Fund (IMF), World Bank (WB), World Trade Organization (WTO) and Organization for Economic Cooperation and Development (OECD) have been persuading Sub-Saharan African countries to liberalize their trade policies in order to accelerate their rates of economic growth. The idea put forward by these international organizations is that nations that permit higher level of trade liberalization policies outperform countries with tighter international trade policies. The proponents of trade liberalization argued that it has numerous benefits which include exposure to global competition, advancement in technological capacity, facilitation of knowledge transfer, increment in world living standard,

creation of marketing networks, reduction of global cost of living, improvement in consumers' welfare, attraction of foreign direct investment, reduction of monopoly power of the public sector, creation of employment opportunities, reduction in rates of interest and tariffs, availability and affordability of global inputs and enhancement of economic growth. The impressive economic success of the South-East Asian countries (Taiwan, South Korea, Singapore and Hong-Kong) corroborated the view among international organizations that such a development strategy is both effective and desirable. Trading activities traceable to trade liberalization usually include exports, imports, foreign direct investment, lending, borrowing and repatriation of funds from abroad.

In Sub-Saharan African countries, trade liberalization, the reduction of barriers to international trade, is characterized by a general move towards more open trade regimes, though the specific policies and their impacts vary. While many countries in the region initially had restrictive trade regimes, they have been largely successful in implementing significant trade reforms, aiming to reduce restrictiveness. These reforms often involved reducing tariffs and other trade barriers, and in some cases, liberalizing exchange rate regimes. Among the prominent features of world economy in the last three decades was that developing economies, especially Sub-Saharan Africa countries, went through fast trade liberalization either individually or as a component of multilateral proposals with the World Bank (WB), World Trade Organization (WTO) and the International Monetary Fund (IMF). Hence, at the early 1980s, most countries in Sub-Saharan Africa effected numerous trade reforms besides the Structural Adjustment Programs (SAPs) imposed by international trade and financial organizations as a necessary step for a free market economy. These include trade liberalization, private sector development via reduction in administrative barriers to trade and investment, legal and judicial reform to increase economic

security, and financial sector reform to develop money markets and indirect instruments of monetary policy, reduction of opportunities for corruption, encouragement of openness and transparency of government, creation of conducive environment for private sector investment and production. All these measures are expected to enhance productivity and competitiveness of the SSA region's products in relation to the rest of the world. The unprecedented integration of the economies of the SSA countries to the economies of the rest of the world is expected to spur regional economic growth.

Some scholars argued that trade liberalization policies have positive effects on economic growth and cited the development of some developing countries in Southern Asian and transitional economies that are competing with developed economies in the global market<sup>19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 & 30</sup>. Other scholars indicated negative relationship between trade liberalization policies and economic growth<sup>31, 32, 33 & 34</sup>. Non-uniform measures were employed by different scholars for trade liberalization and economic growth which resulted to indeterminate outcome. Lastly, some studies exhibited zero relationship between trade liberalization policies and economic growth<sup>35, 36, 37</sup>. Although, the relationship between trade liberalization and economic growth has been analyzed extensively both in advanced and developing economies in recent decades, it remains a controversial topic among policymakers and economists because of the diversity in the empirical findings. It is worth mentioning that existing studies conducted on the effect of trade liberalization policies on economic growth in Sub-Saharan African are mostly country-specific. From these studies, it has been observed that despite the fact that the impact of trade liberalization on economic growth has been a widely researched area, empirical studies conducted for Sub-Saharan African countries are scanty<sup>38,39,40,41,42,43,44,45,46</sup>. Since almost all Sub-Saharan African countries have liberalized their trade policies and invested substantially on

human capital development with a view to accelerating their rates of economic growth over the past few decades, it becomes imperative to investigate in empirical terms the impact of trade liberalization and human capital development on their rates of economic growth. Although, there are plethora of studies on the impact of trade liberalization on economic growth and the effect of human capital development on economic growth at country specific level in SSA countries. To the best of the researcher's knowledge, no study has investigated the relationships amongst trade liberalization, human capital development and economic growth for Sub-Saharan African countries. It is against this backdrop that this study seeks to examine the influence of trade liberalization policies and human capital development on economic growth of Sub-Saharan African countries between 2000 and 2022.

Since human capital development is widely recognized as one of the channels for stimulating economic growth. It has been observed empirically that one of the causes of limited growth effects of trade liberalization is the low level of human capital development. Findings from empirical studies have concluded that human capital development is crucial for the success of economic reforms in developing countries<sup>47, 48, 49, 50 & 51</sup>. The evidence suggests that the failure of trade reforms to promote trade and growth in SSA countries is attributable to the low level of human capital development.

It is in the light of the above that this study investigates how human capital development in the selected SSA countries can contribute meaningfully so that trade liberalization can have a noticeable impact on economic growth and escalate the rate of investment that will boost the growth of aggregate output in the region.

## **1.2 Statement of the Problem**

The effect of trade liberalization on economic growth has been extensively investigated and discussed over the last few decades. This is exemplified in many of the World Trade Organization (WTO) rounds. Sub-Saharan African countries embraced trade liberalization in the early 1980s with the principal objective of promoting their rates of economic growth through exposing their economies to global competition to enhance efficiency in domestic production which would eventually lead to growth in output, reduce the high incidence of balance of payment deficits and consequently enhance GDP growth. The adoption of trade liberalization policies was also in response to the poor performances of their external sectors. Hitherto, SSA countries had pursued a strategy of import-substitution and implemented a series of restrictive trade policies including increase in tariffs, non-tariff barriers and exchange rate controls. The restrictive trade policies adversely affected the growth performances of their economies through a decline of their exports to GDP ratios and imports to GDP ratios. It was therefore thought by many SSA countries that adopting trade liberalization policy was going to alleviate their external sectors of the persistent deficits so that they could play their roles in enhancing economic growth effectively. Low level of human capital development as well as inappropriate trade policies can be responsible for sub-optimal growth.

Education, health and training have been the major variables determining the quality of human resources development in an economy. Several studies have examined the link between high quality of human capital embedded in education level and economic growth, and have concluded that they are positively related. In any case, the level of national, regional and continental economic growth depends, to a large extent, on the level of human capital development in the country, region and continent.

Investigations on the effects of trade liberalization on economic growth have been on the limelight since the existence of trade. It has been observed from empirical literature that there are several other factors that can affect economic growth of a country apart from liberalizing her trade policies. One of such factors is the level of human capital development prevalent in the country. Among the universally accepted causal factors responsible for the impressive performance of the economies of most developed and the newly industrialized countries is an unprecedented commitment to human capital development<sup>52</sup>. This has been largely achieved through increased knowledge, skills and capabilities acquired through education, health and training by all the citizens of these countries. Human capital is acknowledged to play a major role in versions of both neoclassical and endogenous growth models<sup>53 & 54</sup>.

It has been underscored that the disparities in the level of economic growth and development across nations is attributed not so much to natural resources and endowments, climate, technology and the stock of physical capital but to the quality of human resources development. Many scholars considered human resources to be a critical and indispensable variable in the growth process. They are not only means but more importantly, the ends that must be served to achieve economic progress<sup>55</sup>. This notion is emphasized by a notable author who stated that “human resources constitute the ultimate basis for the wealth of nations<sup>56</sup>. Capital and natural resources are passive productive factors; human beings are the active agents of production who accumulate capital, exploit natural resources, build social, economic, and political organizations and pursued national development.

Comprehensibly, any nation, region or continent which cannot develop and utilize the skills and knowledge of its people effectively will remain backward economically. Investment in human capital is germane to increasing global competitiveness, improving standard of living of the

population and in generating national, regional and continental economic growth and development.

Several studies have noted that trade liberalization affects economic growth through four channels namely, capital accumulation, equality of factor prices among countries, technology and knowledge transfers. They opined that knowledge and technology transfers influence human capital development positively <sup>57</sup> & <sup>58</sup>. Adoption of outward-oriented trade policies by Sub-Saharan Africa countries with the rest of the world through international trade increases the quality and quantity of human capital through knowledge transmission, innovative ideas, learning by doing which hitherto were lacking in these countries with the tendency of inducing specialization in production line which subsequently leads to economic growth <sup>59</sup>.

Therefore, the development of any given country, region or continent demands conscious human capital investment by both public and private sectors to stimulate economic growth. In line with these assertions, successive governments in Sub-Saharan Africa countries have designed and implemented several trade and human capital development policies aimed at stimulating economic growth. Some of these programs include structural adjustment program, trade and financial liberalization policy, privatization of public enterprises, deregulation of public corporations, formation of regional economic communities, increase in agricultural productivity, especially for food crops, acceleration of domestic resource mobilization, settlement of conflicts and crises, investment in education, expanding access to healthcare, skills development, reduction in fertility rate, and others too numerous to mention. Consequently, Sub-Saharan African countries have recorded impressive trade statistics and an astronomical increase in the number of health and education institutions over few decades. There are several transmission mechanisms through which trade liberalization affects human capital development in Sub-

Saharan African countries. These channels are foreign direct investments channel, knowledge transfer channel, technology transfer channel, export opportunities channel, importation of intermediate products channel, public foreign capital inflow and skill-based training channel. These channels are often linked to economic growth, which itself can provide the resources to invest in human capital.

The empirical studies on the relationship between trade liberalization and economic growth are inconclusive due to the diversity in their findings. Most of the studies conducted were country-specific and limited to individual Sub-Saharan African countries<sup>60,61,62,63,64,65,66,67,68,69</sup>. Few studies that focused on Sub-Saharan Africa countries examined the effect of trade liberalization on economic growth and the impact of human capital development on economic growth separately without considering the impact of human capital development, that is, whether these Sub-Saharan African countries have high or low level of human capital development that can affect the performance of trade liberalization to affect economic growth<sup>70,71,72,73,74,75</sup>. The linkage among trade liberalization, human capital development and economic growth was not established by these studies. This is the major lacuna in the literature which this study intends to fill. Most studies that investigated the interaction among these variables (Trade liberalization-human capital development-economic growth nexus) used Asian, Americas and European countries as case studies. The SSA countries have not been in the limelight at least not to the researcher's knowledge. For the few studies that focused on SSA countries, not much emphasis was placed on the level of human capital development. In addition, these studies failed to look at the interactive effect of trade liberalization and human capital development on economic growth. This means that trade liberalization should influence human capital development positively for it to have a better impact on economic growth.

Orthodox economic theories predict that trade liberalization should lead to robust economic growth and improved welfare. However, despite many Sub-Saharan African countries implementing trade liberalization policies since the 1980s, the expected large gains have been limited, and the region continues to struggle with persistent poverty, high income inequality, and low levels of sustainable economic development. A key factor in benefiting from trade openness and achieving sustained growth is a well-developed human capital base that can adapt to new technologies and global competition. Yet, SSA countries consistently scores the lowest on the World Bank's Human Capital Index, characterized by inadequate investment in education, significant skills gaps, and 'brain drain'. There is a lack of clear and consistent empirical evidence on how the interaction of trade liberalization and limited human capital development specifically affects economic growth in SSA context.

Therefore, this study attempts to fill the lacuna identified in the literature by addressing the challenge of understanding whether trade liberalization has yielded the anticipated strong and inclusive growth or not in Sub-Saharan African countries, particularly in the context of its significant human capital deficits. This study will shift the frontier of knowledge forward via the following contributions. First, the impact of trade liberalization on human capital development in selected SSA countries shall be empirically investigated which was not carried out by previous studies. Second, previous studies did not analyze the interactive effect between trade liberalization and human capital development on economic growth. Third, the number of explanatory variables influencing economic growth in SSA countries apart from the principal variables of interest which are trade liberalization and human capital development shall be increased to include net foreign direct investment, gross capital formation, exports, imports, net migration, net official development assistance, government total expenditure on health, inflation

rate, government total expenditure on education, primary school enrolment rate, secondary school enrolment rate, infant mortality rate, life expectancy rate, labour force and population growth. The effects of some of these explanatory variables were not examined by the existing studies in this area. Lastly, the sample size of this study (45) is larger or greater than any of the previous studies.

### **1.3 Research Questions**

The following research questions are raised to guide this study:

- i) What is the effect of trade liberalization on human capital development in Sub-Saharan African (SSA) countries?
- ii) What is the effect of trade liberalization on economic growth in Sub-Saharan African (SSA) countries?
- iii) To what extent does human capital development translate into economic growth in Sub-Saharan African (SSA) countries?
- iv) How does the interactive effect of trade liberalization and human capital development affect economic growth in Sub-Saharan African (SSA) countries?

### **1.4 Objectives of the Study**

The main objective of this study is to investigate the links among trade liberalization, human capital development and economic growth of Sub-Saharan African (SSA) countries. The specific objectives of the study are to:

- i. analyze the influence of trade liberalization on human capital development in Sub-Saharan Africa (SSA) countries;
- ii. examine the effect of trade liberalization on economic growth in Sub-Saharan African (SSA) countries;
- iii. investigate the impact of human capital development on economic growth in Sub-Saharan African (SSA) countries; and
- iv. analyze the interactive effect of trade liberalization and human capital development on economic growth in Sub-Saharan African (SSA) countries.

### **1.5 Hypotheses of the Study**

Based on the objectives of this study, the following hypotheses stated in null forms are formulated:

- i)  $H_0$ : Trade liberalization has no statistically significant positive effect on human capital development in Sub-Saharan African (SSA) countries.
- ii)  $H_0$ : Trade liberalization exhibits no positive relationship with economic growth in Sub-Saharan African (SSA) countries.
- iii)  $H_0$ : Human capital development exerts no statistically significant positive impact on economic growth in Sub-Saharan African (SSA) countries.
- iv)  $H_0$ : Trade liberalization and human capital development have no statistically significant positive effect on economic growth in Sub-Saharan African (SSA) countries.

### **1.6 Significance of the Study**

Trade liberalization and human capital development are veritable tools through which nations all over the world employed to achieve high and steady rates of economic growth. This explains why governments globally are constantly seeking appropriate policies that should be implemented for economic growth and development to be achieved. Several international institutions such as International Monetary Fund (IMF), World Bank (WB), World Trade Organization (WTO) and Bretton Woods Institutions (BWI) have encouraged developing countries especially Sub-Saharan African countries to embrace trade liberalization and human capital development to help grow their economies. Many studies have alluded to the assertion that trade liberalization and human capital development have positive impact on economic growth, yet many developing countries are still impoverished. This study delved into the situation in the Sub-Saharan African context, to ascertain if trade liberalization and human capital development are indeed good policies for stimulating economic growth in the region.

The study would be of immense importance to the governments, policy makers, researchers and all stakeholders to comprehend the extent to which trade liberalization and human capital development have impacted on Sub-Saharan African countries' economies over the years. The result of this study would help researchers and policymakers to determine whether the existing trade policies and human capital development programs have benefited Sub-Saharan African economies' positively in terms of accelerated rates of economic growth or otherwise with a view to retaining the effective policies and removing the ineffective ones. This study will provide the opportunity of assessing the benefits of international trade, to determine if there has been noticeable growth in the selected SSA countries. This research would help to identify the factors militating against cordial trade relations between SSA with other countries. It would also help to

evaluate the performance of different trade policies and human capital development policies that Sub-Saharan African countries have implemented over the years.

The research would also constitute an invaluable tool for students and researchers that want to know more about the effect of trade liberalization and human capital development on economic growth rates of Sub-Saharan African countries. It would also educate the students and researchers on the complementarity or substitutability nature of trade liberalization and human capital development in promoting economic growth. Also, the effect of trade liberalization policies being adopted by Sub-Saharan African countries on human capital development over the past few decades will be revealed to the government, policy makers and researchers by this study.

Due to the inclusion of human capital development as one of the principal explanatory variables of interest, this study will be different from other previous studies that focused on the relationship between trade liberalization and economic growth only at country specific level. The effect of foreign direct investment from abroad on human capital development in Sub-Saharan Africa region through knowledge and technology transfer will be unveiled.

Furthermore, the methodology to be adopted for estimating the parameters of this study will be different techniques namely the Pooled Ordinary Least Square (POLS), Panel Fixed Effect Model (PFEM) and the Generalized Method of Moment (GMM). This implies that there will be a methodological departure from other previous studies on the impact of trade liberalization and human capital development in promoting economic growth rates in selected SSA countries. Therefore, this study will unfold the relevance of economic growth in a country. This is because when a country experiences sustained economic growth, aggregate investment and savings increase, output level rises and poverty declines. The study would also contribute to the existing

views on trade liberalization-human capital development-economic growth nexus. It would give people both inside and outside an insight into the importance and significance of trade liberalization and human capital development in affecting economic growth in SSA countries.

### **1.7 Scope of the Study**

This study employs panel secondary data from 2000 to 2022, sourced from the 2024 World Bank's database (World Development Indicators), to examine the effect of trade liberalization policies and human capital development programs on Gross Domestic Product (GDP) growth rates of Sub-Saharan African countries. These countries embarked on trade liberalization policies and human capital development programs from the 1980s till date. In addition, they are all developing countries and belong to Sub-Saharan Africa and the African continent. The choice of the time frame is informed by data availability on the variables of interest and that this era witnessed the undertaking of trade policy reforms characterized by multilateral and regional agreements within SSA countries and the rest of the world. These trade policy reforms were removal of barriers to private sector involvement in economic activities; deregulation of consumer and producer prices; elimination of taxes and subsidies (explicit and implicit); privatization of state marketing or processing enterprises; abolition of official monopolies and the opening of trade to competition. The trade policy reforms undertaken by SSA countries in the 1980s and 1990s were unilateral under the auspices of a World Bank Program.

The forty five (45) selected SSA countries are: Burundi, Djibouti, Ethiopia, Eritrea, Kenya, Rwanda, Kenya, Somalia, Tanzania, Uganda (Eastern Africa). The Western Africa sub-region include the following countries: Benin, Burkina Faso, Cape Verde, Cote D'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Nigeria, Niger, Senegal, Sierra-Leone

and Togo. The Southern Africa countries included in the list are Angola, Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe while the Central Africa countries include Burundi, Angola, Cameroun, Central Africa Republic, Chad, the Republic of Congo, Democratic Republic of Congo, Equatorial Guinea, Gabon, Rwanda, and Sao Tome & Principe. The justifications for selecting or choosing Sub-Saharan African region for this study are numerous. First, nearly all the SSA countries are classified as developing countries that depend on exportation of natural resources, especially oil and mineral resources, for their incomes by many international organizations such as World Bank (WB), International Monetary Fund (IMF), World Trade Organization (WTO) and United Nations Organization (UNO). Second, the countries in this region have similar livelihood systems and shared colonial experience. Third, the region is characterized by major geographical features such as tropical rainforests, savannahs, the Sahel region, and the Sahara desert. Large lakes, mountains, rivers, and volcanoes are also found in Sub-Saharan Africa. Fourth, Sub-Sahara Africa region is the part of Africa that is located south of the Sahara Desert. This area is distinguished from the northern region of Africa by the Sahara itself.

South Sudan, Liberia and Somalia are excluded from the sample of countries studied owing to unavailability of data for most of the economic variables of interest. This is because South Sudan gained independence in 2011, and has been experiencing political instability, economic challenges and humanitarian crisis which triggered displacement of millions and inflicting widespread starvation and suffering. As for Liberia, the challenges facing the country include widespread poverty, high tariffs and inconsistent tax administration, poor physical infrastructure, weak judicial system and widespread corruption. The country has been experiencing 14-year civil war caused by corruption which triggered the current political crisis that threatens her

stability. Similarly, Somalia, has been ravaged by civil war, political instability, and droughts and famines since 2009. This has made it one of the least developed and most fragile states in the world, where most residents are constantly at a risk of losing health or life.

## **1.8 Operational Definition of Terms**

**Sub-Saharan Africa:** Sub-Saharan Africa is the term used to describe the area of the African continent which lies south of the Sahara Desert. It is made up of those countries of the African continent that are not considered part of North Africa. Geographically, the demarcation line is the southern edge of the Sahara Desert.

**Trade Liberalization:** Trade liberalization connotes the total removal or significant reduction of tariffs and non-tariffs barriers to trade in order to allow free flow of goods and services across countries or international borders. These include export duties, import duties, subsidy, embargoes, quotas, exchange rate control, licensing rules and other restrictions.

**Human Capital Development:** Human capital development refers to the process of enhancing and improving the skills, knowledge and abilities, and overall potential of individuals within a society or organization. Investment in human capital implies the process of increased education and skills training of human resources.

**Economic Growth:** The term economic growth connotes the total market value of all final goods and services produced within a country over a period of time. It is commonly assessed by using indicators such as Gross Domestic Product (GDP) or Gross National Product.

**Tariff Barriers:** Tariff barriers are taxes imposed by a government on imports or exports of goods. These taxes can be used to increase the cost of imported goods, make inputs available to domestic producers at more competitive prices and raise revenues for government..

**Non-Tariff Barriers:** Non-tariff barriers (NTBs) alternatively referred to as non-tariff measures (NTMs) are trade barriers that restrict imports or exports of goods or services through mechanisms other than the simple imposition of tariffs. They may take the form of import quotas, subsidies, customs delays, technical barriers, or other systems preventing or impeding trade.

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## **Chapter Two**

### **Literature Review**

#### **2.1 Preamble**

The study of trade liberalization, human capital development and economic growth in Sub-Saharan African countries will be beneficial as it gives insight into numerous interesting issues. This section consists of detailed explanations of imperative concepts; then some clarification is made on measurement issues; and finally, the types, roles of trade liberalization and human capital development and their impacts on economic growth.

#### **2.1 Conceptual Review**

### **2.1.1 Trade Liberalization:**

Trade liberalization refers to the reduction or elimination of tariffs and non-tariffs barriers to trade such as export duties, import duties, quotas, embargoes, subsidy, exchange rate control and other restrictions for the free flow of goods and services across the world. It includes the free mobility of capital and labour force as well as policies that shift the trade regime towards neutrality across the globe. Trade liberalization process commenced in 1980s with the imposition of various structural adjustment programs of International Monetary Fund (IMF), negotiation framework of World Trade Organization (WTO) and imposed conditionality by the World Bank (WB). The proponents of trade liberalization argued that the concept when implemented by various countries would bring about increased global competition, accessibility to modern technologies, exchange of fruitful ideas, reduction in prices of goods and services, adoption of comparative advantage principle, increased productivity, improved standard of living, substantial decline in unemployment level, reduced monopoly of public sector, increased foreign direct investment, reduced rate of tariffs, accelerated human capital development, availability and affordability of world inputs and stimulation of world economic growth. Trade liberalization affects economic growth through four main channels namely capital accumulation, equality of factor prices among countries, technology transfer and knowledge spillover. There are numerous factors influencing trade liberalization of a given country which include factor endowments and productivity, trade policy, exchange rates, foreign currency reserves, population, income, inflation and demand. This variable represents one of the key exogenous variables explaining the changes in the behavior of the endogenous variable of the study. Theoretically, it is expected to exert a positive relationship with rates of economic growth of Sub-Saharan African countries during the studied period.

## 2.1.2 Types of Trade Liberalization

Trade liberalization involves one or more countries agreeing to reduce import tariffs and relaxing import quotas and other forms of protectionism to facilitate free flow of goods and services across the globe. This is to make the economies involved more open to trade and investment so that they can engage more directly in the regional and global economy. There are several types of trade liberalization viz: autonomous trade liberalization or unilateral trade liberalization; bilateral trade liberalization; multi-lateral trade liberalization and regional trade liberalization.

**a. Autonomous Trade Liberalization:** Autonomous trade liberalization alternatively known as unilateral trade liberalization refers to the reduction or elimination of tariffs and non-tariff barriers to trade by a country in order to give room for the free flow of goods and services among the states or regions that make up the economy and the rest of the world, without engaging in international trade negotiations or agreements. This implies that a nation unilaterally implements trade policies like reduction of tariffs or simplifying nontariff barriers to encourage more trade, even if other countries don't reciprocate. This type of trade liberalization involves initiation of trade reforms by a country independently rather than being part of a larger trade agreement or negotiation. These trade reforms typically apply equally to all trading partners, creating a level playing field for everyone. There are several reasons why countries might choose autonomous trade liberalization which include promotion of economic growth, attraction of foreign direct investment and improvement of trade competitiveness. In essence, autonomous trade liberalization constitutes a tool that countries employ to shape their own trade policies, even without the involvement of other nations in formal agreements and negotiations.

**b. Bilateral Trade Liberalization:** Bilateral trade liberalization refers to trade agreements and negotiations between two nations to reduce or eliminate tariffs and nontariff barriers preventing

or hindering free flow of goods and services between them such as export tax, import tax, embargo, quotas, subsidy, and other restrictions. This process expands market access for both countries and can increase savings and investments, and consequently increased economic growth. By making it easier for goods and services to cross borders, bilateral trade liberalization encourages more trade and technology transfer between the two countries. It should be mentioned that bilateral trade agreements are typically negotiated to the mutual benefit of both countries, aiming to create a win-win scenario. Bilateral trade agreements can take various forms, such as free trade agreements which create preferential trade terms between two countries.

**c. Multilateral Trade Liberalization:** Multilateral trade liberalization refers to the reduction or elimination of tariffs and nontariff trade barriers by a group of countries or an overwhelming majority of them, usually under a multilateral organization like the World Trade Organization (WTO) or World Bank (WB). Multilateral trade liberalization can also be explained as trade agreements or actions involving multiple parties, typically nations or countries. It means that a group of countries are working together to reduce trade barriers. These barriers include tariffs (taxes on imports), quotas (limits on the quantity of goods allowed to be imported), and other regulations that make it more difficult for goods and services to cross borders. This process is intended to increase trade and economic growth by making it easier for goods and services to move among countries. Multilateral trade liberalization is beneficial to trading partners in the sense that it can lead to increased production, innovation, and efficiency, which can drive economic growth. In addition, increased competition from imports can lead to lower prices for consumers. Moreover, consumers will have a wider variety of goods and services to choose from.

**d. Regional Trade Liberalization:** Regional trade liberalization involves the reduction or elimination of trade barriers such as tariffs and quotas, specifically among countries within a

geographical region. This process is aimed at creating a more free-flowing trade environment among member countries, encouraging increased trade and investment within the region. Unlike global trade liberalization, regional trade liberalization focusses on a particular geographical area, like a group of countries within a continent or a specific economic zone. It involves lowering or eliminating tariffs, quotas, and other restrictions on trade among the participating countries. The goal of regional trade liberalization is to foster closer economic ties, increase trade flows, and potentially leading to economic growth within the region.

### **2.1.3 Benefits of Trade Liberalization**

Trade liberalization, which involves lowering or elimination of tariffs and nontariff barriers to international trade, offers numerous benefits including lower consumer prices, increased efficiency, and greater economic growth. It also encourages specialization and innovation, leading to higher living standards, improved quality of goods and services, economies of scale and the reallocation of resources to more productive sectors. The detailed discussion of these benefits is given below.

**Reduction of Prices of Goods and Services:** The reduction or elimination of tariffs and nontariff barriers to international trade mean lower costs for imported goods, leading to cheaper prices for consumers. The persistent reduction in the export tax and import tax on goods and services available globally due to trade liberalization will lead to downward trend in the prices of such goods and services. Therefore, trade liberalization reduces or lowers global cost of living.

**Increased Variety of Goods and Services:** Trade liberalization allows consumers globally to have access to a wider range of goods and services from different countries, expanding their

choices and potentially improving their quality of life. The quality of life of the world's citizens is measured by the quantity and quality of goods and services they consume.

**Increased Competition:** With trade liberalization, domestic producers from developing countries are exposed to greater competition from foreign firms in advanced nations, encouraging them to become more efficient and innovative to survive. There will be improvement in the quality of goods and services produced by domestic firms in order to catch up with high quality imported products.

**Accessibility to New Markets:** The existence of trade liberalization globally allows businesses to expand their reach to new markets available in both advanced and developing countries. This expansion in markets networks will afford businesses all over the world the opportunity of increasing their sales and profits.

**Encouragement of Specialization and Innovation:** Trade liberalization permits countries to concentrate on the production of goods and services where they have a comparative advantage, leading to greater efficiency and productivity. For instance, those countries blessed with abundant petroleum resources will specialize in the production of petroleum products while others that have iron and steel would engage in the production of automobile products. In short, countries in the globe will specialize in the production of goods and services where they have a comparative advantage.

**Increased Standard of Living:** The standard of living of the world populace will increase as a result of consuming high quality and quantity of goods and services available in the global markets at reduced costs. Since trade liberalization is associated with increased competition

between domestic and foreign firms which is likely to result to production of high quality and quantity products for world citizens by these industries.

**Greater Economic Growth:** Trade liberalization can stimulate economic growth by promoting efficiency, innovation and investment. The reduction or elimination of tariffs and nontariff barriers to international trade will lead to production of more exportable goods and services by the domestic industries because of increase in demand for their products both domestically and internationally. There will be increase in profits of domestic firms which can be channeled to the employment of labour and other productive resources, thus leading to increase in output and accelerated economic growth. In short, trade liberalization can lead to economic growth through increased trading opportunities, access to new markets and improved competitiveness.

**Technological Advancement:** Trade liberalization allows domestic industries to be exposed to international competition which can drive innovation and the transfer of new technologies, leading to further development. The sophisticated techniques of production are transferred from developed nations to developing countries through foreign direct investment from abroad.

**Encouragement of Specialization and Innovation:** The involvement of Sub-Saharan African countries in international trade will pave way for them to specialize on the production of exportable goods and services for which they have a comparative advantage. Local industries would increase their production capacities in order to satisfy both domestic and international demands for their products. Consequently, output of goods and services in the region will increase, leading to accelerated rate of economic growth. Their trading partners would equally produce goods and services based on the availability of productive resources that they have in abundance.

**Attraction of Foreign Direct Investment:** Adoption of outward oriented trade policies by SSA countries will make them to be considered as destinations for foreign direct investments from abroad. Foreign investors and multinational organizations will be interested in investing in these economies through the establishment of branches of their business organizations in this region. The advanced technology being employed by foreign industries in their production processes would be emulated or mimicked by local firms in SSA countries which is likely to have positive impact on their productivity and consequently accelerated regional rate of economic growth.

**Creation of Employment Opportunities:** Trade liberalization allows countries to trade goods and services without regulatory barriers and their associated costs. The removal of both tariffs and nontariff barriers from the free flow of goods and services across the globe would enable exporters to have more profits which would be reinvested in their businesses, culminating into more production of goods and services globally. The decision to increase productivity by exporters demands employment of labour and other productive resources which would allow idle resources to be employed worldwide.

#### **2.1.4 Challenges of Trade Liberalization**

Trade liberalization, despite its numerous benefits, can pose a threat to developing nations or Sub-Saharan African economies because they are forced to compete in the same market as stronger economies or nations. These challenges can stifle established domestic industries or result in the failure of newly developed industries there. They include:

**Attack on Domestic Environmental Policies and Laws:** Domestic environmental policies and laws may come under attack as “non-tariff trade barriers” could reduce ability of countries to use

import controls as a means to change other country's behavior. Existing and future multi-lateral, international environmental agreements may have their hands tied by trade rules. World Trade Organization (WTO) is more favorable to multilateral trade agreements than unilateral actions.

**Increased Competition and Potential Job Losses in Domestic Industries:** The policy of trade liberalization has been criticized on the ground that it can cause loss of jobs because cheaper goods will flood the nation's domestic market. Critics also suggest that the imported goods can be of inferior quality and less safe than competing domestic products that may have undergone more rigorous safety and quality checks. So, trade liberalization may be very dangerous or harmful to +young industries in developing countries that have not been fully developed. There is likely to be serious loss of jobs in domestic industries in SSA countries due to their inability to compete favorably with highly developed industries from advanced nations. In short, increased competition from foreign producers can negatively impact domestic businesses, potentially leading to job losses and business closure in certain sectors.

**Increased Import Dependence and Price Volatility:** Trade liberalization can result to a greater reliance on imported goods, particularly if domestic industries struggle to compete with cheaper imports. This dependence makes developing economies vulnerable to price fluctuations in international markets, especially for essential goods like food and energy. In addition, external shocks, such as natural disasters or political instability in exporting countries, can disrupt supply chains and cause significant price increases, impacting both consumers and businesses.

**Competition and Economic Instability:** Opening up to international trade exposes domestic industries to greater competition, which can be challenging for less competitive or less efficient businesses. Some local industries may struggle to compete with larger, more established foreign

companies, potentially leading to job losses and reduced economic activity. This can create a domino effect, with struggling industries impacting related sectors and contributing to broader economic instability.

**Financial Integration and Crisis:** Trade liberalization often goes hand-in-hand with financial liberalization, which involves opening up capital markets to foreign investment. Whilst this can attract much-needed capital for investment, it also makes economies more vulnerable to sudden capital outflows, also known as “sudden stops”. If foreign investors lose confidence in an economy, they may quickly withdraw their investments, leading to a sharp decline in currency value, stock market crashes, and a potential financial crisis.

**Impact on Vulnerable Populations:** Trade liberalization can exacerbate existing inequalities, as some groups may benefit more from increased trade than others. Workers in sectors that faced increased competition may lose their jobs or see their wages decline, while those in export-oriented industries may experience wage increases. This can lead to increased poverty and social unrest, particularly if there are inadequate social safety nets to support those who are negatively affected by trade liberalization.

**Difficulty of Adaptation:** Developing countries, in particular, may face challenges in adapting to the increased competition and rapid changes associated with trade liberalization. They may lack the infrastructure, technology, and skilled workforce needed to compete effectively in the global market. Additionally, poorly functioning financial markets can make it difficult for businesses to access the capital needed to invest in new technologies or adapt to changing market conditions.

**Trade Imbalances:** Trade liberalization, while generally promoting economic growth, can sometimes lead to trade imbalances. This happens when a country's imports increase more than its exports, causing a trade deficit. This imbalance can arise from various factors related to the dynamics of trade liberalization itself, such as changes in import and export volumes, exchange rate fluctuations, and the varying ability of domestic industries to compete with imports. First, trade liberalization, with its reduction of tariffs and other trade barriers, makes imported goods cheaper and more readily available. This can lead to a surge in imports as consumers and businesses purchase more foreign products. If domestic industries are unable to increase their exports at a smaller pace, the country's trade balance will shift towards a deficit. Second, while trade liberalization can boost exports by opening up new markets, the benefits may not be evenly distributed across all sectors and countries. Some industries might be slow to adapt to increased competition from imports, or they may face barriers in accessing new export markets. This unevenness can result in a situation where imports rise faster than exports, contributing to trade imbalances. Third, a growing trade deficit can weaken a country's currency. This depreciation can make exports more competitive, but it also makes imports more expensive. If the exchange rate adjustment is not sufficient to offset the initial increase in imports, the trade balance may continue to worsen. Fourth, trade liberalization can expose structural weaknesses in an economy, such as inefficient industries or lack of skilled labour. If these weaknesses are not addressed, the country may struggle to compete in the global market, leading to persistent trade imbalances.

Although trade liberalization can offer numerous economic benefits, it's crucial to acknowledge and address the potential vulnerabilities it can create, especially for developing economies. Robust social safety nets, investments in human capital, and policies that promote a more

equitable distribution of gains are essential to mitigate the risks and ensure that the benefits of trade liberalization are shared more broadly.

### **2.1.5 Measurement of Trade Liberalizations**

Trade liberalization is typically measured by the reduction or removal of barriers to international trade, including tariffs and non-tariff barriers. Key measurements include average import tariffs, indices of non-tariff barriers, and measures of price distortions or exchange rate misalignment.

**Tariff Reductions:** Trade liberalization can be measured via tariff reductions which include average import tariff, tariff dispersion, specific to ad-valorem conversion and elimination of tariff exemptions. Average Import Tariff is a common metric, representing the average level of import duties applied to goods while tariff dispersion connotes reducing the range of tariff rates, (e.g. moving towards a uniform tariff) is also a measure of trade liberalization. In addition, specific to Ad-valorem conversion refers to converting specific tariffs (fixed amount per unit) to ad-valorem tariffs (percentage of value) can simplify trade and increase transparency. Another way of measuring trade liberalization is the elimination of tariff exemptions for certain individuals or groups in order to create a more level playing field.

**2. Non-Tariff Barrier Reductions:** This measure the extent to which trade is restricted by factors other than tariffs. These are more complex to measure and include import quotas, import licenses, technical barriers to trade (like product standards), and other regulations that restrict imports. Indices often use a combination of measures to capture the impact of these barriers.

**3. Trade Openness:** This is a broad measure of how much a country's economy is integrated with the global economy. It's often calculated as the ratio of total trade (exports + imports) to GDP or as exports or imports as a percentage of GDP individually.

**4. Trade Restrictiveness Indices:** These indices attempt to quantify the overall restrictiveness of a country's trade policies, taking into account both tariff and non-tariff barriers. Example include the IMF's Trade Restrictiveness Index

**5. Specific Trade Agreements:** The extent of participation in and compliance with free trade agreements (FTAs) and regional trade agreements (RTAs) also indicates the degree of trade liberalization.

**6. Frequency of Trade Restrictions:** Another way to measure trade liberalization is to look at how frequently different types of trade restrictions are used.

**7. Price Effects:** In some cases, the impact of trade liberalization can be measured by examining the effects on prices of traded goods, especially where liberalization involves price decontrols or exchange rate adjustments.

**8. Dynamic Effects:** Trade liberalization can also be measured by its impact on long-term economic growth, investment and productivity. By analyzing these different measures, economists and policy makers can assess the extent to which a country or region has embraced trade liberalization and the potential impacts of such policies.

#### **2.1.6 Human Capital Development**

Human capital investment refers to the process of increased education and skills training of human resources. Numerous empirical studies have given credence to the potency of human capital investment as a vehicle for stimulating economic growth. Although, the concept of "human capital" refers to the knowledge, skills and health that human resources invest in and

accumulate throughout their lives, enabling them to realize their productive potential which progresses through education, training and experience. Human capital accumulation enhances labour quality, which in turn increases the production capacity of labour force and promote economic growth of an economy. It is widely acknowledged that knowledge and education are the fundamental factors contributing to poverty reduction, increased employment and production. It should be mentioned that human resources development acts as a catalyst for growth and development of any country. This variable represents one of the key exogenous variables in this study that would account for variations in the rates of economic growth in Sub-Saharan African countries over the years. Investing in people through nutrition, health care, quality education, jobs and skills helps develop human capital, and this is key to stimulating economic growth, ending extreme poverty and creating more inclusive societies.

#### **2.1.6 Types of Human Capital Development**

Human capital development encompasses various forms of investment in individuals to enhance their skills, knowledge, and capabilities, ultimately boosting their productivity and economic value. This can be categorized into several types, including technical skills, soft skills, intellectual capital, institutional knowledge, and emotional capital. These variants of human capital development are discussed below:

**Technical Skills:** These are the specific, job-related abilities and knowledge acquired through training, education, or experience, such as coding, data analysis, or operating machinery.

**Soft Skills:** These are interpersonal and communication abilities that enable effective collaboration and interaction, including leadership, teamwork, and problem-solving.

**Intellectual Capital:** This refers to the knowledge, expertise, and experience an individual brings to their work, encompassing both formal education and practical experience.

**Institutional Knowledge:** This is the specific understanding of an organization's culture, history, policies and procedures, often gained through long-term experience within that organization

**Emotional Capital:** This includes emotional intelligence, creativity, resilience, and problem-solving skills, which contribute to an individual's ability to manage stress and adapt to change.

### 2.1.7 Factors Influencing Human Capital development

Human capital development is influenced by a wide array of factors, including education, health, training, and the overall environment. These factors interact to shape an individual's skills, knowledge, and productivity, ultimately impacting their contribution to the economy and society.

Key factors influencing human capital development are:

**Education:** Formal education (primary, secondary, and tertiary) and informal learning opportunities play a crucial role in acquiring knowledge and skills. Education enhances cognitive abilities, critical thinking, and problem-solving skills, making individuals more productive and adaptable.

**Health:** Good health is essential for individuals to participate fully in education, training, and the workforce. Healthy individuals are more likely to attend school, engage in training programs, and contribute to the economy.

**Training and Skills Development:** On-the-job training, apprenticeships, and other vocational training programs provide individuals with the specific skills needed for particular jobs and industries. These programs enhance practical skills and improve job performance.

**Environment:** The socio-economic environment, including access to resources, infrastructure, and social support systems, also influences human capital development. A supportive environment can foster learning, innovation and entrepreneurship.

**Migration:** While sometimes viewed negatively, migration can also contribute to human capital development by allowing individuals to acquire new skills and knowledge in different environments. It can also facilitate the transfer of knowledge and technology between countries.

**Information:** Access to information about job opportunities, training programs, and other relevant resources is crucial for individuals to make informed decisions about their education and career paths.

**Technology:** Technological advancements can create new opportunities for human capital development by providing access to information, facilitating online learning, and transforming the nature of work.

**Institutional Quality:** Strong institutions, such as a fair legal system, effective governance, and a stable political environment, are essential for creating an environment conducive to human capital development.

**Social Capital:** Social networks, community engagement, and social norms can influence an individual's access to resources, opportunities, and support systems, impacting their human capital development. By understanding and addressing these factors, countries and organizations can foster human capital development, leading to sustained economic growth and improved social well-being.

### **2.1.8 Economic Effects of Human Capital Development**

Human capital development has numerous positive effects, primarily boosting economic growth and individual well-being. It enhances productivity, innovation, and adaptability, leading to increased economic output and higher standards of living. Furthermore, it fosters personal growth, improved health outcomes, and reduced inequality.

**Increase Productivity:** A skilled and knowledgeable workforce is more productive when combined with other factors of production, leading to greater output and efficiency.

**Economic Growth:** Investment in human capital, such as education and healthcare, is strongly linked to sustained economic growth.

**Innovation and Technological Advancement:** Human capital development fosters creativity and the capacity to adapt to and adopt new technologies, driving innovation and progress.

**Reduction in Income inequality:** Investment in human capital can help level the playing field, providing opportunities for those with fewer resources to improve their economic standing.

**Higher Wages and Income:** Individuals with better skills and knowledge tend to earn higher wages, contributing to a higher overall standard of living.

**Improvement in Living Standards:** The positive impacts of human capital development on productivity, wages, and poverty reduction ultimately lead to improved living standards for individuals and communities.

**Adaptability and Innovation:** A well-developed human capital base allows a country to adapt to changing economic conditions and technological advancements more effectively, fostering innovation and competitiveness.

### **2.1.9 Measurements of Human Capital Development**

Human capital development can be measured through various indicators. These can be broadly categorized into education and training, health and well-being, income and wages, and innovation and creativity. These indicators provide insights into the knowledge, skills, health, and overall productivity of a population, which are all crucial for economic growth and societal progress. These indicators are explained below:

**Education and Training:** This type of measurement has three sub-measures viz: formal education, skills development and literacy and numeracy. As for formal education, it includes measuring years of schooling, educational attainment (e.g. high school diploma, college degree), and the quality of education received. Skills development assesses the acquisition of specific skills, both cognitive and technical, through formal training programs, apprenticeships, and on-the-job learning. Another sub-measure is literacy and numeracy which measures the ability to read, write and perform basic mathematical operations, crucial for participation in the modern workforce.

**Health and Well-being:** The health and well-being indicator of human capital development has four sub-indexes viz: life expectancy, childhood stunting, adult mortality rates, and mental health. First, life expectancy is a key indicator of overall health and well-being, reflecting the quality of healthcare, sanitation, and living conditions. Moreover, childhood stunting reflects nutritional deficiencies and health issues affecting early childhood development, impacting future learning and productivity. Adult mortality rates indicates the prevalence of diseases and health issues affecting the working-age population. In addition, mental health index assesses the prevalence of mental health conditions, as they can significantly impact productivity and well-being. Lastly, income and wages index measures the income and wages earned by individuals, reflecting the value of their skills and contributions to the economy.

**Income and Wages:** This measurement of human capital development consists of earnings index, wage differentials index and poverty rate index. Earnings index measures the income and wages earned by individuals, reflecting the value of their skills and contributions to the economy. Wage differentials analyzes differences in earnings based on factors like education, experience, and occupation, providing insights into the returns to human capital investments. Poverty rates, on the other hand, measures the proportion of the population living below the poverty line, which can indicate a lack of access to resources necessary for human capital development.

**Innovation and Creativity:** There are a number of sub-measures under this measurement. These include patent applications, research and development spending and entrepreneurship rates. Patent applications is a measure of the level of innovation and technological advancements within a society while research and development spending reflects investment in creating new knowledge and technologies, contributing to future human capital development. Entrepreneurship rates indicates the level of innovation and risk-taking within a population, contributing to economic growth and development.

**Social and Civic Engagement:** This measurement consists of voter turnout, volunteer rates and membership in organizations. Voter turnout is a measure of civic participation and engagement in democratic processes while volunteer rates reflects social responsibility and community involvement, indicating a sense of social cohesion and shared responsibility. Lastly, membership in organizations measures participation in various social, cultural, and professional organizations, reflecting social networks and community involvement.

**Human Capital Index:** The World Bank Human Capital Index (HCI) measures the expected productivity of a child born today, based on their expected health and education.

### 2.1.10 Economic Growth

Economic growth can be defined as the continuous increase or improvement in the inflation-adjusted market value of goods and services produced by an economy over a certain period of time usually a year (real GDP). The term economic growth also connotes the total monetary value of all goods and services produced in a country during a specific period, measured at current market prices without adjusting for inflation (nominal GDP). It is commonly assessed by using indicators such as Gross Domestic Product (GDP) or Gross National Product. Statisticians conventionally measure such growth as the percent rate of increase in the real gross domestic product or real GDP. Growth is usually calculated in real terms, that is, inflation adjusted term to eliminate distorting effect of inflation on the prices of goods produced. Measurement of economic growth uses national income accounting. Since economic growth is measured as the annual percentage of gross domestic product (GDP), it has all the advantages and drawbacks of that measure.

The economic growth rates of countries are commonly compared using the ratio of the GDP to population (per capita income). The rate of economic growth refers to the geometric annual rate of growth in GDP between the first and the last year over a period of time. This growth rate represents the trend in the average level of GDP over the period, and ignores any fluctuations in the GDP around this trend. Economic growth is one of the most important indicators of a healthy economy. One of the biggest impacts of long-term growth is that it has a positive impact on national income and the level of employment, which increases the standard of living. There are four major determinants of economic growth namely human resources, natural resources, capital formation and technology. This is the endogenous variable in this study whose behavioral changes are to be explained by a set of control variables.

### 2.1.11 Key Elements of Economic Growth

Economic growth connotes the persistent increase in the total final output of goods and services produced in an economy during a given period usually a year. Economic growth is influenced by several factors viz: human capital, physical capital, technology advancement, population growth, natural resources, institutional factors and peace and security.

**Natural Resources:** The availability of numerous natural resources in an economy should be regarded as an essential ingredient for enhancing or stimulating economic growth. The discovery of more natural resources such as crude oil, bitumen, gas, bauxite, lime stone, gold, silver and others will boost economic growth as this shifts or increases the country's production possibility curve. Realistically, it is practically impossible to increase the number of natural resources that a country is blessed with by nature. Effective utilization and management of the available natural resources in an economy by both the public and private sector would result in increasing the rate of economic growth. Higher level of economic growth would lead to increased national income which in turn results to higher standard of living for the citizenry.

**Human Resources:** The higher the population of the labour force or workers in an economy, the greater the national output would be. This implies that any economy experiencing growing population is likely to have an increase in the size of workers or employees. The more educated and dedicated a larger proportion of the workforce of an economy, the higher will be total productivity of the country. In other words, the higher the quality and quantity of the labour force of a given economy, the greater the level of national income and consequently the better the standard of living of the people. Economic growth is greatly influenced by the quality and quantity of human resources which every economy is blessed with by nature.

**Technological Advancement:** The invention of modern techniques of production and innovation of the existing ones would have significant positive effects on the productivity of the different categories of workers available in an economy. The rate of economic growth is affected by the type of technology adopted in the production processes. When workers rely on the use of obsolete techniques in the production of goods and services to be consumed domestically and exported to foreign economies. This would result in reduction of aggregate demand for goods and services both locally and externally which will have detrimental effect on the rate of economic growth while the converse is true. Therefore, technological progress is key to improved economic growth.

#### **2.1.12 Determinants of Economic Growth**

**Accumulation of Capital Stock:** This is the process of acquiring additional capital stock which is used in the productive process. Capital accumulation can involve investment in physical capital such as factories and machines. It could be portfolio investment such as purchase of bonds, shares and crypto currencies. Capital accumulation can also refer to investment in assets such as housing and workers. Investments made by the different tiers of government and the private sector in an economy to increase the marginal productivity of workers can also be referred to as capital accumulation. Engagement in massive investments on physical capital, human capital and portfolio investments by both the public and private sector has the potency of increasing or stimulating economic growth.

**Physical Capital / Infrastructure:** The provision of basic infrastructural facilities by the three tiers of government in an economy would serve as catalyst for stimulating economic growth. Such infrastructural amenities include factories, motorable roads, efficient communication

system, well equipped hospitals, drinkable water, machinery, uninterrupted power supply and efficient transport system will lower the cost of economic activity. Better factories and machinery are more productive than physical labour. The higher the stock of physical capital or infrastructure which are not directly related to the production process but are indirectly associated with production of goods services in the economy. Both local and foreign investors would be attracted to invest in the economy that enjoys availability of key infrastructural amenities and hence influencing economic growth.

**Existence of Regulatory Institutional Framework:** The existence of an institutional framework that regulates the economic activities such as rules and laws in an economy serves as incentives for the establishment of various types of industries that will be engaging in the production of goods and services for both domestic market and international market. This would go a long way in accelerating the rate of economic growth in the economy. Effective implementation of the ease of doing business by the concerned authority will spur economic growth in the country.

**Political Stability:** Economic growth and political stability of a country are deeply interconnected. Maintaining stability of the economy by the national and sub-national governments improves job creation, enhances people's living standards, contributes to economic growth and development, and makes the economy healthy. On the other hand, the uncertainty associated with an unstable political environment may reduce investment and the pace of economic growth and development. This explains why countries of the world usually maintain political stability in their respective economies to boost the confidence of local and foreign investors in order to spur economic growth.

**Adequate Security:** The provision of adequate security of lives and properties by the government in an economy should be seen as growth-enhancer. This is because investors both local and foreign will be willing to invest in different sectors of the economy due to the existence of adequate security. The concomitant effect of adequate security would include increased employment opportunities, expanded production of goods and services, escalation of national income level and high standard of living for the citizens. Also, maintenance of good relations with neighboring countries often plays an important role in achieving economic growth by facilitating trade between key surrounding countries. Security is not negotiable for rapid economic growth of a country.

**Macroeconomic Stability:** Macroeconomic stabilization is a condition in which a complex framework for monetary and fiscal institutions and policies is established to reduce volatility and encourage welfare-enhancing growth. In countries with high inflation rate, high interest rates and poor exchange rate, it is evident that long-run savings and investment are hindered. Macroeconomic stability encourages savings and investment which have positive impact on economic growth. Poverty reduction, social equity and sustainable growth are only possible with sound monetary and fiscal policies. Macroeconomic stabilization is key to sustainable growth.

**Public Governance:** Good governance is accountable for its activities and ensures transparency in order to avoid corruption and benefit the population. It has been globally established that countries that practice effective transparency and accountability achieve better economic growth than others with corrupt tendencies. In order for any country to experience rapid economic growth, the people in position of authorities at different levels of government must shun corruption, embezzlement of public fund, misallocation of fund, mismanagement of fund and

other misconduct capable of truncating the realization of high level of economic growth in the economy.

## **2.2 Theoretical Review**

This section presents various theories relating to trade, human capital development, and economic growth. The trade theories are Adam Smith's theory of absolute advantage, David Ricardo's theory of comparative advantage, Hechscher-Ohlin's theory of factor endowment, Stolper-Samuelson theory and new trade theory

### **2.2.1 Adam Smith's Theory of Absolute Advantage**

The theory of absolute advantage was developed by 18<sup>th</sup> century Scottish economist, in his book 'The Wealth of Nations'<sup>1</sup>. The theory states that an individual, company, region or country is said to have an absolute advantage if it can produce a greater quantity of a good or service with the same quantity of inputs per unit of time, or to produce the same quantity of a good or service per unit of time using a lesser quantity of inputs than its competitors. This implies that absolute advantage can be accomplished by creating the good or service at a lower absolute cost per unit using a smaller number of inputs or by a more efficient production process. In other words, countries involved in international trade should specialize in the production of goods and services in which they have comparative advantages over their competitors. This concept of absolute advantage can be regarded as the basis for large gains from trade between producers of different goods with different absolute advantages. By specialization, division of labour and trade, producer with different absolute advantages can always gain more than producing and consuming in isolation. International trade allows these countries to get other goods cheaply from abroad than to produce them at high costs domestically. The theory of absolute advantage

propounded by Adam Smith is based on the following assumptions namely: labour is the only factor of production and the cost of producing good is calculated from the relative amount of labour required; trade involves only two countries, X and Y, in the world; trade also involves only two commodities, A and B, in the whole world; there is existence of free trade between the two countries; labour is immobile across countries but mobile within countries; and lastly, no transportation cost can affect the selling price when the goods arrive at the destination country. The main weakness of the absolute advantage theory is that it fails to explain how countries can benefit from trade if one country is more efficient at producing all goods. This occurs because absolute advantage only focusses on absolute productivity, whereas the comparative advantage theory, developed by David Ricardo, explains that trade is beneficial if a country specializes in goods with a lower opportunity cost.

### **2.2.2 David Ricardo's Theory of Comparative Advantage**

This theory was developed in the book titled 'The Principles of Political Economy and Taxation' written in 1817, to explain why countries engage in international trade even when one country's workers are more efficient at producing every single good than workers in other countries<sup>2</sup>. The theory states that countries engaging in international trade should specialize in the production and exportation of goods and services where they have comparative advantages. A country is said to have comparative advantage in the production of a particular good or service if it can produce the good or service at a lower opportunity cost than its trading partners. Comparative advantage refers to the products that a country can produce more cheaply than other countries. David Ricardo demonstrated that if two countries capable of producing two commodities engage in international trade with the assumption that the capital and labour do not move internationally, then each country will increase its overall consumption by exporting the good for which it has a

comparative advantage while importing the other good, provided that there exist differences in labour productivity between the two countries. He famously showed how England and Portugal both benefit by specializing and trading according to their comparative advantages. Comparative advantage can also be regarded as the best option given trade-off. If two options are being considered, each of which has a trade-off, the one with the best overall package is one with the comparative advantage. The Ricardian theory of comparative advantage is based on the following assumptions viz: there are only two countries, say A and B in the whole world; they produce the same two commodities, X and Y; tastes are similar in both countries; labour is the only factor of production; and there is no movement of production factor among countries.

### **2.2.3 Heckscher-Ohlin's Theory of Factor Endowment**

This is another form of comparative advantage theory in international trade postulated by two Swedish Economists in 1933<sup>3</sup>. The theory states that countries engaging in international trade should specialize in the production and exportation of products based on the availability of productive resources or factors endowment. According to the proponents of the theory, countries in which capital is relatively plentiful or abundant and labour relatively scarce will tend to produce and export capital-intensive products and import labour-intensive products, while countries in which labour is relatively plentiful and capital relatively scarce will tend to produce and export labour-intensive products and import capital intensive products. For example, goods requiring much capital and only a little labour such as automobiles and chemicals, tend to be relatively inexpensive in countries with plentiful and cheap capital. Thus, countries with abundant capital should generally be able to produce capital-intensive goods relatively inexpensively, exporting them in order to pay for imports of labour-intensive goods. In this theory, it is not the absolute amount of capital that is important but rather, it is the amount of

capital per worker. The Heckscher-Ohlin theory is based on the following assumptions viz: there are only two countries in the whole world; there are only two commodities; only two factors of production are available in the world; perfect competition prevails in both factor and product market; perfect mobility of factors domestically but immobility internationally; identical technology; existence of different factor intensities, no transportation costs, no barriers to trade and lastly, there is full employment of productive resources in the economy.

#### **2.2.4 Stolper-Samuelson Theory**

The theory represents an addition to the Heckscher-Ohlin theory in elucidating comparative advantage<sup>4</sup>. The theory states that under specific economic assumptions (constant returns to scale, perfect competition, equality of the number of factors to the number of products), a rise in the relative price of a good will lead to a rise in the real return to that factor which is used most intensively in the production of the good, and conversely, to a fall in the real return to the other factor. According to the proponents of this theory, free trade that is line with a country's comparative advantage will bring about an increase in the demand for unskilled labour in the labour-abundant countries and also raise wages once there is elimination of labour surplus. Conversely, the demand for skilled labour will soar in the capital-intensive industries. The demand for labor and wages of unskilled labour will both fall simultaneously. Free trade is unambiguously beneficial for a developing country since it does not only promote efficiency and growth but also has gainful effects on the abundant factor in the economy. However, the beneficial growth, employment and distributional implications of trade liberalization hinge on the assumptions of existence of perfectly competitive markets and constant returns to scale. Both the Heckscher-Ohlin and Stolper-Samuel's trade theories complement each other in that they drive international specialization of countries of the world via the comparative advantage

argument. International trade is portrayed by both theories as a vehicle for a country to capitalize on her abundant resources through more intensive production, and export products that require large inputs of the abundant resources while relieving her factor shortage through the importation of products that use large amounts of her scarce resources.

### **2.2.5 New Trade Theory**

The new trade theory was developed by Paul Krugman, a neo-Keynesian economist and the sole recipient of the 2008 Nobel Prize in the 1970s. The theory states that international trade among countries of the world is not driven or caused by differences in productive resources and technologies alone but by also increasing returns to scale product differentiation and imperfect competition. Traditional trade theory, like the Ricardian and Heckscher-Ohlin models, focusses on differences in productive resources and technologies as the basis for trade. New trade theory does not dismiss comparative advantage but emphasize increasing returns to scale, product differentiation and imperfect competition as additional factors driving trade patterns. The theory explains why countries with similar resources and technologies might trade with each other and why some countries or firms dominate specific industries. The key concepts of new trade theory include increasing returns to scale, imperfect competition, network effects, intra-industry trade and early entry advantage. New trade theory rests on the assumptions that differ from traditional trade theories. It assumes increasing returns to scale, product differentiation, and imperfect competition, particularly monopolistic competition as key drivers of international trade. The theory recognizes that firms can achieve lower average costs as they produce more and that products can be differentiated to create market segments. New trade theory moves away from the assumption of perfect competition, recognizing that many industries are characterized by

imperfect competition, such as monopolistic competition. In monopolistic competition, firms have some market power owing to product differentiation and can influence prices.

### **2.2.6 Human Capital Development Theory**

Human capital theory points out that education and training are investments that could add to productivity<sup>5</sup>. The theory posits that human beings can increase their productive capacity through greater investment in education and skills training. It is expedient to state that the stock of human capital increases in a period only when gross investment exceeds depreciation over time, with intent use or lack of use. Investment in education is a productive investment in human capital which the proponents of human capital theory consider to be worthwhile than in physical capital. This implies that basic education enhances the productivity of workers. It should be stated that the greater the investment in education, the better for national productivity and economic growth. This study will adopt this theory as it upholds that investment in education which is one of the independent variables in this study will stimulate the rates of economic growth of Sub-Saharan Africa countries.

### **2.2.6 Modernization Theory**

This theory states that education should be regarded as a powerful tool to transform an individual's values, beliefs and behavior. This implies that exposure to modern institutions such as schools, companies and mass media inculcates modern values and attitudes in people. These attitudes include openness to new idea, willingness to plan and growing sense of personal and social efficacy. According to the modernization theorists, there would be continuity of these normative and attitudinal changes throughout human life cycle, permanently changing an individual's relationship with the social structure. The higher the number of people exposed to

modernized institutions, the greater the level of individual modernity attained by the society. Once a significant proportion of the population changes in this way, the pace of the society's modernization and economic development accelerates. Thus, educational development through its effects on individual values and benefits sets in motion the necessary building blocks for a more productive workforce and a more sustained economic growth. Proponents of modernization theory claim that modern states are wealthier and more powerful and that their citizens are freer to enjoy a higher standard of living. This theory is relevant to the human capital component of this study.

### **2.2.7 Classical Growth Theory**

The classical growth theory states that a country's economic growth will decrease with an increasing population and limited resources. It lays emphasis on the rate of investment as the key determinant of growth. Investment according to the theorists is a function of the profits share in the national income. So, the higher the overall level of profits, the higher the level of investment, and hence the higher the rate of economic growth in an economy. The proponents of the classical growth theory include Adam Smith, David Ricardo and J. S. Mill. In summary, the classical economists believed that if real Gross Domestic Product (GDP) increased above the subsistence level of income, it would cause the population to increase and bring real GDP back to subsistence level. Alternatively, if the real GDP fell below the subsistence level, part of the population would die off and real income would rise back to the subsistence level. However, the major setback of this theory is that it completely ignores the role of technology in the growth process. The basic assumptions of the classical growth theory are the following; there is the existence of full employment without inflation in the economy; there is a laissez-faire capitalist economy without government interference; the economy is a closed one without foreign trade;

labour is homogenous; there is perfect competition in labour and product markets; population growth depends upon the wage rate; equality of saving and investment; wages and prices are perfectly flexible; and there is perfect information on the part of all market participants.

### **2.2.8 Neoclassical Growth Theory**

The neoclassical growth theory states that a steady state economic growth rate in a country result from the interaction of three key variables namely labour, capital and technology. The simplest and most popular version of the neoclassical growth model is the Solow-Swan growth model. According to the theorists, an economy has limited resources in terms of capital and labour but the contribution from technology to growth is boundless. The theory maintains that short-term equilibrium results from varying amounts of labour and capital in the production function. The theory also argues that technological change has a major influence in an economy, and economic growth cannot continue without technological advances. It clarifies that temporary equilibrium is different from long-term equilibrium, which does not require any of these three factors. Neoclassical growth model uses the following production function:  $Y = AF(K, L)$  where  $Y$ = Gross domestic product,  $K$ = Capita input,  $L$ = Amount of unskilled labour in the economy, while  $A$ = Determinant level of technology.

As a result of the dynamic relationship between labour and technology, an economy's production function is often restated as  $Y = F(K, AL)$ . This states that technology is labour augmenting and that workers' productivity depends on the level of technology. The neoclassical growth theory is based on the following assumptions viz: people are rational in making choices between identifiable and value- associated outcomes; individuals' purpose is to maximize utility while companies' objective is to maximize profits; people act independently based on complete,

relevant and readily available information without bias; savings determine investment in the economy; steady state of the economy; existence of free markets where the state is refrained from imposing too many rules and regulations.

### **2.2.9 Endogenous Growth Theory**

Endogenous growth theory states that economic growth in any country is primarily the result of internal forces, rather than external ones. This implies that economic growth is due to factors that are internal to the economy and not because of external factors. The theory maintains that investment in human capital, population growth, innovation and knowledge are significant contributors to economic growth. It also focuses on positive externalities and spillover effects of a knowledge-based economy which will lead to economic development. The endogenous growth theory primarily holds that the enhancement of a nation's human capital will lead to economic growth by means of development of new forms of technology and effective means of production. The theory also emphasizes on the role that population growth, human capital and the investment in knowledge play in generating macroeconomic growth, rather than exogenous factors where technological and scientific process are independent of economic forces. Endogenous growth theory stands in contrast to classical growth theory and neoclassical growth theory, which focus more on natural resource endowments, accumulation of capital, and gains from specialization and trade, and the adoption of new technologies exogenous to the economy. Accordingly, population growth and innovation have more impact on economic growth than physical capital. It emphasizes on human capital development which is one of the key exogenous variables of this study as a major determinant of economic growth. The theory also motivates businesses to invest in research and development so that they can contribute to direct innovation. There are increasing returns to scale by investing in human capital through education, health and training

programs. Doing so can improve the quality of labour, which increases productivity and consequently economic growth rates in Sub-Saharan African countries. Endogenous growth theory is based on the following assumptions namely, government should provide incentives and subsidies for businesses in the private sector; there are increasing return to scale by investing in human capital through education or training programs; investment in technological advancement increases productivity; existence of increasing return to scale; enactment of policies by the government to assist entrepreneurs create new businesses and jobs; and investments should also be made to improve infrastructure and manufacturing processes in order to achieve innovation in production.

#### **2.2.10 Solow-Swan Growth Theory**

The model was developed independently in 1956 and superseded the Keynesian Harrod-Domar model<sup>6</sup>. This exogenous growth model is an economic model of long run economic growth. It attempts to explain long-run economic growth by looking at capital accumulation, labour or population growth, and increases in productivity largely driven by technological progress. It is an aggregate production function, often specified to be of Cobb-Douglas type, which enables the model to make contact with microeconomics. Mathematically, the Solow-Swan model is a nonlinear system consisting of a single ordinary differential equation that models the evolution of the per capita stock of capital. Due to its particularly attractive mathematical features, the model proved to be a convenient starting point for various extensions. It is set in continuous-time world with no government or international trade. A single good (output) is produced using two factors of production, labour (L) and capital in an aggregate production function that satisfies the Inada conditions, which imply that the elasticity of substitution must be asymptotically equal to one. The model is based on the following assumptions: the population grows at a constant rate;

all consumers in the economy save a constant proportion of their incomes and consume the rest; all firms in the economy produce output using the same production technology that takes in capital and labour as inputs; the production function exhibits constant return to scale; present capital stock, future capital stock, rate of capital depreciation and level of capital investment are linked through the capital accumulation equation.

### **2.2.11 New Growth Theory**

The new growth theory is an economic concept, positing that humans' desires and unlimited wants foster ever-increasing productivity and economic growth. It argues that real gross domestic product per person will perpetually increase because of people's pursuit of profits. A central tenet of new growth theory is that competition squeezes profit, forcing people to constantly seek better ways to do things or invent new products in order to maximize profitability. The theory emphasizes the importance of entrepreneurship, knowledge, innovation and technology, rejecting the popular view that economic growth is determined by external, uncontrollable forces. A significant aspect of the new growth theory is the idea that knowledge is treated as an asset for growth that is not subject to finite restrictions or diminishing returns like other assets such as capital or real estate. Knowledge is an intangible quality, rather than physical, and can be a resource grown within an organization or industry. New growth theory differs from traditional growth theory in that traditional growth theory did not explain what causes improvements in technology, but new growth theory does. The theory argues that technology must be considered a separate factor of production that is endogenous and sensitive to economic incentives. A capitalistic market is a classic example of new growth theory.

## **2.3 Relevant Theoretical Foundations for the Study**

The most relevant theoretical foundations upon which this is based are endogenous growth theory, Heckscher-Ohlin international trade theory and Gary Becker theory of human capital development. The endogenous growth theory propounded by Romer, Mankiw and Weils in 1992 maintains that investment in human capital, population growth, innovation and knowledge are significant contributors to economic growth. It emphasizes on human capital development which is one of the key exogenous variables of this study as a major determinant of economic growth. The theory also motivates businesses to invest in research and development so that they can contribute to direct innovation. There are increasing returns to scale by investing in human capital through education, health and training programs. Doing so can improve the quality of labour, which increases productivity and consequently economic growth rates in Sub-Saharan African countries. It is characterized by assumption of constant returns to scale in production which is crucial in giving the possibility of sustained growth. The theory also focuses on positive externalities and spillover effects of a knowledge-based economy which will lead to economic growth and development.

Another relevant theoretical foundation upon which this study is premised is the Heckscher-Ohlin international trade theory. The theory states that countries engaging in international trade should specialize in the production and exportation of products based on the availability of productive resources or factors endowment available in their respective countries. It is used to evaluate trade and the equilibrium of trade between two countries that have varying specialties and natural resources. The theory emphasizes the production and exportation of goods and services that require factors of production a country has in abundance. It also underscores the importation of goods and services that a nation cannot produce efficiently at home. This theory is relevant to this study because it explains the scheme of international trade that is observed in the

world economy. According to the theory, countries tend to export goods whose production makes intensive use of relatively abundant factors of production. Countries rich in capital resources such as factories and machines export capital-intensive products, while those rich in labour export labour-intensive products. The main assumptions of this theory include factor intensity, factor mobility and constant returns to scale.

The third theoretical premise upon which this study is based is the human capital development theory propounded by Gary Becker in 1960. Human capital development theory states that education and training are investments that could add to productivity<sup>5</sup>. This implies that human beings can increase their productive capacity through greater investment in education and skills training. According to the proponent of the theory, human capital development allows an economy to grow. When human capital development increases in areas such as science, education and management, it leads to increases in innovation, social well-being, equality, increased productivity and improved rates of participation, all of which contribute to economic growth in SSA countries.

### **2.3.1 Review of Empirical Studies**

For clarity, this section has been subdivided into four subsections, namely: (1) trade liberalization and human capital development (ii) human capital development and economic growth (iii) trade liberalization and economic growth (iv) trade liberalization, human capital development and economic growth

### **2.3.2 Trade Liberalization and Human Capital Development**

The empirical literature on the effect of trade liberalization on human capital is very scanty. A renowned author empirically investigated the impact of trade liberalization on human capital

accumulation in India over the period 1981 to 2011. Census data covering four decades was used to determine the association between the dependent and independent variables of the study. The data for the study was sourced from United Nations Conference on Trade and Development Analysis and Information System (TRAINS) at the 6-digit level of the Indian Trade Classification Harmonized System for around 5000 product lines. Methodologically, multiple estimation strategy was employed for the study. Human capital accumulation was proxied by completion of different stages of schooling and aggregate schooling while trade liberalization was represented by tariff. Empirical findings revealed that trade liberalization has no impact on either aggregate year of schooling or completion of different stages of schooling. The study also found that there was increase in workforce participation among school going children age group in districts that experienced larger reduction in tariff protection<sup>7</sup>.

The effect of trade liberalization on human capital development among seven developing and seven developed countries over the period 2005 to 2019 has been empirically examined. The countries included in developing economies were Pakistan, India, Nepal, Bangladesh, Iran, Indonesia and Bolivia while the countries included in the set of developed economies were Austria, Norway, United Kingdom, France, Italy, Luxemburg and Belgium. Annual data sourced from World Development Indicator (WDI) was used for the study. The human development index (HDI) was used as a measure of human development and trade openness (total trade as a percentage of GDP) was used as a proxy for trade liberalization. The model for the study specified total population (TPOP), gross domestic product (GDP) and Inflation (CPI) as the explanatory variables while human development index (HDI) was the explained variable of interest. Methodologically, fixed effects model (FEM) was employed in estimating the

parameter estimates of the study. Empirical findings revealed that trade liberalization encouraged human capital development in both developed and developing countries. The study also found that economic growth exerted positive impact on human capital development. However, inflation critically impacted human development in developed countries while showing no effect on developing countries<sup>8</sup>.

The impact of trade liberalization on individual's long-term human capital accumulation in India over the period 1990 to 2010 was empirically investigated. Data for this study was gathered from Central Bank of India (CBISB) statistical bulletin. The dependent variable of interest was human capital accumulation while the independent variables of interests were tariff, individual controls, dummies for gender siblings, urban residence, minority ethnic group, school attendance, cognitive abilities, labour market performance and non-cognitive outcomes. Fixed effect technique was employed in estimating the parameters of the model. Empirical findings revealed that trade liberalization reduced young people's educational achievement and long-term cognitive abilities. The result also showed that trade liberalization impacted negatively on non-cognitive outcomes<sup>9</sup>.

The effect of trade liberalization on human development was empirically investigated for forty-three (43) emerging countries for the period 1995 to 2014. Panel dataset was utilized for the study. Human capital index (HCI) was modeled as the dependent variable while gross domestic product growth (GDPG), per capita gross domestic product (PCGDP), labour force participation rate (LFPR), carbon dioxide emission (COE), average health expenditure (AHEXP), secondary school enrolment (SSE), religion (RELG) and culture (CULT) were the independent variables.

Panel Multiple Regression Model (PMRM) was used in estimating the parameter estimates of the study. Empirical results showed that higher trade liberalization impacted positively on human development status in the emerging economies in all aspects. Both human capital accumulation and per capita GDP have positive impacts on human development whereas the effect of GDP growth was negative<sup>10</sup>.

The relationship between trade liberalization and human development has been empirically investigated for Turkey and Azerbaijan. The explained variable of the model was human capital development (HCD) while life expectancy at birth (LEAB), mean years of schooling (MYS), expected schooling years (ESY) and per capita gross national income (PCGNI) were the explanatory variables of interest. Correlation analysis method was employed in determining the parameters of the study. Empirical findings revealed that trade liberalization impacted positively on the human capital development in Turkish economy while it exerted negative relationship with human capital development in Azerbaijan economy<sup>11</sup>.

A notable scholar empirically examined the relationship between trade liberalization and human development in Sub-Saharan Africa's least developed countries for the period 1990 to 2010. Panel data was used for the study. Human capital development index (HCDI) was specified as the controlled variable while trade liberalization (TLIB), government effectiveness (GOVE), agricultural factors (AGRF), geography (GEOG), conflict (CONF) and trade reform (TRADR) were the control variables. Methodologically, a bivariate correlation analysis and a multiple regression analysis were used in estimating the parameters of the model. The study

found that trade liberalization exerted a statistically insignificant positive relationship with human capital development in Sub-Saharan Africa's least developed countries<sup>12</sup>.

The impact of trade openness on human capital in 112 countries worldwide for the period 2000 to 2019 has been empirically investigated. Human capital (HC) was modeled as the dependent variable of the study while foreign direct investment (FDI), exports (EXPT), imports (IMPT), international cooperation (INTC), economic growth (GDP), urbanization (URBNT) and economic structural transformation (EST) were the principal independent variables of interest. Methodologically, a Two-Stage Least Square Fixed Effect Model (TSLFSM) and Instrumental Variable (IV) were employed in estimating the parameter estimates of the study. Empirical findings revealed that foreign direct investment (FDI) had no effect on human capital in developed and upper-middle- income developing countries, its effect is positive in lower-middle income countries and negative in low-income countries. Exports stimulated human capital formation in developed countries but in low-income developing countries, they acted as an impediment to human capital formation. Imports had a positive effect on human capital in developing countries but negative in developed countries. International cooperation effectively raised the level of human capital in developed, upper-middle-income and low-income countries; however, it had no effect in lower-middle-income countries<sup>13</sup>.

### **2.3.3 Human Capital Development and Economic Growth**

Several studies that examined the growth effect of human capital development in developing and advanced economies with diversity in methodologies and findings are reviewed as shown below. The impact of human capital development on economic growth in Nigeria spanning from 1989 to

2023 has been empirically examined. Secondary data obtained from Central Bank of Nigeria (CBN) statistical bulletin and National Bureau of Statistics (NBS) were used for the study. Autoregressive Distributed Lag (ARDL) model was employed in estimating the parameters of the study. Empirical findings revealed that gross fixed capital formation (GFCF) has a positive and statistically significant effect on the real gross domestic product in Nigeria. In addition, tertiary school enrolment also exerted a statistically significant positive effect on economic growth in Nigeria. The study recommended that government at all levels in Nigeria should invest more in human capital development process and prioritize education sector budgeting considering its growth driving potentials in Nigeria<sup>14</sup>.

A study empirically examined the effect of human capital development in Nigeria from 1981 to 2021. Annual time series data sourced from Central Bank of Nigeria (CBN) statistical bulletin and World Development Indicator (WDI) database were used for the study. The estimated model had gross domestic product growth rate as the dependent variable while government expenditure on education, government expenditure on health, gross fixed capital formation and labour participation rate as the independent variables of interest. Autoregressive Distributed Lag (ARDL) model was employed in estimating the parameters of the study. Empirical results revealed that government expenditure on education and labour participation rate have statistically insignificant relationship with economic growth while gross fixed capital formation exerted a statistically significant negative relationship with the dependent variable. The author recommended that government should prioritize investment in education in order to bring long run improvement in economic growth and development and there should increase investment in health sector to enhance the productivity of the workforce<sup>15</sup>

The nexus between human resource development and sustainable economic activity in Ebonyi state was empirically investigated by renowned authors. The study adopted descriptive survey method. The sample size of 104 was used for the study. A judgmental sampling technique was employed, and data were analyzed using percentage, frequency tables and spearman correlation coefficient. Empirical findings revealed that bureaucratic corruption, inadequate funding, lack of clear-cut policy as the major challenges of human resource development in Ebonyi state Ministry of economic development. The study further concluded that the policies of the state have not significantly contributed in developing human resource in the ministry. The study recommended that government should develop and improve service delivery on health and education in order to produce skilled personnel that will fit the public service capable of achieving sustainable economic viability in Ebonyi state. Government should continue to provide enabling environment through macroeconomic stability capable of increasing investment in human resource development by individuals, private and public sectors. The development of human resource should be a joint responsibility of the government at all levels, professional organizations, communities, individuals and the educational institutions through their various managerial skills<sup>16</sup>.

The moderating effect of human capital development in the resource-growth relationship in selected African countries has been empirically examined. Panels Corrected Standard Errors (PCSE) was employed as the main estimator. Empirical results confirmed the Dutch disease by showing that natural resources had a negative impact on economic growth while had a beneficial influence. It was also shown that the development of human capital could not mitigate the detrimental impact of natural resources on economic growth. The study recommended that African countries should make efforts to reduce their dependence on natural resources and focus

on the development of other sectors of their economies as a way of solving the problem of resource curse<sup>17</sup>.

Dynamics of human capital development and economic growth in Nigeria has been empirically investigated from 1981 to 2022. Secondary data gathered from Central Bank of Nigeria (CBN) statistical bulletin and World Development Indicator (WDI) database were used for the study. The estimated model of the study had gross domestic product as the dependent variable while government expenditure on education, government expenditure on health, tertiary school enrolment and gross fixed capital formation were the independent variables. Empirical results revealed that government expenditure on education and tertiary school enrolment were positively related to economic growth while expenditure on health and gross fixed capital formation exerted statistically significant negative relationship with economic growth in the short run<sup>18</sup>.

A group of scholars examined human capital development and economic growth nexus in Nigeria using a secondary time series data obtained from Central Bank of Nigeria (CBN) statistical bulletin and World Development Indicator (WDI) database. The study applied an econometric regression technique of the Ordinary Least Squares (OLS) regression technique to ascertain the effect of macroeconomic growth induced variables on human capital development in Nigeria. Empirical findings revealed that there is a strong evidence of cointegration between the dependent variable (HCD) and the independent variables. Also, the study indicated a long-run causal relationship between dependent variable (HCD) and the independent variables. It could be observed from the findings that the relationship between some of the variables like TGE, TEE, THE and FDI and human capital development is positive while that of LEI is negative. In addition, the results showed that TGE, TEE, THE, and FDI have statistical significance on human capital development in Nigeria while LEI has statistically insignificant on human capital

development. The study recommended that government should give educational grants, provide vocational training, and provide basic health facilities that can enhance the competitiveness of the economy. Also, government should make adequate budget for education in line with the UNESCO recommendation<sup>19</sup>.

The impact of human capital development on economic growth in Nigeria from 1981 to 2018 has been empirically examined. Annual time series data sourced from Central Bank of Nigeria (CBN) statistical bulletin and World Development Indicator (WDI) database were used for the study. Ordinary Least Squares (OLS) technique was employed in estimating the parameters of the model. Empirical findings showed that government expenditure on education statistically and significantly influenced real GDP positively. However, government expenditure on health had a positive and insignificant impact on real GDP. It was also found that gross fixed capital formation and population growth positively and statistically significantly influenced real GDP and foreign direct investment had a negative and insignificant impact on real GDP. Also, a significant unidirectional causality was found running from government expenditure on education and health to real GDP. The study recommended that government should sustain expenditure on education and increase healthcare expenditure.<sup>20</sup>

Some notable scholars empirically investigated the relationship between industrial sector performance, human capital development and economic growth in Nigeria from 1981 to 2020. Secondary data obtained from World Development Indicator (WDI) and Penn World were utilized for the study. The Augmented Dickey Fuller (ADF) test was applied to obtain the stationarity conditions of the variables before performing the Autoregressive Distributed Lag (ARDL) model to determine the short and long-run relationships among the variables. Empirical results showed no evidence of long-run relationship among the variables. The authors

recommended that government should formulate policies that would boost industrial productivity and promote human capital development in the country<sup>21</sup>.

The relationship between human capital development and economic growth in Nigeria from 1981 to 2018 has been empirically assessed. Secondary data obtained from Central Bank of Nigeria (CBN) statistical bulletin and World Development Indicator (WDI) were used for the study. The data analysis technique employed was Autoregressive Distributed Lag (ARDL) bound testing approach. Empirical findings revealed that the human capital development factors of education and health had favorable and statistical significance impacts on economic growth. The study recommended that robust action plan focusing on the rejuvenation of the country's educational and health sectors must be entrenched. In addition, there should be upward review of yearly budgetary provisions to these two sectors by government at all levels and holistic restructuring and overhauling of the concerned agencies affiliating the sectors<sup>22</sup>.

Some scholars empirically investigated the relationship between human capital development and economic growth in selected twenty (20) African countries over the period 1987 to 2023. Annual time series and cross sectional data sourced from World Development Indicator (WDI) and Penn World Table (PWT) were used for the study. Panel data were analyzed using unit root test and Autoregressive Distributed Lag (ARDL) model. Analysis was carried out on the countries as well as countries grouped into Blocs of North Africa, West Africa, East Africa, Central Africa and Southern Africa respectively. Empirical findings showed that school enrolment and government expenditure on education exerted statistically insignificant positive impact on real gross domestic product growth rate. Moreover, government expenditure on education had a statistically significant negative impact on real gross domestic product for combined sample of African countries. Also, on the long run, human capital variables including school enrolment,

government expenditure on education and government expenditure on health had statistically insignificant impact on real gross domestic product growth rate across all blocs though with varying magnitude and signs<sup>23</sup>.

A study empirically examined the nexus between human capital development and economic development in Nigeria. Annual time series data extracted from the Central Bank of Nigeria (CBN) .development was proxied by public education capital expenditure, public health recurrent expenditure and tertiary education enrolment, while economic development was measured with real gross domestic product, human development index and national poverty index. Unit root test was conducted using Augmented Dickey Fuller (ADF) method which revealed that the variables were integrated at level and first difference necessitating the use of autoregressive distributed lag model to explore the long run relationship existing among the variables in each model. Empirical results revealed that while some of the outcomes conformed to apriori expectations, others did not conform to apriori expectations. Based on the findings from the analysis, the study recommended among others, the government of Nigeria should intensify her investments in the areas of education and health so as to improve on the quality of education and health care facilities and as such, the quality of the human resources that could be instrumental to an improvement on the real gross domestic product of Nigeria and the achievement of desired economic growth and development. In addition, proper accounting and blocking of leakages will go a long way in improving the economy<sup>24</sup>.

The nexus between human capital development, information technology and economic growth in Nigeria has been examined empirically spanning from 1991 to 2021. Annual time series data obtained from Central Bank of Nigeria (CBN) statistical bulletin and National Bureau of Statistics (NBS) were used for the study. Augmented Dickey Fuller (ADF) unit root test and

Autoregressive Distributed Lag (ARDL) model were employed in estimating the parameters of the study. Real gross domestic product was the dependent variable while gross capital formation, information technology, secondary school enrolment, labour force and tertiary school enrolment were the independent variables of interest. Empirical findings showed that gross capital formation has a statistically significant positive effect on the real gross domestic product in Nigeria. Information technology has a positive but statistically significant effect on the real gross domestic product. In addition, labour force, secondary school enrolment and tertiary school enrolment impacted real gross domestic product positively and significantly. The study recommended that government at various levels should implement specific policies that facilitate investment in ICT in the country, empowering youth on different aspect of information technology to become self-reliant and achieve higher economic growth<sup>25</sup>.

A study empirically examined the impact of human capital on economic growth in forty-eight (48) African countries from 2000 to 2019. Secondary data sourced from World Bank Development Indicators and Penn World Table (PWT) were employed for the study. The estimated model had economic growth as the dependent variable while human capital development index, the rate of inflation, trade openness, gross savings and internet penetration as the independent variables of interest. Two-step system generalized method of moments was the estimating technique employed in finding the parameters of the model. Empirical findings revealed that both the male and the female genders for human capital development are important for economic growth of African countries. Similarly, internet penetration and foreign direct investments interacted with human capital to produce positive net effects on economic growth. The study recommended that policymakers should allocate more resources to the education and

health sectors to enhance human capital development as a prerequisite to ensure a stable economic growth<sup>26</sup>.

The impact of human capital expenditure on economic growth in Nigeria has been empirically examined. Secondary data collected from the Central Bank of Nigeria (CBN) statistical bulletin, National Bureau of Statistics (NBS) and World Bank Annual Report (WBAR) were used for the study. Gross domestic product was the explained variable in the estimated model while government expenditure on education, government expenditure on health, growth of labour force and life expectancy at birth were the explanatory variables of interest. Ordinary Least Squares (OLS) estimating technique was used in determining the parameters of the study. Empirical findings revealed that government expenditure on education, government expenditure on health, growth of labour force and life expectancy at birth all influenced economic growth positively and significantly. The study recommended that government at all levels should increase budgetary allocations to education and health sectors in order to aid economic transformation<sup>27</sup>.

The nexus between human capital expenditure and economic growth in Namibia has been empirically examined over the period 1980 to 2015. Annual time series data were used for the study. Johansen cointegration test and Vector-auto regression techniques were employed in finding the parameters of the study. Empirical results indicated a statistically significant long run inverse relationship of government spending on healthcare with fertility rate, infant mortality rate and under-five mortality rate. However, no cointegration was observed between government spending on healthcare and life expectancy or adult mortality rate. Also, the findings revealed a significant long-run positive relationship of government spending on education with literacy rate, net primary and gross tertiary enrolment rate. The vector auto-regression analysis revealed significant impacts of expenditure on healthcare and education on the GDP growth in the long-

run through improved human resources. The study recommended continuous expansionary government expenditure policy to achieve faster economic growth in Namibia<sup>28</sup>.

The relationship between human capital investment and economic growth in Nigeria over the period 1985 to 2021 has been empirically examined. Secondary data sourced from online World Bank Development Indicators (WBDI) were used for the study. The estimated model specified real gross domestic product (RGDP) as the explained variable while government expenditure on education (GEE), government expenditure on health (GEH), primary school enrolment rate (PSER), secondary school enrolment rate (SSER), tertiary school enrolment rate (TSER), child mortality rate (CMR), life expectancy rate (LER) and inflation rate (INFR) were the explanatory variables of interest. The data analytical techniques were descriptive statistics, Augmented Dickey Fuller (ADF) unit root test and Autoregressive Distributed Lag (ARDL) model. Empirical results showed that education expenditure and health expenditure have statistically insignificant positive impacts on economic growth in Nigeria. Similarly, tertiary school enrolment rate also had statistically insignificant positive impact on economic growth. The study concluded that human capital investment has positive and insignificant impact on economic growth in Nigeria. The author recommended that government at all levels should start and sustain allocating equipment, computers and other modern learning resources. In addition, government should also attract international donor agencies like World Bank (WB), United Nations (UN) and UNESCO to help and put funds into the educational sector<sup>29</sup>.

The impact of human capital development on economic growth in Nigeria from 1981 to 2021 using the Autoregressive Distributed Lag (ARDL) method has been empirically examined. Annual time series data obtained from the Central Bank of Nigeria (CBN) statistical bulletin and United Nations Educational, Scientific and Cultural Organization (UNESCO) institute for

statistics were utilized for the study. The dependent variable of the specified model was real gross domestic product growth rate (RGDPG) while the independent variables were government expenditure on education (GEE), government expenditure on health (GEH), gross fixed capital formation (GFCF), primary school enrolment (PSE), secondary school enrolment (SSE) and tertiary school enrolment (TSE). Empirical results indicated the existence of long-run relationship amongst the variables. In addition, health care spending, secondary school enrolment and even tertiary school enrolment all contributed to economic growth in the short-run, but human capital development has little effect on growth in the long-run in Nigeria<sup>30</sup>.

The nexus between human capital and economic growth in 48 African countries from 2000 to 2019 has been empirically investigated. Secondary data sourced from the Penn World Table (PWT) and World Bank Development Indicators (WBDI) were used for the study. The estimated model for the study specified GDP per capita as the explained variable while trade openness (TOP), gross domestic savings (GDS), foreign direct investments (FDI), internet penetration (IP) and inflation rate (INFR) were the explanatory variables of interest. Methodologically, Ordinary Least Square (OLS) model, Driscoll/Kraay Technique (DKT) and a robust Generalized Method of Moment (GMM) strategy were employed for estimating the parameters of the study. Empirical findings revealed that economic growth in Africa was positively influenced by human capital development. The results further showed that both male and female genders for human capital development are important for the economic growth of African countries. Similarly, internet penetration and foreign direct investments interacted with human capital to produce positive net effects on economic growth. The study recommended that policymakers should allocate substantial resources to the education and health sectors to enhance human capital development as a prerequisite for stable economic growth<sup>31</sup>.

The growth impact of human capital in Ethiopia's economy spanning from 1980 to 2020 has been empirically analyzed. Annual time series data obtained from the National Bank of Ethiopia (NBE), World Economic Outlook (WEO) of International Monetary Fund (IMF) and World Bank Development Indicators (WBDI) were utilized for the study. The endogenous variable of the estimated model was real gross domestic product (RGDP) whereas labour force (LF), gross fixed capital formation (GFCF), education expenditure (EDE), health expenditure (HEE), total government expenditure (TGE), secondary school enrolment (SSE), official development assistance (ODA) and consumer price index (CPI) were the exogenous variables. Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) unit root tests were used to check the stationarity of the variables. The Autoregressive Distributed Lag (ARDL) bound test was employed in evaluating the presence of cointegration between human capital and exogenous variables. Empirical results revealed the existence of a long-run relationship between the endogenous variable and exogenous variables entered into the model. The estimated error correction model with a -0.9528 coefficient also confirmed the existence of cointegration with a high speed of adjustment towards the long-run equilibrium. In the long-run, real GDP, education expenditure, health expenditure, labour force, gross capital formation, total government expenditure, official development assistance, secondary school enrolment, consumer price index, drought and policy change have a stable long-run connection. The study recommended an increasing ratio of health expenditure and secondary school enrolment should be designed, among others, to contain improved human capital in Ethiopia<sup>32</sup>.

The relationship between human capital and economic growth of South Asian Association for Regional Cooperation (SAARC) for the period 2010 to 2019 has been empirically examined. Secondary data gathered from World Bank Development Indicators (WBDI), UNESCO global

education monitoring reports and Pakistan Economic Survey (PES) were used for the study. The estimated model for the study specified gross domestic product (GDP) as the dependent variable while government total expenditure on education (GTEE), primary school enrolment (PSE) and labour force (LF) were the independent variables. Population size (POPS) and inflation (INFR) were the control variables. In terms of methodology, fixed effect model (FEM), random effect model (REM) and pooled regression analysis (PRA) were employed in estimating the unknown parameters of the model. Empirical findings revealed that labour force has a statistically significant positive impact on economic growth of SAARC countries whereas government spending on education and primary school enrolment had no discernible effects on economic growth<sup>33</sup>.

The long-term and short-term asymmetric effects of human capital on economic growth in China over the period 1978 to 2021 has been empirically investigated. Annual time series data sourced from China Statistical Bulletin (CSB) were used for the study. The gross domestic product (GDP) was the outcome variable while private health expenditure (PHE), government health expenditure (GHE) and social service expenditure were the stimulus variables. Nonlinear Autoregressive Distributed Lag (NARDL) model was employed in examining the long and short-term effects of positive and negative human health capital shocks on economic growth. Empirical findings indicated that all three types of health expenditure which measure the level of human health capital have an asymmetrical effect on GDP per capita. Furthermore, the results demonstrated that the reaction of economic growth to the positive and negative shocks of the three types of health expenditure differs significantly. Both positive and negative changes in health expenditure significantly affected economic growth. In the short-term, the increase in

private health spending, social services spending and government health spending stimulated an increase in per capita GDP and their decline hindered economic growth<sup>34</sup>.

The relationship between human capital formation and economic growth for Indian states spanning the period 1998-99 to 2018-19 has been empirically analyzed. Annual time series data extracted from publications of the Reserve Bank of India (RBI) were utilized for the study. The model developed for the study specified net state value added proxy for economic growth as the dependent variable while government expenditure on health (GEH) and government expenditure on education (GEE) were the independent variables of interest. The estimated model employed the Engel-Granger (1987) two-step-residual-based-cointegration test, Fisher test and Vector Error Correction model (VECM) for determining the parameters of the model. Also, Wald test was used to examine short run dynamics and causal interplays between the variables. Empirical findings revealed that human capital and state incomes have a long-term relationship. The Wald test showed that there exists a short-run linkage between human capital and income of the states' economies, with the causality running from human capital investment to output of the economy. The study recommended that the government of the states and union territories should make additional investments in sectors such as education and health in order to secure long-term economic prosperity<sup>35</sup>.

The effect of human capital investment on economic growth in Nigeria over the period 2004 to 2021 has been empirically examined. Secondary data sourced from the Federal Budget Office (FBO), Central Bank of Nigeria (CBN), Ministry of Finance (MOF) and United Nations Annual Publication (UNAP) of various years was utilized for the study. The estimated model for the study had Real Gross Domestic Product (RGDP) as the endogenous variable while Capital Expenditure on Education (CEE), Recurrent Expenditure on Education (REE), Capital

Expenditure on Health (CEH), Recurrent Expenditure on Health (REH) and Universal Basic Education (UBE) as the exogenous variables of interest. Descriptive statistics, Ordinary Least Square (OLS) as well as cointegration regression analysis were employed in estimating the parameters of the model. Empirical findings revealed that only capital expenditure on education has a positive and significant association with real gross domestic product. Capital expenditure on health and universal basic education have a positive but insignificant association with real gross domestic product. Recurrent expenditure on education and health have negative and insignificant associations with real gross domestic product. The study recommended that government at all levels and policymakers should display concerted and sincere effort in building and developing human capacity through adequate educational funding<sup>36</sup>.

The relationship between human capital development indicators and economic growth in Nigeria over the period 1991 to 2020 has been empirically investigated. Secondary data collected from the Central Bank of Nigeria (CBN) Annual Statistical Bulletin and World Bank data base was utilized for the study. Gross domestic product growth rate (GDPGR) was the explained variable of the estimated model while total government expenditure on education (TGED), total government expenditure on health (TGEH), life expectancy (LE) and gross fixed capital formation (GFCF) were the explanatory variables of interest. Augmented Dickey Fuller (ADF) unit root test was employed to investigate the order of integration of the variables. Methodologically, Autoregressive Distributed Lag (ARDL) framework was used in estimating the parameters of the model. Empirical findings revealed the existence of cointegration between economic growth and human capital development indicators. The study also found that government expenditure on education having positive insignificant long run relationship with economic growth. Equally, gross capital formation was found having positive insignificant

relationship with GDP at the long run. However, life expectancy exerted a negative and insignificant long run relation with the GDP. The study recommended that budgetary allocation to the education and health sector should be improved by both the federal and state government. In addition, government at all levels should be encouraged in utilizing development templates like Public-Private-Partnership (PPP) in fast-tracking development in strategic sectors like that of the education and health<sup>37</sup>.

Three renowned economists investigated the effect of human capital on economic growth of South Africa over the period 1993 to 2016. The exogenous variables of the specified model were skilled employment (SE), semi-skilled employment (SSE), low-skilled employment (LSE) and gross fixed capital formation (GFCF) while total output (TO) was the endogenous variable. Panel causality test and the generalized method of moments estimating technique were employed for the study. Empirical results revealed bidirectional causality between human capital and total output, as well as between total employment and total output. The resultant aggregate findings suggested that human capital had a positive effect on both economic output and growth in South Africa. The disaggregated proxy of human capital revealed that high level of skilled employment is associated with higher level of total output and economic growth. The study recommended that investments in high and skill programs to fully equip labour would boost the total output and output growth across municipalities in South Africa<sup>38</sup>.

The nexus between human capital and economic growth in Nigeria over the period 1981 to 2017 has been empirically examined. Secondary data collected from the Central Bank of Nigeria (CBN) statistical bulletin and World Development Indicators (WDI) of World Bank was utilized for the study. The specified model contained gross capital formation (GCF), labour participation rate (LPR), student enrolment (SER), total labour force (TLF) and government expenditure

(GEXP) as explanatory variables while real gross domestic product (RGDP) was the explained variable. Augmented Dickey Fuller (ADF) unit root test, Johansen cointegration test and Vector Autoregressive (VAR) technique were employed in determining the parameters of the model. Empirical results showed that human capital had a statistically significant positive impact on economic growth in Nigeria both in the short run and long run during the reviewed periods. Also, the Johansen cointegration result confirmed the existence of cointegration among the variables. The author recommended that government should establish special agencies with the obligation of improving the skills and capabilities of labour across all educational levels of the federation for sustained long run economic growth. In addition, efforts should be geared towards improving education and health sectors in terms of increased governmental budgetary allocation for continuous growth sustainability<sup>39</sup>.

The impact of human capital development on economic growth in Ethiopia over the period 1974 to 2018 has been empirically analyzed. Annual time series data was employed for the study. The estimated model specified gross fixed capital formation (GFCF), government expenditure on education (GEED), government expenditure on health (GEH), official development assistance (ODA), life expectancy at birth (LEB), primary school enrolment (PSCE), secondary school enrolment (SESE) and dummy of policy change (DOPC) as exogenous variables while real gross domestic product (RGDP) was the endogenous variable. Augmented Dickey Fuller (ADF) unit root test, Johansen cointegration test and Vector Error Correction Model (VECM) were the estimating techniques applied to analyze short run and long run impact of human capital on economic growth. Empirical findings revealed that human capital proxied by primary and secondary school enrolments and active labour force have a statistically significant positive short run and long run effect on economic growth in Ethiopia. The results further indicated that

education expenditure and life expectancy at birth have a positive and statistically significant long run effect on economic growth. However, the expenditure on health, secondary school enrolment and official development assistance were statistically significant and have an unexpected negative impact on long run economic growth. The author recommended that government should prioritize public expenditure on education by devoting more resources to it, and that greater attention should be given to human capital stocks development by both the public and private sectors<sup>40</sup>.

The relationship between human capital development and economic growth in Nigeria from 2000 to 2019 using secondary time series data obtained from Central Bank of Nigeria (CBN) statistical bulletin of various publications and World Development Indicators (WDI) data base has been empirically examined. The model for the study specified real gross domestic product (RGDP) as the dependent variable while government expenditure on education (GEE), government expenditure on health (GEH), infant mortality rate (IMR) and life expectancy (LE) were the independent variables. Autoregressive Distributed Lag (ARDL) framework was employed in estimating the parameters of the model. Empirical results showed that government expenditure on education exerted a statistically significant positive impact on economic growth in Nigeria in the short run but had a negative and significant impact on economic growth in the long run. On the other hand, government expenditure on health exhibited a statistically significant positive impact on economic growth in Nigeria both in the short run and long run. Infant mortality rate and life expectancy have a positive and significant impact on the economic growth of Nigeria in the short run while in the long run, they have a negative and significant impact on the economic growth in Nigeria. The study recommended that government should

comply with the 26% benchmark of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) on education<sup>41</sup>.

The impact of human capital and financial development on economic growth of eighty-three (83) emerging economies for the period 2002 to 2017 has been empirically investigated. Dynamic panel data sourced from World Development Indicators (WDI) was utilized for the study. The independent variables of the estimated model were labour force (LB), government general expenditure (GGE), trade openness (TOP), gross fixed capital formation (GFCF), secondary school enrolment (SSE), primary pupils' enrolment (PPE), domestic credit to private sector (DCTPS), domestic credit by financial sector (DCFS) and inflation rate (INFR) while real gross domestic product per capita was the (RGDPPC) dependent variable. The two-step system generalized method of moments was the methodology employed for model estimation. Empirical results revealed that human capital and financial development have a statistically significant positive impact on economic growth of the selected emerging economies. The authors recommended that government should increase access to education by increasing the number of schools across different regions and ensure the supply of highly qualified teachers<sup>42</sup>.

The nexus between human capital and economic growth in the presence of corruption for a disaggregated sample of developed and developing economies, and East, West and South Asia has been empirically examined. Dynamic panel data sourced from World Development Indicators (WDI) and Penn World Table (PWT) was utilized for the study. The estimated model had real gross domestic product growth rate (RGDPGR) as explained variable while human capital (HCAP), incidence of corruption (CORRP), gross fixed capital formation (GFCF), population growth (POP) and democracy (DEMOC) were the explanatory variables. Generalized Method of Moments (GMM) was the methodology applied in estimating the parameters of the

model. Empirical findings revealed that human capital positively impacted on economic growth of the sampled economies. The results further showed that corruption had positive impact on economic growth for some economies while it exerted negative impact for some others. The population growth rate negatively impacted on economic growth of all economies, but democracy had mixed effects for the groups of the economies<sup>43</sup>.

The relationship between human capital and economic growth in Nigeria for the period 1986 to 2015 has been empirically examined. Secondary data sourced from World Development Indicator (WDI) was utilized for the study. The study modeled gross fixed capital formation (GFCF), labour force (LF), trade openness (TOP), interest rate (INTR) and manufacturing value added (MVA) as control variables while real gross domestic product (RGDP) was the controlled variable. Error Correction Model (ECM) was employed for the analysis. Empirical results indicated that human capital exhibited a statistically insignificant positive relationship with economic growth in Nigeria. Trade openness and physical capital have a negative impact on economic growth. However, manufacturing and interest rate exerted a statistically significant positive impact on economic growth during the reviewed period. The authors recommended the need for total restructuring of the educational system and provision of complementary resources to enable the workforce to contribute significantly to economic growth<sup>44</sup>.

The impact of human capital on economic growth for a selected sample of nine (9) Sub-Saharan African (SSA) countries between 1980 and 2016 has been empirically investigated. Annual panel data sourced from World Development Indicators (WDI) and Penn World Table (PWT) was utilized for the study. The estimated model contained human capital accumulation (HCA), physical capital accumulation (PCA), government spending (GEXP), foreign direct investment (FDI) and urbanization (UB) as exogenous variables while real gross domestic product (RGDP)

as the endogenous variable. The Dynamic Ordinary Least Squares (DOLS) and Fully Modified Ordinary Least Squares (FMOLS) panel econometric techniques were employed in finding the parameters of the model. Empirical results showed an insignificant effect of human capital on economic growth of the selected sample. Government spending and foreign direct investment have statistically significant negative impact on economic growth of the selected countries whereas urbanization had a positive and significant effect on economic growth. The study recommended the prioritization of the development of stringent public policy expenditure projects aimed at improving the future productivity capacity of human capital within SSA countries. In addition, governments in SSA countries need to place increasing emphasis on developing urbanized population which can support human capital development objectives<sup>45</sup>.

Some scholars examined the impact of human capital development on economic growth in Nigeria spanning from 1980 to 2015. Annual time series data sourced from Central Bank of Nigeria (CBN) statistical bulletin of various editions, National Bureau of Statistics (NBS) annual bulletin of various editions and World Development Indicators (WDI) data base was utilized for the study. The explanatory variables of interest were education expenditure (EEXP), health expenditure (HEXP), primary school students' enrolment (PSSE), secondary school students' enrolment (SSSE), tertiary institutions students' enrolment (TISE) and labour force (LB) while real gross domestic product growth rate (RGDP) was the explained variable. Augmented Dickey Fuller (ADF) unit root test, Johansen multivariate cointegration test and Ordinary Least Squares (OLS) multiple regression technique were employed in estimating the parameters of the model. Empirical results showed a positive and significant relationship between labour, government expenditure on education, government expenditure on health and economic growth in Nigeria, while enrolment into various levels of educational institutions was negatively related to

economic growth in Nigeria. The authors recommended improved funding of the education sector at all levels alongside increment in remuneration packages of teachers and raising of qualifications required for employment in the sector<sup>46</sup>.

The transmission mechanism through which investment in human capital translates to inclusive and green growth development strategy in Nigeria over the period 1999 to 2017 has been empirically analyzed. Secondary data obtained from Nigeria Budget Office (NBO), Central Bank of Nigeria (CBN) Statistical Bulletin and World Bank (WB) was used for the study. The explanatory variables of interest to the study were budgetary allocation to education out of government's total expenditure (EBPGTE), budgetary allocation to education as percentage of gross national product (EBPGNP), adult literacy rate (ALR) and government allocation to health as percentage of total government expenditure (HBPGE). Inclusive green growth (IGG) was specified as the explained variable. Methodologically, descriptive analytical tools were employed in analyzing the trend of the data. Empirical findings revealed that investment in human capital enhances the productive and creative capabilities of human beings which can be harnessed to achieve higher and more sustainable levels of human welfare and wellbeing. Public investment in human capital via education emphasizes the acquisition of skills, technology and capacity building programs which are crucial for productive workforce and competitive economies within the inclusive green growth agenda. The study recommended an urgent improvement in the government budgetary and GDP allocation to education and health. In addition, there should be substantial investment in Technical, Vocational Education and Training (TVET) and Science, Technology, Engineering and Mathematics (STEM) such that adequate technical support and skill upgrading will be given to green initiatives in the inclusive green framework<sup>47</sup>.

The cointegration and causality between investment in education and sustainable economic growth in Guangdong province in China by using the panel data of twenty-one (21) cities from 2000 to 2016 has been explored. Dynamic panel data sourced from Guangdong Province Yearbooks (GPY) and Local Government Websites (LGW) was utilized for the study. The estimated model specified physical capital (K), labour force (LF) and human capital (H) as the independent variables while real gross domestic product (RGDP) was the dependent variable. A panel data model with an individual fixed effect based on the Cobb-Douglas production function was constructed to estimate the contribution of the investment in education to economic growth by introducing lags. The results revealed that local investment in education played a positive and statistically significant role in promoting sustainable economic growth in the studied cities. However, the contribution of the local financial investment in education to economic growth varied in different areas<sup>48</sup>.

The effect of physical and human capital on the economic growth of South Sumatera over the period 2010 to 2015 has been empirically analyzed. Annual panel data gathered from World Development Indicators (WDI) and Penn World Table (PWT) was used for the study. The estimated model specified government capital expenditure (GCE), education (EDU), health (HEA) and labour (LB) as the explanatory variables while real gross domestic product (RGDP) was the explained variable. The study employed linear regression analysis method with fixed effect model. Empirical results indicated that education, health, labour and agriculture capital expenditure have significant positive effect on economic growth of South Sumatera<sup>49</sup>.

The relationship between human capital development and economic growth in Nigeria covering the period of 1981 to 2015 has been empirically examined. Secondary data obtained from Central Bank of Nigeria (CBN) statistical bulletin and World Bank Statistics (WBS) was used

for the study. The model for the study specified government expenditure on education (GEED), government expenditure on health (GEH), gross fixed capital formation (GFCF) and labour force (LBF) as exogenous variables of interest while gross domestic product per capita (GDPPC) was the endogenous variable. Augmented Dickey Fuller (ADF) unit root test, Granger causality test, Johansen cointegration test and Error Correction Model (ECM) were the estimating techniques employed to analyze the data. Empirical results revealed that human capital exhibited a statistically significant positive impact on economic growth in Nigeria within the reviewed period. The study also found a bidirectional relationship between economic growth and government expenditure on health and between economic growth and government expenditure on education at 5% level of significance. The authors recommended that the Nigerian government should sustain increased investment in education and health and encourage private investment in the sectors too<sup>50</sup>.

The relative impact of human capital formation on economic growth in Nigeria from 1981 to 2014 has been empirically explored. Annual time series data collected from Central Bank of Nigeria (CBN) statistical bulletin and World Development Indicator (WDI) was used for the study. The study modeled total government expenditures on education (TGEE), total government expenditures on health (TGEH), gross fixed capital formation (GFCF) and life expectancy (LVEXP) as stimulus variables while real gross domestic product (RGDP) was the outcome variable. Methodologically, the Autoregressive Distributed Lag (ARDL) bound estimating technique was employed to examine the existence of long run and short run dynamic relationship between human capital formation and economic growth in Nigeria. The results showed that human capital had a statistically significant positive relationship with economic growth in Nigeria. The study recommended that policymakers should inter-alia increase not just the total

amount of expenditure made on the education sector, but also the percentage of total expenditure accorded to the sector<sup>51</sup>.

The effect of human capital development on industrial output growth in Nigeria covering the period 1976 to 2016 has been empirically investigated. Annual time series data obtained from Central Bank of Nigeria (CBN) statistical bulletin, Central Bank of Nigeria (CBN) Statement of Accounts and Annual Reports, African Development Bank (ADB), International Monetary Fund (IMF) Reports and World Development Indicator (WDI) was used for the study. The model for the study was specified using oil prices (OP), gross capital formation (GCF), capacity utilization (CU), recurrent expenditures on education (REEDU), recurrent expenditure on health (REHLT), inflation rate (INFR) and exchange rate as explanatory variables while industrial output growth was the explained variable. Augmented Dickey Fuller (ADF) unit root test, Johansen cointegration test and Error Correction Model (ECM) were the estimating techniques employed for the study. The results showed that recurrent expenditure on education and health have a negative impact on industrial output growth. The study recommended, among others, strict adherence by government at all levels to the 26 percent minimum budgetary allocation by UNESCO for education which will spur improvement in human capital development<sup>52</sup>.

The impact of human capital and foreign aid on economic growth in Nigeria has been empirically investigated. Secondary data sourced from Central Bank of Nigeria (CBN) statistical bulletin and World Development Indicator (WDI) was used for the study. The specification of the model featured secondary school enrolment (SSE), total government education expenditure (GEE), total government health expenditure (GHEXP), real domestic investment (RDINV), foreign direct investment (FDI), trade openness (TOP) and foreign aid (FAD) as exogenous variables while real gross domestic product per capita (RGDPPC) was the endogenous variable.

Engel-Granger causality test and Vector Error Correction Model (VECM) were the estimating techniques employed for the study. Empirical results showed that human capital exhibited a statistically significant positive impact on economic growth in Nigeria via education and health expenditure. The study recommended the need to formulate appropriate education and health policies in order to promote investment in the sectors<sup>53</sup>.

Some erudite scholars empirically examined the impact of human capital development on economic growth of 132 countries over the period 1996 to 2011. Dynamic panel data sourced from Penn World Tables (PWT), World Development Indicators (WDI) and Economic Freedom Dataset (EFD) of the Fraser Institute was employed for the study. The study modeled real gross domestic product (RGDP) as the dependent variable whereas stock of physical capita (k), employed labour force (LF), human capital (H), economic opportunities (EO) and quality of legal institutions and property rights (LP) were the independent variables. Fixed Effects Models (FEM) was the estimating technique used to analyze the panel data. Empirical findings revealed that human capital exerted a statistically significant positive relationship with economic growth of the studied countries only in the presence of better economic findings opportunities and high-quality legal institutions. The study recommended the establishment of high-quality legal institutions and creation of better economic opportunities for the citizens in their respective countries for human capital to impact positively on economic growth<sup>54</sup>.

The relationship between human capital and economic growth of India over the period 1995 to 2014 has been empirically investigated. Secondary data obtained from World Bank (WB) national accounts data and Organization of Economic Cooperation and Development (OECD) national accounts data files was used for the study. The estimated model included health expenditure per capita (HEPC), gross fixed capital formation (GFCF) and secondary school

enrolment (SSE) as exogenous variables while gross domestic product (GDP) featured as endogenous variable. Methodologically, multiple linear regression models and neo-classical Solow production function were employed in estimating the parameters of the model. Empirical results showed that human capital and other variables used in the study exerted statistically significant positive relationships with economic growth of India. The study recommended that policy makers in India should consider allocating substantial financial resources towards improving human capital, which can be achieved by increased health care expenditure and more funding towards education<sup>55</sup>.

The effect of human capital development on the growth of the Nigerian economy covering the period 1970 to 2013 has been empirically assessed. Annual time series data collected from the Central Bank of Nigeria (CBN) statistical bulletin of various publications and National Bureau of Statistics (NBS) was utilized for the study. The model for the study specified total government expenditure on education (TGEE) and total government expenditure on health (TGEH) as the independent variables while gross domestic product (GDP) was the dependent variable. Augmented Dickey Fuller (ADF) unit root test, Phillips-Perron (PP) unit root test, Johansen cointegration test and Vector Error Correction Model (VECM) were the techniques employed to estimate the parameters of the model. Empirical results indicated that total government expenditure on education positively and significantly impacted on economic growth while total expenditure on health exerted a significant negative relationship with economic growth in Nigeria. The authors recommended that government at all levels should meet up with world standard benchmark on education expenditure in the annual budget and effort should be made to address the agitations by the health workers which always make them to resort to frequent strike actions<sup>56</sup>.

The impact of human capital development on economic growth in Nigeria spanning from 1980 to 2013 has been empirically examined. Secondary data sourced from World Development Indicators (WDI) and National Bureau of Statistics (NBS) was used for the study. Public expenditure on education (PEE), public expenditure on health (PEH), primary school enrolment (PSE), secondary school enrolment (SSE), tertiary school enrolment (TSE), life expectancy rate (LER) and gross fixed capital formation (GFCF) were the explanatory variables of interest while real gross domestic product (RGDP) was the explained variable of the study. Phillips-Perron unit root test and Autoregressive Distributed Lag (ARDL) cointegration analysis were the estimating techniques employed for analyzing the data. Empirical findings revealed that public expenditure on education, secondary school enrolment, life expectancy rate and gross fixed capital formation have statistically insignificant positive relationships with economic growth. However, public expenditure on health, primary school enrolment and tertiary school enrolment had statistically significant negative relationships with economic growth in Nigeria within the period reviewed. The study recommended that government should put in place the required education and training policy that would guarantee quality schooling for primary and tertiary education. Also, government should commit more financial resources to health sector to achieve human capital development<sup>57</sup>.

The effect of education human capital on economic growth of 55 countries and regions from 1960 to 2009 was empirically investigated. Annual time series data gathered from Groningen Growth and Development Centre (GGDC) and World Bank Data Centre (WBDC) was utilized for the study. The estimated model specified primary education (PE), secondary education (SE), tertiary education (TE) and life expectancy rate (LER) as control variables while per capita gross domestic product (PCGDP) was the controlled variable. Augmented Dickey Fuller (ADF) unit

root test, Kao residual cointegration test and Fixed Effects Model (FEM) were employed in estimating the parameters of the model. Empirical results showed that education capital and health capital exerted statistically significant positive relationships with economic growth. The positive impact of higher education on economic growth is especially significant. However, the primary education and secondary education have no significant impact on economic growth. The authors recommended that governments in these countries should increase the investment on primary education and secondary education for them to have significant positive contribution to economic growth<sup>58</sup>.

The impact of human capital development on economic growth in Nigeria spanning from 1981 to 2010 has been empirically analyzed. Annual time series data obtained from the Central Bank of Nigeria (CBN) statistical bulletin of various publications and National Bureau of Statistics (NBS) was utilized for the study. The study modeled gross fixed capital formation (GFCF), government total expenditure on education (GTEE), government total expenditure on health (GTEH), labour force (LBF), primary school enrolment (PSE), secondary school enrolment (SSE) and tertiary school enrolment (TSE) as the exogenous variables of interest while gross domestic product (GDP) was the endogenous variable. Autoregressive Distributed Lag (ARDL) modelling framework was adopted to estimate the parameters of the study. Empirical findings indicated existence of cointegration between economic growth and human capital development indicators. Findings also showed that human capital development indicators had significant positive impact on economic growth in Nigeria within the reviewed periods. The study recommended that government at all levels should invest more in human capital development process and endeavors to prioritize the health and education sectors budgeting considering the growth driving potentials in Nigeria<sup>59</sup>.

The role of government investment in human capital on economic growth of the Nigerian economy spanning from 1980 to 2010 has been empirically examined. Annual time series data collected from World Bank (WB), Central Bank of Nigeria (CBN) Statistical Bulletin and National Bureau of Statistics (NBS) was utilized for the study. Human capital augmented Solow model as presented by Mankiw, Romer and Weil in 1992 was the theoretical framework adopted by the study. Methodologically, Ordinary Least Square (OLS) and System Three Stage Least Square (STLS) were the estimating techniques employed in estimating the parameters of the models developed or specified for the study. Empirical findings revealed that human capital alongside with technological development and population growth has a positive relationship with growth of the Nigerian economy. The model confirmed that adequately trained and employed population enhances the growth of the economy. It further revealed that the Nigerian experience does not support Solow's hypothesis of high population growth or low productivity relationship. The study also found that education has the greatest marginal impact on life expectancy. Although the private sector benefits maximally from an educated population, she may not invest adequately in human capital development. However, both the rent-seeking and non-rent seeking behavior of economic agents are estimated to impact positively on economic growth of Nigeria directly or indirectly. The authors therefore suggested an urgent need for government to strategically shift her investments towards the continuous development of effective and efficient human capital<sup>60</sup>.

A notable author empirically investigated the impact of human capital on economic growth in Sudan for the period 1982 to 2009. Secondary data sourced from the Central Bureau of Statistics (CBS), Ministry of Finance (MOF), Ministry of Investment (MOI) and International Monetary Fund (IMF) Year Book was utilized for the study. The estimated model had school attainment

(SA), investment in education (EINV), investment in health (HINV), foreign direct investment (FDI), human development index (HDI) and total factor productivity (TFP) as explanatory variables while real gross domestic product (RGDP) was the explained variable. Three Stage Least Squares (TSLS) technique was employed in estimating the parameters of the model. Empirical results revealed that education investment and health investment have statistically significant positive relationships with economic growth in Sudan. However, total factor productivity had adverse effect on economic growth and human development due to the obsolete and old fashion technology<sup>61</sup>.

#### **2.3.4 Trade Liberalization and Economic Growth**

Empirical studies conducted in both advanced countries and developing economies of the world on the effect of trade liberalization on economic growth are reviewed below. The impact of trade liberalization on economic growth in South Africa covering the period of 1986 to 2022 has been empirically investigated. Autoregressive Distributed Lag (ARDL) was the estimating technique employed to find the parameters of the model. Empirical findings revealed that there exists a positive relation between trade liberalization and economic growth in South Africa. The study recommended that the African governments especially South Africa should further open its economic border to allow for free trade with other economies of the world<sup>62</sup>.

Two renowned scholars examined the effect of trade liberalization on long run economic growth in Nigeria spanning from 2000 to 2021. Annual time series data obtained from Central Bank of Nigeria's Statistical Bulletin (CBNSB) and World Bank Development Indicators (WBDI) were utilized for the study. The model specification had economic growth measured by gross domestic product as the dependent variable while gross fixed capital formation, trade liberalization, labour

force participation rate, inflation and interest rates were the independent variables of interest. Augmented Dickey Fuller (ADF) unit root test, Johansen cointegration test and linear regression model were employed in determining the parameters of the study. Empirical findings revealed that trade liberalization and gross fixed capital formation have a positive and significant effect on economic growth. In addition, inflation and interest rates were shown to have a negative influence on economic growth whereas labour force participation rate was found to have a positive impact on economic growth. However, a positive link was established between trade liberalization and economic growth. The study recommended that the government should implement suitable policies to diversify the productive base of the economy in order to encourage net exports, as well as construct an efficient service infrastructure to stimulate private domestic and international investment. Furthermore, the government should give sufficient incentives to manufacturers of export items, stimulate consumption of locally produced commodities, and guarantee adequate standard controls to ensure that goods produced meet international standards<sup>63</sup>.

The effect of trade liberalization on economic growth in Kenya spanning 1990 to 2022 has been empirically examined. Annual time series data sourced from World Bank Development Indicators (WBDI) were utilized for the study. Vector Auto regression (VAR) was employed in determining the parameters of the study. Empirical results showed that foreign direct investments inflows exerted a statistically significant negative effect on economic growth while manufacturing output had a statistically significant positive effect on economic growth in Kenya. The study recommended that Kenyan policymakers should control ways to draw in beneficial FDI while simultaneously emphasizing the manufacturing sector which will be beneficial for the economy<sup>64</sup>.

A study investigated empirically the nexus between trade liberalization and economic growth in Nigeria from the period 1981 to 2021. Annual time series data gathered from Central Bank of Nigeria (CBN) and the National Bureau of Statistics (NBS) were used for the study. The study employed the econometrics method of Autoregressive Distributed Lag (ARDL), Error Correction Model (ECM) and Toda-Yamamoto Causality (TYC) test were used in estimating the parameters of the study. Empirical results indicated that export value index proxy for exports had a statistically significant positive relationship with the growth rate of gross domestic product in the long run, import value index proxy for imports impacted a statistically significant negative relationship with growth rate of gross domestic product in the long run. Moreover, trade openness and exchange rate had a significant negative relationship with growth rate of gross domestic product in the long run. The paper, therefore, recommended that trade policies by ministry of trade and industry should be targeted at encouraging Nigerian businesses to diversify their export products and markets beyond traditional commodities, promote value-added manufacturing, agricultural processing, and service exports to increase the range of exportable goods and services. This will reduce dependence on a few primary commodities and expand export opportunities<sup>65</sup>.

Another study examined the impact of trade openness on economic growth in Madagascar for the period 1993 to 2020. Annual time series data were used for the study. Vector Error Correction Model (VECM) was the estimating technique employed to determine the parameters of the study. Empirical estimated results provided sound evidence that there exists a long run cointegration among the variables. The results further showed that trade openness had a statistically negative effect on economic growth in Madagascar. Moreover, inflation rate, foreign direct investment net inflow and labour force participation rate demonstrated a positive and significant complementary

relationship with economic growth. The study concluded with the recommendation that policymakers should develop and execute trade laws that are aimed at regulating various sources of import and export in the country<sup>66</sup>.

The interplay between trade liberalization, economic growth and economic development has been empirically assessed for two distinct periods, pre-BRICS (1991-2010) and post-BRICS (2011-2021) in South Africa. A Vector Error Correction Model (VECM) was employed to account for potential cointegration among the variables. Empirical findings revealed that there exists a long-run equilibrium relationship among the variable. The estimated results indicated that trade openness positively and substantially influenced gross domestic product growth rate in the post-BRICS period and revealed a unidirectional causal relationship between trade liberalization and economic growth. The results also indicated a positive association between trade openness and economic development, implying that openness engendered growth and facilitated broader development outcomes in South Africa<sup>67</sup>.

The impact of intra-African trade openness on economic growth in Nigeria for the period of 1990 to 2022 has been empirically examined. Secondary data obtained from Central Bank of Nigeria (CBN) statistical bulletin, World Integrated Trade Solution (WITS), Trade Law Centre (TRALAC) and the National Bureau of Statistics (NBS). Economic growth proxy by real gross domestic product was the dependent variable while intra-African exports, intra-African imports, unemployment and trade openness were the independent variables. Ordinary Least Squares estimating technique was employed to determine the parameters of the study. Empirical results revealed that intra-African exports and imports had a significant positive impact on Nigeria's economic growth in the long run and short run respectively. The study recommended an increase

in Nigeria's intra-African trade in order to practice openness especially to help conserve foreign exchange<sup>68</sup>.

A renowned scholar empirically investigated the impact of trade liberalization policies on investment and development in developing countries. Secondary data gathered from published studies and reports that were easily accessed through online journal and libraries were utilized for the study. A desk study research design methodology was employed for the study. Empirical results indicated that trade liberalization policies positively and significantly increased foreign direct investment inflows and export opportunities in developing countries. However, they have also posed challenges such as heightened competition and vulnerability to external shocks. The effectiveness of trade liberalization policies varies across countries and depends on factors such as heightened competition, institutional capacity, infrastructure and trade related regulations. The study recommended that policymakers should prioritize the design and implementation of targeted interventions aimed at maximizing the benefits of trade liberalization while mitigating its potential adverse effects. Moreover, policymakers should prioritize investments in education, healthcare, social protection to enhance human capital development and ensure that the benefits of trade liberalization are equitably distributed across societies<sup>69</sup>

The relationship between trade liberalization and economic growth in Nigeria spanning from 1981 to 2020 has been empirically investigated. Annual time series data gathered from the Central Bank of Nigeria (CBN) statistical bulletin were used for the study. The Augmented Dickey Fuller (ADF) unit root test and Fully Modified Ordinary Least Squares (FMOLS) techniques were employed in estimating the parameters of the study. Real gross domestic product was used as measure of economic growth while trade liberalization was proxied by degree of openness. Exchange rate and inflation rate were used as check variables. Empirical

findings revealed a positive and statistical significant relationship between degree of openness and real gross domestic product. The paper recommended that government at all levels should be tactful in the formulation and implementation of trade policies<sup>70</sup>. .

A study empirically examined the impact of trade liberalization on the performance of Tanzania's export sector over the period 1980 to 2019. Secondary data sourced from World Bank (WB) and Tanzania Bureau of Statistics (TBS) were used for the study. Vector Error Correction Model (VECM) and Autoregressive Distributed Lag (ARDL) model were employed in finding the parameters of the study. Empirical results indicated that a significant positive correlation between trade liberalization and subsequent export performance as well as the interdependencies between trade liberalization and foreign direct investment strategies. There exists a reciprocal relationship between trade liberalization and exchange rates, implying the significance of competent exchange rate management in enhancing export competitiveness. The study recommended a carefully executed trade liberalization policy not only for the expansion of the export industry and the influx of capital, but also for the transformation and development of the nation growth<sup>71</sup>.

The effect of trade liberalization on economic growth in Nigeria has been empirically explored over the period 1981 to 2021. Annual time series data obtained from the Central Bank of Nigeria (CBN) statistical bulletin and the National Bureau of Statistics (NBS) was employed for the study. The growth rate of GDP was modeled as the explained variable while export value index (EVI), import value index (IVI), exchange rate (EXGR) and trade openness (TOP) were the explanatory variables of interest. Methodologically, the Autoregressive Distributed Lag (ARDL), Error Correction Model (ECM) and Toda-Yamato Causality Test (TYCT) were utilized in estimating the parameters of the model. Empirical findings revealed that export value index has a

significant and positive relationship with the growth rate of GDP in the long run while import value index has a negative and significant relationship with the growth rate of GDP in the long run. The results further showed that trade openness and exchange rate have a significant and negative relationship with growth rate of GDP in the long run. In addition, a unidirectional positive causality exists between export value index and growth rate of GDP. The authors recommended that trade policies by ministry of trade and industry should be targeted at encouraging Nigerian businesses to diversify their export products and markets beyond traditional commodities, promote value-added manufacturing, agricultural processing and service exports to increase the range of exportable goods and services required<sup>72</sup>.

The nexus between foreign trade liberalization and economic growth in Albania using annual time series economic development data from 1994 to 2019 has been empirically investigate. The study modeled growth rate of gross domestic product (GRGDP) as the outcome variable while external debt stocks (EDS), trade volume (TV), final consumption expenditure (FCE), foreign direct investment (FDI), remittances (RT) and inflation (INF) were the stimulus variables. In terms of methodology, Ordinary Least Square (OLS) regression analysis was employed in estimating the parameters of the model. Empirical findings showed that trade liberalization, exports and imports exerted statistically significant positive relationships with Albania's economic growth in the long-run. This suggests that a sizeable percentage of Albania's economic growth has been attributable to a long-term increase in the country's exposure to trade, exports and imports. The authors recommended that government at all levels should change the composition of commerce by shifting from export of raw materials and semi-manufactured commodities to high-value-added items for the outward-oriented strategy to impact economic growth substantially. Additionally, trade policy should support investments in capital-intensive

industries and foster the development of human capital capable of absorbing modern technology. Moreso, there is need for national and sub-national governments to support initiatives that boost participation in the exportation and importation of goods<sup>73</sup>.

The impact of international trade and entrepreneurship on economic growth and development in Nigeria from 1990 to 2022 has been empirically investigated. Annual time series data sourced from the Central Bank of Nigeria (CBN) statistical bulletin and World Bank Development Indicators (WBDI) was used for the study. The estimated model specified real gross domestic product (RGDP) as the dependent variable while domestic credit to private sector (DCPS), exchange rate (EXGR), self-employment (SEEM), total exports (TEXP), total imports (TIMP) and inflation rate (INFR) were the independent variables of interest. Methodologically, the autoregressive distributed lag (ARDL) technique via Eview9 statistical software was employed to analyze the data. The results indicated that in the long-run, self-employment and total exports coefficients were positively signed and statistically significant while total imports turned up with a negative sign and also statistically significant. The implication of this result is that total exports and self-employment exerted positive relationships with economic growth while total imports showed a negative relationship with economic growth. The study recommended amongst others that government should promote entrepreneurship by providing credits and grants to encourage self-employment. In addition, government should also encourage import substitution, promote exportation of locally made goods in order to spur economic growth and development<sup>74</sup>.

The impact of trade liberalization on economic growth in Iraq over the period 1990 to 2020 has been empirically analyzed. Annual time series data obtained from World Bank Indicators (WBI) was used for the study. The estimated model had annual growth rate of gross domestic product (GDPGR) as the dependent variable while the independent variables of the model were gross

fixed capital formation (GFCF), human capital (HC), population growth (POPG) and oil price (OP). The study applied the autoregressive distributed lag (ARDL) approach for estimating the parameters of the model. Empirical findings revealed that trade liberalization has a positive and significant impact on economic growth in Iraq in the short run and long run. The authors recommended that Iraq government should consider diversification of her export sector. In addition, there is a need for Iraq to develop strong initiatives for adding value to exports so as to compensate for the level of imports<sup>75</sup>.

The nexus between trade liberalization and economic growth in Nigeria covering the period 1981 to 2021 has been empirically investigated. Annual time series data gathered from Central Bank of Nigeria (CBN) statistical bulletin and National Bureau of Statistics (NBS) was utilized for the study. The explained variable of the estimated model was the growth rate of gross domestic product (GRGDP) while the explanatory variables of interest were export value index (EVI), import value index (IVI), exchange rate (EXGR) and trade openness (TOP). Empirical results showed that export value index has a statistically significant positive relationship with the growth rate of gross domestic product in the long run while import value index has a negative and significant relationship with the growth rate of GDP in the long run. A unidirectional positive causality existed between export value index and the growth rate of GDP. The study recommended that trade policy by ministry of trade and industry should be targeted at encouraging Nigerian businesses to diversify their export products and markets beyond traditional commodities, promote value-added manufacturing, agricultural processing and service exports to increase the range of exportable goods and services<sup>76</sup>.

The economic growth impact of trade liberalization in Nigeria covering the period 1988 to 2020 has been empirically examined. Secondary data sourced from Federal Bureau of Statistics (FBS)

and World Bank (WB) were used for the study. The estimated model had real gross domestic product (RGDP) while trade openness (TOP), tariff rate (TRFR), real exchange rate (REXGR), net export (NEXPT) and foreign direct investment (FDI) were the independent variables of interest. Ordinary Least Square (OLS) regression model was the estimating technique adopted for estimating the parameters of the model. Empirical findings revealed that trade openness, real exchange rate, tariff rate and foreign direct investment have statistically significant positive relationships with real gross domestic product whereas net export was found to be negatively and statistically significant relationship with real gross domestic product. The study recommended that government at all levels should encourage industrialization in Nigeria through local production of export goods among others<sup>77</sup>.

The nexus between trade openness and economic growth in Madagascar for the period 1993 to 2020 has been empirically determined. Annual time series data gathered from the World Bank (WB) and World Development Indicators (WDI) were used for the study. The endogenous variable of the study was growth rate of gross domestic product (GRGDP) while foreign direct investment (FDI), trade openness (TOP), labour force participation rate (LFPR) and inflation (INFR) were the exogenous variables of interest. In terms of methodology, Vector Error Correction Model (VECM) technique was employed in estimating the parameters of the study. Empirical results showed that there exists a long-run cointegration among the variables. The results further revealed that trade openness has a negative effect on economic growth in Madagascar. Moreover, this study demonstrated a positive and significant complementary relationship between inflation, foreign direct investment and labour force participation rate in strengthening economic growth. The authors recommended that policy makers should develop

and execute trade laws that are aimed at regulating various sources of import and export in the country<sup>78</sup>.

The impact of trade liberalization on economic growth in Nigeria over the period 1981 to 2019 has been empirically investigated. Annual time series data obtained from the Central Bank of Nigeria (CBN) statistical bulletin was utilized for the study. The estimated model for the study had real gross domestic product (RGDP) as the dependent variable while total balance of trade (TBT), total export trade (TET), total import trade (TIT) and exchange rate (EXGR) were the independent variables. Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) unit root tests were used for the test of stationarity while Autoregressive Distributed Lag (ARDL) bound test was employed to examine the long-run relationship between the variables. Empirical findings revealed that total export trade has a positive relationship with economic growth while total import trade showed a negative relationship with economic growth in Nigeria. The study recommended that government should try as much as possible to restrict importation of goods and services that are locally produced in the country in order to avoid dumping of foreign goods and services as well as over dependent on imported goods and services in the country. Moreover, government should develop policies and programs targeted at increasing locally produced export-oriented goods and services in the country in order to increase more export of goods and services which will invariably lead to economic growth in the country<sup>79</sup>.

The relationship between trade liberalization policy and economic growth of 42 African countries from 1995 to 2018 has been empirically examined. Dynamic panel data sourced from Penn World Tables (PWT), International Monetary Fund (IMF) database and World Development Indicators (WDI) of World Bank was utilized for the study. The estimated model specified trade openness (TOP), financial system efficiency (FSE), domestic price stability

(INFR), natural resources' rent (NTRR), national debt (DEBT), gross fixed capital formation (GFCF), population growth (POP), human capital index (HCI) and institutional quality (INSTQ) as independent variables while annual per capita income (APCI) was the dependent variable. Pooled Mean Group (PMG) technique was employed in estimating the parameters of the model. Empirical findings revealed that trade liberalization policy exerted a positive impact on economic growth of African countries up to a certain threshold, beyond which it began to cause the economy to under-heat. The results further confirmed the existence of nonlinear relationship between trade liberalization and economic growth in African countries. The study recommended among others, the promulgation of competitive policies and debt obtained should be channeled to priority infrastructures capable of increasing the manufacturing base of countries in Africa. In addition, African countries should spend strategically on education in order to build an army of educated labour force<sup>80</sup>.

The effects of trade liberalization on Nigerian economic growth between 1981 and 2018 has been empirically investigated. Annual time series data gathered from Central Bank of Nigeria (CBN) statistical bulletin of various publications and World Development Indicators (WDI) was utilized for the study. The model for the study had trade openness (TOP), foreign direct investment (FDI), gross fixed capital formation (GFCF), labour force (LF) and official exchange rate (EXGR) as explanatory variables while gross domestic product (GDP) was the explained variable. Augmented Dickey Fuller (ADF) unit root test, Johansen co integration test and Error Correction Mechanism (ECM) were the estimating techniques employed to determine the parameters of the model. Empirical results showed that foreign direct investment (FDI) and labour force (LF) have statistically significant positive impact on economic growth in Nigeria in the short run. Gross fixed capital formation (GFCF), trade openness (TOP) and exchange rate

(EXGR) have statistically insignificant effects on economic growth in the short run. All the model's explanatory variables have statistically significant positive relationship with economic growth in Nigeria in the long run within the studied period. The authors recommended the formulation and implementation of appropriate policy measures by the government to facilitate trade linkages between Nigeria and the rest of the world<sup>81</sup>.

Three notable scholars investigated the impact of trade openness on economic growth in Nigeria and Ghana using panel data from 1985 to 2018. Annual panel data sourced from World Development Indicators (WDI) was used for the study. The estimated model included trade openness (TOP), gross fixed capital formation (GFCF), exchange rate (EXGR) and inflation rate (INFR) as independent variables while real gross domestic product (RGDP) featured as dependent variable. Pooled Ordinary Least Squares (POLS) regression analysis was the methodology adopted for the study. Empirical findings revealed that trade openness and real exchange rate positively and significantly impacted economic growth using the random effect. In contrast, inflation and investment have an insignificant impact on economic growth using random effects estimated models. The study recommended that governments of these countries should implement policies and measures to manage the real exchange rate and trade effects to protect economic growth<sup>82</sup>.

The impact of trade liberalization on economic growth for Mexico, Indonesia, Nigeria and Turkey over the period 1986 to 2020 has been empirically examined. Annual data obtained from World Bank and World Development Indicator (WDI) was used for the study. The dependent variable of the study was the real gross domestic product (RGDP) per capita while gross fixed capital formation, trade openness and government final consumption expenditure were specified as the explanatory variables of interest. Augmented Dickey Fuller (ADF) unit root test, Toda and

Yamamoto causality test and Autoregressive Distributed Lag (ARDL) technique were utilized in estimating the parameters of the model. Empirical findings revealed that there was no relationship between trade liberalization and real gross domestic product per capita except for Mexico and in this situation, the significance level was at 10%. The result of the causality test showed that no causality was detected between real gross domestic product per capita and trade liberalization for Mexico and Indonesia. A bidirectional causality between real gross domestic product per capita and trade liberalization was found for Nigeria whereas a unidirectional causality from trade liberalization to real gross domestic product per capita was revealed for Turkey. The no causality results for Mexico and Indonesia means that the policy objectives of trade liberalization and economic growth can be pursued independently in both economies. In addition, the bidirectional causality detected for Nigeria suggests that the policy objectives of trade liberalization and economic growth can be pursued together in Nigeria. Furthermore, the unidirectional causality from trade liberalization to real gross domestic product per capita found for Turkey implies that she employs trade liberalization policies effectively for objectives of economic growth, thus trade liberalization causes economic growth<sup>83</sup>.

A study empirically investigated the impact of trade liberalization on economic growth in Sub-Saharan Africa. Annual panel data sourced from World Development Indicator (WDI) and Penn World Table (PWT) was used for the study. The estimated model specified real gross domestic product (RGDP) as the dependent variable while exports (EXP), imports (IMP), exchange rate (EXGR) and interest rate (INTR) were the explanatory variables of interest. Ordinary Least Squares (OLS) regression technique was employed in estimating the parameters of the model. Empirical findings showed that exports and imports exhibited statistically significant positive impacts on economic growth of the Sub-Saharan Africa countries studied. On the other hand,

exchange rate and interest rate exerted statically significant negative relationships with economic growth of these economies. The study recommended that government of countries in Sub-Saharan Africa should implement trade policies on exports and imports in order to experience major improvement in their economic growth<sup>84</sup>.

A group of eminent researchers empirically investigated the nexus between trade liberalization and economic growth in Asian Tigers' economies by applying annually panel data regression approach between the periods 1960 to 2014. Secondary data obtained from the Penn World Table (PWT) was used for the study. Real gross domestic product (RGDP) was specified as the endogenous variable while human capital index (LHCI), export price (LEX) and import price (LIM) were the exogenous variables of interest. Empirical results showed that trade liberalization exerted a statistically significant positive impact on Asian tigers' economic growth for the studied period. The Fixed Effect Model (FEM) revealed that human capital index and export price have a positive impact on economic growth, while import price negatively influenced economic growth. The Dumitrescu and Hurlin causality suggested that economic growth (LGDP) has a bi-directional causality with human capital index (LHCI) and import price (LIM), while the causality with export price (LEX) is unidirectional. The study recommended that policies relating to foreign direct investment must be reviewed to protect the local industries and the economy's output capacity so that trade liberalization in the economic activities of the Asian tigers will not be a drawback for the local industries<sup>85</sup>.

The impact of trade liberalization on economic growth was empirically analyzed in Nigeria over the period 1981 to 2018. Annual time series data sourced from Central Bank of Nigeria (CBN) statistical bulletin, World Bank Development Indicator (WDI) and Penn World Table (PWT) was utilized for the study. Economic growth (Y) was specified as a function of labour force (L),

physical capital (K), human capital (HC), trade openness (TOP), tariff rates (TRF) and real effective exchange rate (REEF). Descriptive statistics, cointegration test and Autoregressive Distributed Lag (ARDL) modelling framework were employed in estimating the parameters of the study. Empirical findings revealed that physical capital and human capital exhibited statistically significant positive impact on economic growth. Also, trade openness exerted significant positive effect on economic growth only in the short run while tariff rates and real effective exchange rate showed statistically significant negative relationships with economic growth. The study recommended that policymakers should consider alternative trade liberalization strategies such as deeper integration framework capable of promoting the development of regional human capital and consequently long-term economic growth<sup>86</sup>.

The effect of regional and non-regional trade on economic growth using annual data from Economic Community of West African States (ECOWAS) member countries for the period 2007 to 2017 has been empirically examined. The estimated model had the growth rate of GDP per capita as the dependent variable while the independent variables of interest were ECOWAS regional trade (ERT), ECOWAS non-regional trade (ENRT), inflation rate (INFR), exchange rate (EXGR), population growth rate (PGR), unemployment rate (UEMR) and gross capital formation (GCF). The data employed for the study was collected from World Development Indicators (WDI). Dynamic System Generalized Method of Moments (DSGMM) was employed in estimating the parameters of the model. Empirical results revealed that the estimated coefficient of ECOWAS regional trade was statistically significant and positive in predicting growth. Other predictors introduced into the model as controlled variables such as exchange rate, unemployment rate, population growth rate and gross capital formation displayed mixed results.

More importantly, population growth rate, unemployment rate and exchange rate inhibited economic growth while gross capital formation promoted economic growth<sup>87</sup>.

The impact of trade liberalization on economic growth and development in the kingdom of Morocco for the period 1960 to 2018 has been empirically examined. Annual time series data sourced from the Federal Reserve Bank of Saint Luis (FRED) was utilized for the study. Granger causality test and Autoregressive Distributed Lag (ARDL) were employed for determining the parameters of the model. The exogenous variables of interest were trade openness and human capital while the endogenous variable was real gross domestic product. Empirical results revealed that trade liberalization granger caused economic growth. Autoregressive Distributed Lag (ARDL) result showed that trade liberalization had no statistically significant positive impact in the short run and long run<sup>88</sup>.

Four notable authors empirically assessed the association between trade liberalization and economic growth in Nigeria over the period 1981 to 2018. Annual time series data sourced from the World Development Indicators (WDI) was employed for the study. The endogenous variable was real gross domestic product per capita growth rate (RGDPPC) while the exogenous variables of interest were trade openness (TOP), gross fixed capital formation (GFCF), inflation rate (INFR) and government final consumption expenditure (GFCEXP). Autoregressive Distributed Lag (ARDL) bounds technique to cointegration was employed in determining the parameters of the model. The result showed that trade liberalization had no statistically significant positive impact on economic growth in Nigeria. Furthermore, the results revealed the presence of unidirectional causality from real gross domestic product to trade liberalization in Nigeria. The study therefore recommended that policymakers of the government should balance its strategies of trade liberalization as a result of the inability of the economy to absorb the adverse shocks

from foreign trade, appropriate fiscal and monetary policy should be deployed by the government for the protection of the economy against foreign influences and the diversification of the structure of export is necessary to ensure more exportation of manufactured products<sup>89</sup>.

The impact of trade liberalization on economic growth and development in Nigeria over the period 1986 to 2016 has been empirically examined. Annual time series data obtained from Central Bank of Nigeria (CBN) statistical bulletins of various publications was utilized for the study. Augmented Dickey Fuller (ADF) unit root test and Autoregressive Distributed Lag (ARDL) technique were employed as econometric tools for estimating the parameters of the model. Empirical findings revealed that trade liberalization had no statistically significant positive impact on economic growth in Nigeria during the period covered. The study recommended that government should embark on massive diversification of the economy to achieve accelerated economic growth<sup>90</sup>.

The relationship between trade liberalization and economic growth in Ghana over the period 1970 to 2016 has been empirically analyzed. Annual time series data sourced from the World Development Indicator (WDI) was used for the study. Endogenous growth model in the form of an augmented production function was employed to model economic growth in order to capture the impact of trade openness (proxied for trade liberalization). The real gross domestic product was specified as the dependent variable while the explanatory variables of interest in the study were investment, trade openness, inflation rate, exchange rate and population growth of the country. Augmented Dickey Fuller (ADF) unit root test, Phillips-Perron unit root test, Granger causality test and Autoregressive Distributed Lag (ARDL) estimating techniques were employed for the study. Empirical findings revealed that trade liberalization, population growth and inflation rate exerted statistically significant negative relationships with the growth rate of the

Ghanaian economy in the long run, whilst the exchange rate had a significant and long run positive effect on economic growth. Also, investment had no impact on economic growth in the long run. The result further indicated that only inflation and population growth have significant impacts on economic growth in the short-run. The result of the Granger causality test showed that no complementary relationship between trade openness and economic growth exists in the short run in Ghana. The study recommended that government should make massive investment in physical infrastructure and human capital<sup>91</sup>.

An eminent scholar assessed the impact of trade openness on economic growth among ECOWAS countries over the period 1975 to 2017. Secondary panel data obtained from World Bank and the International Monetary Fund (IMF) was utilized for the study. Pooled mean Group (PMG) and Mean Group (MG) estimators (Dynamic panel data estimators) were employed in estimating the parameters of the model since time dimension (43 years) was more than cross sections (15 countries). The estimated model was developed using the augmented version of the Solow-Swan model that incorporated human capital. Real gross domestic product per capita (RGDPPC) was specified as the dependent variable while trade openness, labour force, gross fixed capital formation, foreign direct investment, government expenditure and exchange rate were the explanatory variables of interest. Empirical findings showed that trade openness had highly significant positive impact on growth of ECOWAS member countries in the long run. The results further revealed that trade openness was beneficial to ECOWAS member countries in the long run unlike the short run where the impact of trade openness differed across countries. The study recommended that ECOWAS member countries should improve cooperation among economic actors by using export consortia to help small and medium enterprises (SMEs) in their region access the international markets. In addition, they should combine short term and long-

term export-led growth policies such as export promotion policies aimed at enhancing productivity and technological content of domestic producers<sup>92</sup>.

The long term and short-term relationships between trade liberalization and economic growth for 13 transition countries in Europe from 1995 to 2016 has been empirically examined. The exogenous variables of interest were export (EXPT), import (IMPT), gross fixed capital formation (GFCF), foreign direct investment (FDI) and human capital (HC) while the endogenous variable was gross domestic product (GDP). Panel unit root test, Swamy panel homogeneity test, panel cointegration test, Granger panel causality test, Westerlund Error Correction Model (WECM) panel cointegration and PDOLS estimating techniques were employed for the study. Empirical results indicated that trade liberalization had a statistically significant positive impact on economic growth in both the short run and long run in the countries studied<sup>93</sup>.

The impact of trade liberalization on economic growth of Nepal from 1980 to 2013 has been empirically analyzed. Annual time series data sourced from World Development Indicators (WDI) was utilized for the study. Explanatory variables of interest included in the estimated model were real exports (X), real imports (M), total trade (TT) and trade balance (TB) while real gross domestic product (RGDP) was the explained variable. Augmented Dickey Fuller (ADF) unit root test, Johansen cointegration test, Granger causality test and Ordinary Least Squares (OLS) estimating technique were employed in analyzing the data. Empirical results showed that trade liberalization exerted a statistically significant positive relationship with economic growth of Nepal during the studied period<sup>94</sup>.

The effect of trade liberalization on economic growth in Nigeria over the period 1980 to 2015 has been empirically investigated. Secondary data sourced from Central Bank of Nigeria (CBN) statistical bulletin of various issues and World Development Indicators (WDI) was utilized for the study. Ordinary Least Squares (OLS), Johansen cointegration technique and Chows breakpoint test were the time series techniques employed for estimating the parameters of the model. Real gross domestic product was specified as the endogenous variable of the model while trade openness, foreign direct investment exports and imports were the exogenous variables of interest. Empirical results indicated that trade liberalization exhibited a statistically significant positive effect on economic growth in Nigeria, with an evidence of a long run relationship. Similarly, strong evidence was found to support structural change that took place in 1986 when free trade policy was adopted. The results further showed that export influenced economic growth negatively while import exerted positive impact on the dependent variable contrary to a priori theoretical expectation. The study recommended that an enabling environment should be provided by the government in the areas of infrastructural facilities to boost domestic production and revitalize ailing industries to enable them produce internationally competitive goods<sup>95</sup>.

The impact of trade liberalization on the economic growth of Pakistan over the period 1972 to 2014 has been empirically analyzed. Annual time series data obtained from World Development Indicator (WDI) was used for the study. The model specified economic growth as the endogenous variable while gross fixed capital formation, trade liberalization, labour force participation, inflation rate and interest rate were the exogenous or explanatory variables. Augmented Dickey Fuller (ADF) unit root test, Johansen-Juselius cointegration test and linear regression technique were employed in estimating the parameters of the model. Empirical findings revealed that trade liberalization and gross fixed capital formation have statistically

significant positive impacts on economic growth. On the other hand, inflation rate and interest rate have negative impact on economic growth. The study recommended that Pakistan government should give priority to the production and exportation of labour-intensive products to take advantage of its labour abundance. Also, there should be improvement in infrastructure, capital accumulation, and establishment of entrepreneurship and development of a secured macroeconomic framework<sup>96</sup>.

An erudite scholar empirically examined the impact of trade liberalization on economic growth of three Sub-Saharan Africa countries namely Ghana, Nigeria and Cote d'Ivoire over the period 1960 to 2015. Annual panel data sourced from World Development Indicator (WDI) was utilized for the study. Gross fixed capital formation (GFCF), government consumption expenditure (GCE), inflation rate (INF), exports (EXP), oil rents (OR) and the lag of real gross domestic product per capital growth (RGDPPCG (-1)) were used in explaining growth in real gross domestic product per capita (RGDPPCG) for the countries. Augmented Dickey Fuller (ADF) unit root test, Johansen and Juselius cointegration test and panel least squares estimating technique were employed in finding the parameters of the model. Empirical findings revealed that trade liberalization had no statistically significant positive impact on economic growth of these countries. The study recommended proper regional integration through the African continental free trade area, a healthy industrialization organization, and bridging out the infrastructural gap. Also, government of these countries should make concerted efforts in the implementation of free trade area agreements and regulations<sup>97</sup>.

The impact of multilateral trade liberalization on the economic growth rate has been empirically assessed by using an unbalanced panel dataset comprising 150 countries over the period 1995 to 2015. The control variables used in the study include domestic trade policy, financial openness,

financial development, human capital accumulation, government expenditure over GDP, inflation rate, gross fixed capital formation as a share of GDP, total population and institutional quality. The dependent variable was real per capita income growth rate. Descriptive statistics, pairwise correlations and generalized method of moment (GMM) were the estimating techniques employed in finding the parameters of the model. Empirical findings revealed that multilateral trade liberalization had a strong positive impact on economic growth in both entire sample and sub-samples<sup>98</sup>.

Two distinguished researchers analyzed the effect of trade liberalization on economic growth of Switzerland using annual data from 1990 to 2014. Secondary data obtained from World Development Indicators (WDI) was used for the study. The growth rate of gross domestic product (GDPGR) was specified as the endogenous variable while labour force (LBF), trade openness (TOP) and foreign direct investment (FDI) were the exogenous variables of interest of the study. The Autoregressive Distributed Lag (ARDL) bounds test approach was employed in estimating the parameters of the model. The empirical findings indicated that trade openness had a positive and significant effect on economic growth in Switzerland. The study recommended that there is a need for the country to put strong initiative on adding value on her exports so as to compensate for imports<sup>99</sup>.

The growth implication of trade liberalization in twelve West African (WA) countries was empirically investigated using time series data for the period of 1970 to 2011. The data used for the study was sourced from World Development Indicators (WDI), Global Development Finance (GDF) and International Financial Statistics (IFS). The model for the study specified real gross domestic product per capita (RGDPPC) as the dependent variable while real exports (REXPT), domestic investment (DINV) and trade policy (TP) were the independent variables of interest.

Methodologically, Vector Error Correction Model (VECM) was employed in estimating the parameters of the model. Empirical findings showed that trade policy variable, investment rate and export shocks have significant positive impact on economic growth in eight (8) out of twelve (12) West African countries. The implication of the result is that it is possible to stimulate economic growth in some African countries through an outward-looking strategy of export expansion<sup>100</sup>.

The impact of trade openness on economic growth of MENA countries over the period 1990 to 2014 has been empirically assessed. Annual panel data sourced from World Development Indicator (WDI) was used for the study. Gross domestic product per capita (GDPPC) was the endogenous variable while gross fixed capital formation, secondary education duration, population growth, consumption expenditure, foreign direct investment and exports were the exogenous variables of interest in the study. Empirical findings revealed that openness to international trade had a statistically significant positive impact on economic growth for the countries of MENA region. The study recommended proper diversification of their economies in order to boost the internal drivers of economic growth. In addition, strengthening the role of institutions and improving the attractiveness of high-tech foreign direct investments are critical for the trade openness to exert positive impact on economic growth of the MENA countries<sup>101</sup>.

The effect of trade liberalization on economic growth of selected twelve Middle East and North Africa (MENA) countries over the period 2000 to 2013 has been empirically examined. Annual panel data was used for this study. The model specified real gross domestic product growth rate (RGDP) as the endogenous variable while tariff rate (TR) and trade volume (TV) were the exogenous variables of interest. Dynamic panel inter-country regression approach Generalized Least Squares (GLS) was employed in estimating the parameters of the model. Empirical

findings revealed that trade volume had a statistically significant positive association with economic growth in the selected MENA countries while tariff changes exerted a statistically significant inverse relationship with economic growth<sup>102</sup>.

A group of prominent economists empirically examined the impact of trade liberalization on economic growth in two groups of developed and developing countries to account for the development level as well as income level of countries using the Sacks-Warner index of trade liberalization during 1985 to 2014. The estimated model had real gross domestic product per capita (RGDPPC) as the endogenous variable while gross fixed capital formation (GFCF), population (POP), landlockedness variable (LLOCK) and trade liberalization (TLIB) were the exogenous variables. The model was estimated within a dynamic panel framework using instrument variable approach based on Hausman Taylor (HT) estimators. Empirical results indicated that trade liberalization had a positive impact on the economic growth of the studied countries. The results further showed that developed countries were in less advantageous position due to trade liberalization compared to developing countries<sup>103</sup>.

The relationship between trade liberalization and economic growth in Nigeria for the period 1980 to 2013 has been empirically explored. Annual time series data culled from the Central Bank of Nigeria (CBN) statistical bulletin, Annual Report and Statement of Account (ARSA) and National Bureau of Statistics (NBS) was used for the study. Terms of trade (TOT), index of industrial production (IIDP), degree of openness (DOP) and exports (EXPT) were the explanatory variables of the study while real gross domestic product (RGDP) was the explained variable. The Vector Error Correction Model (VECM) technique was used for model estimation. Empirical findings showed that openness of the foreign sector and trade liberalization dummy have positive significant impact on both industrial performance and economic growth in Nigeria

within the period under review. The study recommended that Nigerian government should remove all known impediments to trade such as excessive import levies and arbitrary tariffs<sup>104</sup>.

The effects of trade liberalization on the economic growth of Bangladesh over the period 1990 to 2010 has been empirically assessed. Annual secondary data obtained from the Bangladesh Bank (BB), Ministry of Finance of Bangladesh (MFB), Bangladesh Bureau of Statistics (BBS) and World Development Indicators (WDI) was used for the study. The estimated model included exchange rate (EXGR), export earnings (EXPTE), import earnings (IMPE) and terms of trade (TOT) as regressors while real gross domestic product (RGDP) was the regressed. Ordinary Least Squares (OLS) multiple regression analysis was employed in estimating the parameters of the model. The results showed that the inward policy of trade liberalization reduced import while the forward policy increased the employment, production and export. Finally, trade liberalization policy exhibited a statistically significant positive impact on economic growth of Bangladesh<sup>105</sup>.

The causal relationship between trade liberalization and economic growth of five countries namely Brazil, Russia federation, India, China and South Africa for a period spanning from 1990 to 2014 has been empirically analyzed. A balanced panel data sourced from World Bank Development Indicators (WBDI), International Monetary Fund (IMF), International Financial Statistics (IFS) and also from the Central Bank of respective countries was utilized for the study. Net foreign direct investment (NFDI), human capital formation (HCF), gross domestic fixed capital formation (GDFCF) and exchange rate (EXGR) were included as determinants of economic growth in the BRICS countries. Generalized Method of Moment (GMM) estimating technique was employed in finding the parameters of the model. Empirical findings revealed that trade liberalization proxy by trade openness exerted a statistically significant positive impact on

economic growth rate. The study suggested that developing countries should develop internal institutions in order to follow the path of BRICS economies to economic recognition<sup>106</sup>.

A notable author investigated the impact of trade liberalization and shocks on economic growth of Nigeria covering the period 1961 to 2012. Secondary data sourced from the Central Bank of Nigeria (CBN) statistical bulletin, National Bureau of Statistics (NBS) and the World Bank (WB) publications was utilized for the study. The study modeled trade openness (TOP), manufacturing output (MANQ), government expenditure (GEXP), exchange rate (EXGR) and inflation rate (INFR) as the independent variables while real gross domestic product (RGDP) was the dependent variable. The Vector Autoregressive (VAR) methodology was applied to estimate the parameters of the model. Empirical findings revealed that the causality runs from exchange rate, trade openness, manufacturing output, and the size of public sector to output growth. Also, shocks from trade openness influenced the output growth significantly, implying that volume of international trade affected output of Nigeria. The authors recommended that monetary authority should ensure price stability and efforts should be geared towards boosting the manufacturing sector<sup>107</sup>.

The impact of trade liberalization on the economic growth of the Nigerian economy over the period 1970 to 2012 has been empirically examined. Secondary data obtained from Central Bank of Nigeria (CBN) statistical bulletin, National Bureau of Statistics (NBS) and World Development Indicators (WDI) was employed for the study. The estimated model for the study included trade liberalization (TROP), exchange rate (EXGR), type of regime (REGIM) and structural adjustment program (BFSAP) as explanatory variables while real gross domestic product (RGDP) was the explained variable. The Ordinary Least Squares (OLS) regression analysis was used for estimating the parameters of the model. Empirical results indicated that

trade liberalization proxy by trade openness had a statistically significant negative impact on economic growth. While other variables such as exchange rate, regime of administration and structural adjustment program showed positive non-significant relationship with economic growth. The study recommended the adoption of trade protectionism policy and currency devaluation in order to boost economic growth<sup>108</sup>.

The effect of trade liberalization on economic growth in Nigeria over the period 1971 to 2012 has been empirically investigated. Annual time series data collected from the Central Bank of Nigeria (CBN) statistical bulletin was utilized for the study. The independent variables of the study were imports (IMPT), exports (EXPT), foreign direct investment (FDI), exchange rate (EXGR) and inflation rate (INFR) while real gross domestic product (RGDP) was the dependent variable. Ordinary Least Squares (OLS) multiple regression analysis was the methodology adopted to estimate the parameters of the model. Empirical findings revealed that imports and exports significantly and positively affected economic growth in Nigeria. The study concluded that trade liberalization had a statistically significant positive impact on economic growth during the reviewed period. The authors recommended the adoption of an inward-looking strategy and provision of an enabling environment for domestic production and exports<sup>109</sup>.

The effect of trade liberalization on economic growth in Tanzania has been empirically analyzed over the period 1970 to 2010. Annual time series data obtained from the Bank of Tanzania was used for the study. The estimated model specified exports (EXPT) and imports (IMPT) as the exogenous variables while real gross domestic product (RGDP) was the endogenous variable. Ordinary Least Squares (OLS) approach was adopted to estimate the regression equations. Empirical results indicated that trade openness had a positive and significant effect on economic growth in Tanzania. However, this effect was relatively greater during the closed economy

compared to the open economy period. The study recommended, among other things, development of more domestic industries, attracting more investors in the economy and elimination of unnecessary tariffs<sup>110</sup>.

A renowned economist examined the impact of trade liberalization policy on growth rate of real gross domestic product of Ghana over the period 1986 to 2010. Annual time series data gathered from World Development Indicators (WDI) was utilized for the study. Trade openness (TOP), capital stock (CAPS), population (POP), foreign direct investment (FDI) and inflation rate (INFR) were the explanatory variables of interest in the study while real gross domestic product growth rate (RGDPGR) was the explained variable. Autoregressive Distributed Lag (ARDL) technique was employed to estimate the long run and short run parameters for the specified model. Empirical results showed that trade liberalization exhibited a statistically significant positive relationship with real GDP in the long run in Ghana. Capital stock and population were found to have positive impacts on real GDP growth in both the long run and short run while foreign direct investment was found to have a negative impact on real GDP growth. The study recommended the provision of tax holidays and tax relieves to investors who wish to go into agriculture and manufacturing sectors as well as improvement in the infrastructural base of the country<sup>111</sup>.

### **2.3.5 Trade Liberalization, Human Capital Development and Economic Growth**

There is paucity of empirical literature on the relationship among trade liberalization, human capital development and economic growth in both advanced and developing economies of the world. The impact of trade liberalization on the human capital development and economic growth was empirically examined by using panel data analysis. Selected Asian countries were grouped into lower income countries and higher income countries. The lower income countries

were India, Indonesia, Sri Lanka and Pakistan while Singapore, South Korea, Japan and Malaysia were classified as higher income countries for comparative analysis. The panel data used for this study was sourced from World Development Indicators (WDI) of the World Bank and spanning from 1981 to 2012. Two estimated models were developed for this study. The first model was developed to examine the impact of trade liberalization on the human capita while the second model was formulated to investigate the direct impact of trade liberalization on the economic growth. The estimated model for the study had gross fixed capital formation (GFCF), secondary school enrolment (SSE), trade openness (TOP), dependency ratio (DEP), per capita income (PCI) and labour force (LBF) as independent variables while real gross domestic product (RGDP) was the dependent variable. The Fixed Effect Model (FEM) was employed for the study. Empirical results showed that both developed and developing countries enjoyed trade led growth for the selected countries. The impact of trade liberalization on human capital was found to be positive for both groups but was significant for the developed countries due to well-trained human capital. The fruits of trade liberalization in form of increased productivity of human capital have not been achieved in developing countries due to their less trained and less skilled workers<sup>112</sup>.

The causal links among trade liberalization, human resource development and economic growth in Nigeria spanning between 1980 and 2009 has been empirically examined with a view to identifying the nexus connecting these three variables. Annual time series data obtained from the Central Bank of Nigeria (CBN) statistical bulletin of various publications and International Financial Statistics (IFS) published by the International Monetary Fund (IMF) was used for the study. The model for the study specified degree of openness (DOP), money supply (MS), industrial production (IPROD), public expenditures (PEXP), consumer price index (CPI) and

exchange rate (EXGR) as exogenous variables while real gross domestic product (RGDP) was the endogenous variable. Vector Auto regression (VAR) model was the estimating technique employed for the study. Empirical findings revealed that economic growth granger-caused both poverty level and trade liberalization in Nigeria. Besides, trade liberalization equally predicted poverty level. The study recommended initiation of strategies by the government that would further boost economic growth in Nigeria in order to alleviate poverty and to derive maximum benefits from trade liberalization<sup>113</sup>.

The nexus between trade openness, human capital and economic growth of seventeen countries in the Middle East and North Africa (MENA) in the period 1990 to 2014 has been empirically investigated. Annual time series data obtained from World Bank (WB) database was used for the study. The estimation was based on two econometric models namely random and fixed effects models. The random effects model measured the trade openness on human capital while the fixed effects model measured the trade openness impact on economic growth. The first estimated model had human capital (HC) as the dependent variable while the independent variables were trade liberalization (TLIB), dependency ratio (DER), and the growth of per capita income (GPCI). For the second estimated model, the dependent variable was the growth of the real gross domestic product (GRGDP) while the independent variables of interest consisted of gross capital formation (GCF), labour force (LABF), human capital (HC) and trade openness (TOP). Empirical findings revealed that trade openness impacted human capital negatively but insignificantly. Moreover, trade openness impacted economic growth positively but insignificantly. In addition, human capital impacted economic growth negatively and significantly. The study recommended that the countries of the MENA region must invest in human capital in order to benefit from trade openness<sup>114</sup>.

The relationships among trade openness, capital formation and economic growth in India over the period 1993 to 2019 has been empirically investigated. Annual time series data obtained from World Development Indicators (WDI) of World Bank was utilized for the study. The estimated model specified real gross domestic product (RGDP) as the dependent variable while secondary school enrolment (SSE), real gross fixed capital formation (RGFCF) and trade openness index (TOI) were the independent variables of interest. Descriptive statistics, Augmented Dickey Fuller (ADF) unit root test, Phillips-Perron (PP) unit root test and Autoregressive Distributed Lag (ARDL) bound testing approach were employed in estimating the parameters of the model. Empirical findings revealed that trade openness had a negative relation with economic growth in India, both in the short run and long run. The study suggested the adoption of policies that can boost human and physical capital formation so that the economy can grow to the threshold level required to reap the benefits of trade openness<sup>115</sup>.

The impact of trade openness and human capital on economic growth in Nigeria from 1981 to 2020 has been empirically examined. Annual time series data sourced from the Central Bank of Nigeria (CBN) statistical bulletin was used for the study. The exogenous variables of interest in the study were government recurrent expenditure on education (GREE), government capital expenditure on education (GCEE), government recurrent expenditure on health (GREH), government capital expenditure on health (GCEH), trade openness (TOP) and exchange rate (EXGR) while nominal gross domestic product (NGDP) was the endogenous variable. Descriptive statistics test, Augmented Dickey Fuller (ADF) unit root test, Johansen cointegration test and Error Correction Mechanism (ECM) techniques were employed for the analysis. The result revealed that capital component of government expenditure on health and education were negatively related to economic growth during the period of investigation. However, the recurrent

component of government expenditure on both education and health as well as trade openness were positively related to economic growth for the period. The study recommended among others that government should increase funding in education and health sectors to meet the 20% to 15% benchmark recommended by UNESCO and WHO<sup>116</sup>.

A group of eminent scholars empirically analyzed the impact of trade openness and human capital on economic growth in 19 Asian countries from 1985 to 2017. Panel time series data gathered from World Development Indicators (WDI) of World Bank was utilized for the study. The model for the study included tertiary education (TE), urban population (UPOP), total population (TPOP), labour force participation (LFP), trade openness (TOP) and foreign direct investment (FDI) as control variables while gross domestic product per capita (GDPPC) featured as the controlled variable. Augmented Dickey Fuller (ADF) panel unit root test, Fully Modified Ordinary Least Squares (FMOLS), Dynamic Ordinary Least Squares (DOLS) and Dumitrescu and Hurlin (DH) causality test were employed in determining the parameters of the model. The results showed that trade openness and human capital have a significant and positive relationship while labour force participation has a negative effect on economic growth in Southern Asia, and in the case of Western Asia, the impact is positive<sup>117</sup>.

The impact of trade openness, investment and human capital on economic growth of Pakistan over the period 1980 to 2012 has been empirically investigated. Secondary data sourced from World Development Indicators (WDI) of World Bank was used for the study. The estimated model specified gross domestic product (GDP) as the dependent variable while trade openness (TOP), gross fixed capital formation (GFCF) and secondary school enrolment (SSE) were the independent variables of interest. Augmented Dickey Fuller (ADF) unit root test, Johansen cointegration test, Error Correction Model (ECM) and Vector Autoregressive (VAR) technique

were employed in estimating the parameters of the model. Empirical findings indicated that trade openness, investment and human capital development exerted a statistically significant positive impact on economic growth of Pakistan. The study recommended that government of Pakistan should sustain macroeconomic stability in all the economic sectors particularly in Agriculture and industry and should introduce investment-friendly business environment<sup>118</sup>.

The causal links among trade liberalization, human resource development and economic growth in Nigeria spanning between 1980 and 2009 was empirically examined with a view to identifying the nexus connecting these three variables. The estimated model specified real gross domestic product (RGDP) as the dependent variable while secondary school enrolment (SSE), real gross fixed capital formation (RGFCF) and trade openness index (TOI) were the independent variables of interest<sup>119</sup>.

Also, the impact of trade openness and human capital on economic growth in Nigeria from 1981 to 2020 was empirically examined. The exogenous variables of interest in the study were government recurrent expenditure on education (GREE), government capital expenditure on education (GCEE), government recurrent expenditure on health (GREH), government capital expenditure on health (GCEH), trade openness (TOP) and exchange rate (EXGR) while nominal gross domestic product (NGDP) was the endogenous variable<sup>120</sup>.

## **2.4 Conceptual Framework**

Trade liberalization involves the elimination or reduction of tariff barriers and non-tariff restrictions on flow of goods and services across nations. The resultant effects of trade liberalization include massive foreign capital inflows, increase in exports volume, escalation of importation of capital goods, knowledge transfer and technology transfer. These effects should

be regarded as the five channels through which trade liberalization influences human capital development for it to have meaningful impact on economic growth.

Regarding the increase in exports volume channel, the removal of exports duties on exportable goods and services of SSA countries would serve as incentives for the export's goods producers owing to the rise in their profitability level. Increased profit level would engender high levels of investment and saving by the exports producers, resulting in higher level of employment of labour and other productive resources. This gives room for high productivity of exportable goods, leading to more production and increase in regional output. Increased output of exportable goods will pave way for growth of national incomes of these countries. Higher national incomes give impetus for investment in education, training and health of workforce. This results in high level of human capital development in these countries which serves as a significant stimulator of economic growth.

The second channel of transmission of trade liberalization is the capital accumulation into SSA economies. Trade liberalization increases capital inflows and this takes several forms. The capital inflows are largely divided into official development assistance or public capital inflows consisting of grants, loans and technical assistance, and private capital inflows comprising of foreign direct investment (FDI) and remittances which represent important sources of capital inflows which fill the investment gap in the economy. Capital inflow escalates investment level in the economy which leads towards more employment opportunities for jobless people, raises production level, creates more output, increases market size and thus resulting in higher gross domestic product. The national incomes of the affected SSA countries will rise, giving them the opportunity of investing in education, skill training, health, creativity and technical skills which constitute human capital development. The concomitant effect of high quality of human capital

development in the SSA countries are enhancement of efficiency of production, increased output of goods and services, and higher economic growth rates.

The third channel through which trade liberalization affects human capital development in order to impact positively on economic growth is increase in importation of modern capital goods into the SSA countries. Elimination of import taxes on latest capital goods coming from advanced countries creates an incentive for importers in SSA countries to be able to import more capital goods into the region. The higher the quantity and quality of new capital goods available in SSA region, the higher would be the efficiency of production and output, *ceteris paribus*. Increased regional output raises regional national income which paves way for more investment and savings by these economies. Governments of SSA countries would have resources to be invested on human capital development which helps to stimulate economic growth in the region.

The fourth channel through which trade liberalization influences human capital development for it to be positively related to economic growth in SSA countries is knowledge transfer from advanced economies. The phrase knowledge transfer refers to the exchange of information, ideas, abilities and experience between people, departments, companies and international organizations. There are three types of knowledge transfer namely explicit knowledge, implicit knowledge and tacit knowledge. Explicit knowledge is one that is easily shared and transferred through writing or speaking. It is information that can easily be picked up from talking to someone, reading a book looking something up online. Implicit knowledge, on the other hand, is obtainable or derivable from experience of employees and employers while tacit knowledge is knowledge that is acquired from personal wisdom and insights. In a rapidly evolving knowledge economy, a highly skilled workforce is essential for sustainable economic growth. Indeed, knowledge is nowadays considered as a driving force for enhancing productivity, promoting economic growth

and development. There are several methods of transferring knowledge which include training sessions, mentoring, job shadowing, coaching, documentation, collaborative work and modeling. International collaboration through trade liberalization enables SSA countries to invest in human capital development by exchanging expertise, educational programs and training opportunities. The accompanying or associated effect of knowledge transfers in SSA countries include fostering of innovation, enhancement of regional production efficiency, higher regional output and accelerated economic growth.

The fifth channel of transmission through which trade liberalization affects human capital development for it to have meaningful impact on economic growth rates of SSA countries is technology transfer. The movement of data, designs, inventions, materials, software, technical knowledge or trade secrets from one organization to another or from advanced countries to the developing world is what is known as technology transfer. There are three basic types of technology transfer viz: technology push, market pull and technological spillover. Technology push takes place when a company or research institution patents its invention and licenses it to other companies while market pull refers to the development of new technologies in response to demand for a product or service.

Technological spillover, on the other hand, connotes the unintentional technological benefits to firms that come from the research and development efforts of other firms without the costs being shared. Technology transfer has several mechanisms of transmission which include cooperative research and development agreement, licensing agreement, memorandum of understanding and partnership intermediary agreement. Pursuance of outward oriented trade policies enables developing countries to have access to the advanced techniques of production available in the developed economies. The concomitant effects of exposure to modern technology from advanced

economies by SSA countries include upgrading of their technological capabilities, fostering innovation and enabling regional domestic industries to remain competitive on a global scale. In addition, modern technology also brings about enhancement of efficiency of production, increased output of goods and services and higher economic growth rates.

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## 2.5 Theoretical Framework

The endogenous growth theory is considered to be an extension of some other prominent theories of economic growth that existed before it. Harrod and Domar growth theory posits that investment plays a critical role in the process of stimulating economic growth<sup>8</sup>. Investment is said to have a dual purpose. First, it generates income and secondly it is used for augmenting the productive capacity of the economy through increase in capital stock. The former is known as the ‘demand effect’ while the latter is the ‘supply effect’ of investment. Thus, as long as net investment is taking place, real income and output will, other things being equal, continue to increase or expand. Robert Solow growth theory expanded the Harrod-Domar formulation by adding a second factor, labour and introduced a third independent variable, that is, technology to the growth equation<sup>9</sup>. He developed his neoclassical growth model by explaining a production function that allows the substitution of capital and labour. The conventional neoclassical theory, as modeled by Solow maintains that economic growth in any country is dependent on accumulated physical capital and an expansion of the labour force, in conjunction with an exogenous factor, technological progress which makes physical capital and labour more productive.

Solow’s model of economic growth is premised on the notion that output (Y) in an economy is produced by a combination of labour (L) and capital (K), under constant returns, so that doubling input results in doubling output. Thus, the quantity of output is also determined by the efficiency of productivity (A) otherwise called “technical progress” with which capital and labour is used.

Mathematically; 
$$Y = A \cdot f(L, K) \quad (2.1)$$

The Solow neoclassical growth model uses a standard Cobb-Douglas production function given

as: 
$$Y_t = A_t K_t^\alpha L_t^{1-\alpha} \quad 0 < \alpha < 1$$

(2.2)

In equation (3.1) above, Y is Gross Domestic Product, K is stock of capital, L is labour and A represents a measure of productivity efficiency, assumed to grow at exogenous rate (n). The share of capital in output production is denoted by the symbol ( $\alpha$ ) while  $1-\alpha$  represents the share of labour in output production, but  $\alpha$  has a value that ranges between zero and one such that  $\alpha + 1 - \alpha = 1$ . The model further makes the following assumptions:

$$L_t = L_0 e^{nt}$$

(2.3)

$$A_t = A_0 e^{nt}$$

(2.4)

$$L_t A_t = e^{nt} (L_0 A_0) =$$

$$L_0 A_0 e^{nt} = \varphi e^{nt}$$

(2.5)

where  $\varphi = L_0 A_0$ , means the effective units of labour, which grows at rate n. However, the new endogenous growth theory came into existence due to the omissions and deficiencies in the Solow neoclassical growth model. The theory states that the long-run growth rate of an economy is dependent on endogenous factors as against exogenous factors identified by the neoclassical growth theory. This theory maintains that the growth in gross domestic product is a natural consequence of long run equilibrium. The theory elucidates the causative factors of both growth rate differentials across countries and a greater proportion of the growth observed. Endogenous growth theory repudiates or dumps the neoclassical assumption of diminishing marginal returns to capital investments, allowing increasing returns to scale in aggregate production and frequently focusing on the role of externalities in determining the rate of return on capital investments. By assuming that public and private investments in human capital generate external economies and productivity improvements that offset the natural tendency for diminishing

returns, endogenous growth theory explains the existence of increasing returns to scale and the divergent long-term growth patterns among countries. Thus, the theory lays great emphasis on technical progress resulting from the rate of investment, the size of the capital stock and the stock of human capital as main determinants of economic growth in any economy.

Due to the shortcomings of Solow's growth model, the study adopted the empirical framework of the augmented neoclassical growth theory as suggested by Mankiw, Romer and Weil (1992) that incorporated human capital. Thus, the Cobb-Douglas production function is stated as

$$Y_{it} = A_{it}f(K_{it}^{\alpha}H_{it}^{\beta}L_{it}^{1-\alpha-\beta}) \quad (2.6)$$

where

$Y_{it}$ = Real gross domestic output in country i at time t

$K_{it}$ = Stock of physical capital in country i at time t

$L_{it}$ = Labour population growth in country i at time t

$H_{it}$ = Stock of human capital in country i at time t. t is time dimension and i represents cross sections.  $0 < \alpha < 1$  is the elasticity of output with respect to capital and elasticity of output with respect to labour.  $A_{it}$  connotes labour knowledge or augmenting technology.

Transforming the model by taking natural logarithm, equation (3.6) becomes:

$$\ln Y_{it} = \alpha \ln K_{it} + \beta \ln H_{it} + (1 - \alpha - \beta) \ln L_{it} + \eta_i + v_{it}$$

(2.7)

## 2.6 Summary of Gaps in Literature Reviewed

This study attempts to fill the gaps identified in the literature which are enumerated and expatiated below. It is quite different from other studies reviewed in the following ways. First,

previous studies did not investigate the impact of trade liberalization on human capital development in SSA countries. This study will unveil the effect of different trade liberalization policies being pursued by SSA governments over the years on their level of human capital development. Second, other studies did not examine the interactive effect between trade liberalization and human capital development on economic growth of SSA countries, they only restricted themselves to the impact of trade liberalization on economic growth alone. A lot of explanatory variables not examined by previous studies are included in this study. These are technology, net migration, foreign direct investment, net official development assistance, gross fixed capital formation, life expectancy rate, infant mortality rate, population growth rate, government total expenditure on education, government total expenditure on health, labour force, and inflation rate. Some of these variables were omitted from previous studies.

Third, previous studies covered few countries in SSA in their analyses while this study covers large sample (forty-five countries) out of forty-eight countries. No existing study in this area has investigated the linkage among trade liberalization, human capital development and economic growth using such a large sample. Fourth, this study will also contribute to the growing literature by investigating whether the level of human capital development is influenced by the degree of trade liberalization which to the best of the researcher's knowledge, previous studies did not examine. The principal variables of interest that will be examined in this model include human capital development, trade liberalization, exports, imports, foreign direct investment, gross fixed capital formation, technology transfer and net migration.

Fifth, there will be a methodological departure from previous studies, some of the studies reviewed employed elementary econometric techniques in their analyses of data due to their country-specific nature. Such estimating techniques include Fully Modified Ordinary Least

Squares (FMOLS), Error Correction Mechanism (ECM), Autoregressive Distributed Lag (ARDL) bound testing approach and others. Advanced econometric methodology will be utilized in estimating the parameters of the numerous models developed for this study. These are Pooled Ordinary Least Square (POLS), Panel Fixed Effect Model (PFEM) and Generalized Method of Moments (GMM) techniques. Moreover, the recently released human capital index (HCI) provided by the Penn State World Tables which is considered a superior measure in capturing multidimensional facets of human capital will be used in investigating the trade liberalization-human capital development nexus, hence reflecting the novelty of this study.

Furthermore, this study goes beyond investigating the enhancing impact of trade liberalization on human capital development to economic growth and further considers other plausible 'interactive variables' such as foreign direct investment, net migration, infant mortality and gross fixed capital formation.

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## **Chapter Three**

### **Methodology**

This chapter of the study focused on the estimation methodologies employed to investigate the relationship between trade liberalization, human capital development and economic growth in Sub-Saharan African countries. It covers the specifications of empirical models, a priori expectations, data sources, data measures, estimating methodologies, and diagnostic assessments.

#### **3.1 Model Specification**

The empirical studies on growth effects of trade liberalization have followed several approaches. Most of the recent studies followed either cross-section or panel approaches, usually with large samples of countries<sup>1,2,3,4,5,6,7</sup>. The endogenous growth theory is considered to be an extension of some other prominent theories of economic growth that existed before it. Harrod and Domar growth theory posits that investment plays a critical role in the process of stimulating economic growth<sup>8</sup>. Investment is said to have a dual purpose. First, it generates income and secondly it is used for augmenting the productive capacity of the economy through increase in capital stock. The former is known as the ‘demand effect’ while the latter is the ‘supply effect’ of investment. Thus, as long as net investment is taking place, real income and output will, other things being equal, continue to increase or expand. Robert Solow growth theory expanded the Harrod-Domar

formulation by adding a second factor, labour and introduced a third independent variable, that is, technology to the growth equation<sup>9</sup>. He developed his neoclassical growth model by explaining a production function that allows the substitution of capital and labour. The conventional neoclassical theory, as modeled by Solow maintains that economic growth in any country is dependent on accumulated physical capital and an expansion of the labour force, in conjunction with an exogenous factor, technological progress which makes physical capital and labour more productive.

Solow's model of economic growth is premised on the notion that output (Y) in an economy is produced by a combination of labour (L) and capital (K), under constant returns, so that doubling input results in doubling output. Thus, the quantity of output is also determined by the efficiency of productivity (A) otherwise called "technical progress" with which capital and labour is used.

Mathematically; 
$$Y = A \cdot f(L, K) \quad (3.1)$$

The Solow neoclassical growth model uses a standard Cobb-Douglas production function given as:

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha} \quad 0 < \alpha < 1 \quad (3.2)$$

In equation (3.1) above, Y is Gross Domestic Product, K is stock of capital, L is labour and A represents a measure of productivity efficiency, assumed to grow at exogenous rate (n). The share of capital in output production is denoted by the symbol ( $\alpha$ ) while  $1-\alpha$  represents the share of labour in output production, but  $\alpha$  has a value that ranges between zero and one such that  $\alpha + 1 - \alpha = 1$ . The model further makes the following assumptions:

$$L_t = L_0 e^{nt} \quad (3.3)$$

$$A_t = A_0 e^{nt} \quad (3.4)$$

$$L_t A_t = e^{nt}(L_0 A_0) = L_0 A_0 e^{nt} = \varphi e^{nt}$$

(3.5)

Where  $\varphi = L_0 A_0$ , means the effective units of labour, which grows at rate  $n$ . However, the new endogenous growth theory came into existence due to the omissions and deficiencies in the Solow neoclassical growth model. The theory states that the long-run growth rate of an economy is dependent on endogenous factors as against exogenous factors identified by the neoclassical growth theory. This theory maintains that the growth in gross domestic product is a natural consequence of long run equilibrium. The theory elucidates the causative factors of both growth rate differentials across countries and a greater proportion of the growth observed. Endogenous growth theory repudiates or dumps the neoclassical assumption of diminishing marginal returns to capital investments, allowing increasing returns to scale in aggregate production and frequently focusing on the role of externalities in determining the rate of return on capital investments. By assuming that public and private investments in human capital generate external economies and productivity improvements that offset the natural tendency for diminishing returns, endogenous growth theory explains the existence of increasing returns to scale and the divergent long-term growth patterns among countries. Thus, the theory lays great emphasis on technical progress resulting from the rate of investment, the size of the capital stock and the stock of human capital as main determinants of economic growth in any economy.

Due to the shortcomings of Solow's growth model, the study adopted the empirical framework of the augmented neoclassical growth theory as suggested by Mankiw, Romer and Weil (1992) that incorporated human capital. Thus, the Cobb-Douglas production function is stated as:

$$Y_{it} = A_{it} f(K_{it}^\alpha H_{it}^\beta L_{it}^{1-\alpha-\beta}) \quad (3.6)$$

where

$Y_{it}$  = Real gross domestic output in country  $i$  at time  $t$

$K_{it}$  = Stock of physical capital in country  $i$  at time  $t$

$L_{it}$  = Labour population growth in country  $i$  at time  $t$

$H_{it}$  = Stock of human capital in country  $i$  at time  $t$ .  $t$  is time dimension and  $i$  represents cross sections.  $0 < \alpha < 1$  is the elasticity of output with respect to capital and elasticity of output with respect to labour.  $A_{it}$  connotes labour knowledge or augmenting technology.

Transforming the model by taking natural logarithm, equation (3.6) becomes:

$$\ln Y_{it} = \alpha \ln K_{it} + \beta \ln H_{it} + (1 - \alpha - \beta) \ln L_{it} + \eta_i + v_{it}$$

(3.7) Trade liberalization and human capital variables are made up of a set of variables which are specified in equations (3.8) and (3.9) below:

$$TLIB = (NFDI, GCF, NMGR, NODA, TPOP, INFR) \quad (3.8)$$

$$HCD = (GTEE, GTEH, PSER, SSER, LER, IMR, LABF) \quad (3.9)$$

In equation (3.8), TLIB denotes trade liberalization (total trade to GDP ratio) and its associated variables which include NFDI indicates net foreign direct investment; GCF refers to gross capital formation; NMGR indicates net migration; NODA denotes net official development assistance; TPOP indicates total population and INFR connotes inflation rate. Equation (3.9) is made up of human capital development (HCD) and its associated variables viz: GTEE connotes government total expenditure on education; GTEH stands for government total expenditure on health; PSE means primary school enrolment rate; SSE denotes secondary school enrolment rate; LER stands for life expectancy rate; IMR refers to infant mortality rate and LABF connotes labour force.

### 3.1.1 Empirical Model of Trade liberalization and Human Capital Development

The first model analyzes the influence of trade liberalization on human capital development in the selected countries in Sub-Saharan Africa region. In other words, do outward-oriented trade policies being pursued by SSA countries over the years have positive or negative impact on their level of human capital development. The explained and explanatory variables of interest include human capital development (HCD), trade liberalization (TLIB), net foreign direct investment (NFDI), gross capital formation (GCF), net migration (NMGR) and net official development assistance (NODA). The mathematical expression of the above enumerated variables is symbolically given below:

$$HCDI = F(TLIB, NFDI, GCF, NMGR, NODA) \quad (3.10)$$

The econometric form of this mathematical expression of the impact of trade liberalization on human capital development is shown below:

$$HCDI_{it} = \Delta_{1it} + \Delta_{2it}TLIB + \Delta_{3it}NFDI + \Delta_{4it}GFCF + \Delta_{5it}NMGR + \Delta_{6it}NODA + U_{it} \quad (3.11)$$

The parameter estimates  $\Delta_2$ ,  $\Delta_3$ ,  $\Delta_4$ ,  $\Delta_5$ , and  $\Delta_6$  are expected to exert positive impact on the level of human capital development. Additionally, the coefficients  $\Delta_2$  to  $\Delta_6$  represent the elasticities of the variables because they measure the rate of change.  $\Delta_{1i}$  is the intercept of the above model.

### 3.1.2 Empirical Model of Trade Liberalization and Economic Growth

The second model in this study examines the effect of trade liberalization on economic growth rates of the selected Sub-Saharan African countries. According to endogenous growth model which can be regarded as an extension of the Solow model, it assumed that aside labour and capital, economic growth is influenced by several other microeconomic and macroeconomic variables. In order to achieve the second specific objective of this study, it is assumed that economic growth is influenced by real gross domestic product (RGDP), gross capital formation

(GCF), labour force (LABF), trade liberalization (TLIB), net foreign direct investment (NFDI), total population growth (TPOP) and inflation rate (INFR). The above endogenous and exogenous variables can be expressed in mathematical form as shown below:

$$RGDP = F(GFCF, LABF, TLIB, NFDI, TPOP, INFR) \quad (3.12)$$

The econometric transformation of the mathematical form of equation 3.12 is given below:

$$GRGDP_{it} = \beta_{1i} + \beta_{2i}GFCF_{it} + \beta_{3i}LABF_{it} + \beta_{4i}TLIB_{it} + \beta_{5i}NFDI_{it} + \beta_{6i}TPOP_{it} + \beta_{7i}INFR_{it} + E_{it} \quad (3.13)$$

In terms of a-priori theoretical expectation about the signs and size of the exogenous variables of the model, the parameter estimates  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ ,  $\beta_5$  and  $\beta_6$  are expected to exhibit positive relationships with economic growth while  $\beta_7$  should have negative sign.

### 3.1.3 Empirical Model of Human Capital Development and Economic Growth

The third model investigates the impact of human capital development on economic growth of the selected countries in Sub-Saharan Africa region. In other words, do massive investments made by SSA countries on human capital development over the years have positive or negative impact on their rates of economic growth. The explained and explanatory variables of interest include gross domestic product (GDPG), labour force (LABF), government total expenditure on education (GTEE), government total expenditure on health (GTEH), human capital index (HCDI), secondary school enrolment rate (SSER), primary school enrolment rate (PSER), life expectancy rate (LER), infant mortality rate (IMR) and inflation rate (INFR). The mathematical expression of the above enumerated variables is symbolically given below:

$$GDPG = F(LABF, GTEE, GTEH, HCDI, PSER, SSER, LER, IMR, INFR) \quad (3.14)$$

The econometric form of this mathematical expression of the impact of human capital development on economic growth is shown below:

$$GRGDP_{it} = \Delta_{1i} + \Delta_{2it}LABF + \Delta_{3it}GTEE + \Delta_{4it}GTEH + \Delta_{5it}PSE + \Delta_{6it}SSE + \Delta_{7it}LER + \Delta_{8it}IMR + \Delta_{9it}NFR + U_{it} \quad (3.15)$$

The parameter estimates  $\Delta_2$ ,  $\Delta_3$ ,  $\Delta_4$ ,  $\Delta_5$ ,  $\Delta_6$ , and  $\Delta_7$  are expected to exert positive impact on economic growth while  $\Delta_8$  and  $\Delta_9$  are to influence economic growth negatively. Additionally, the coefficients  $\Delta_2$  to  $\Delta_{10}$  represent the elasticities of the variables because they measure the rate of change.  $\Delta_{1i}$  is the intercept of the above model.

### 3.1.4 Empirical Model of Trade Liberalization, Human Capital Development and Economic Growth

Based on the theoretical and conceptual frameworks on the effect of trade liberalization and human capital development on economic growth of the selected Sub-Saharan African countries, an endogenous growth model that incorporates trade liberalization and human capital is specified. The specification allows for the identification of the channels through which trade liberalization, human capital development and other policy interventions affect economic growth of the SSA region over time. The dependent and independent variables of interest for the model specification include real gross domestic product (GDPG), trade liberalization (TLIB), exports (EXPT), imports (IMPT), net foreign direct investment (NFDI), gross capital formation (GCF), labour force (LABF), government total expenditure on education (GTEE), government total expenditure on health (GTEH), human capital development index (HCDI), primary school enrolment (PSE), secondary school enrolment (SSE), life expectancy rate (LER), infant mortality rate (IMR) and inflation rate (INFR). Consequently, this study specifies the trade liberalization-human capital –growth model explicitly in mathematical and econometric form as follows:

$$GRGDP = F(TLIB, NFDI, GCF, LABF, GTEE, GTEH, HCDI, PSSE, SSER, LER, IMR, INFR) \quad (3.16)$$

The econometric form of the above mathematical model of the combined effect of trade liberalization and human capital on economic growth of selected Sub-Saharan African countries is depicted below:

$$GRGDP_{it} = \alpha_{1i} + \alpha_{2i}GRDGPI_{it-1} + \alpha_{3i}TPIB_{it} + \alpha_{4i}GTEE_{it} + \psi(TLIB \times HCDI)_{it} + \alpha_{5i}FDINV_{it} + \alpha_{6i}GCF_{it} + \alpha_{7i}LABF_{it} + \alpha_{8i}GTEH_{it} + \alpha_{9i}PSE_{it} + \alpha_{10i}SSE_{it} + \alpha_{11i}LER_{it} + \alpha_{12i}IMR_{it} + \alpha_{13i}INFR_{it} + \mu \quad (3.17)$$

The specification of equation (3.17) is aided by the endogenous growth theory and empirical studies as discovered from the literature. In this regard, the dependent variable in the growth equation is the GRGDP, which is the growth rate of the value of the final goods and services produced within the territorial boundary of a country in a year when valued at constant prices. This is commonly used as an indicator of economic growth. The higher the level of growth rate of real gross domestic product, the higher the level of growth of the economy while the converse is true. The parameter estimates  $\alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7, \alpha_9, \alpha_9,$  and  $\alpha_{10}$  are expected, theoretically, to positively influence economic growth in the selected Sub-Saharan African (SSA) countries while  $\alpha_{11}, \alpha_{12},$  and  $\alpha_{13}$  should exert negative impact on economic growth of these economies.

### 3.2 Theoretical Expectation

Theoretically, regarding the model of trade liberalization and human capital development, trade liberalization is expected to exert positive impact on human capital development in Sub-Saharan Africa through numerous channels, including adoption of new technologies embedded in foreign direct investment from abroad, mimicking of knowledge transferred from abroad, increased access to education, enhanced labour mobility and skills-based training. Exports can affect human capital development positively via increase in government revenue due to disposal of goods and services in foreign markets which allows greater investment in education and training.

Trade liberalization can also facilitate movement of workers (migration), both within and between countries, allowing them to gain experience and skills in different sectors and environments. This can lead to a more diversified and skilled workforce and consequently, human capital development in SSA countries. In addition, trade liberalization allows for the transfer of new technologies and managerial skills (foreign direct investment) from developed countries to Sub-Saharan Africa. This can stimulate innovation and productivity growth, which can further enhance human capital development. As for gross capital formation, which includes investments in physical assets like machinery and infrastructure, indirectly supports human capital development by creating a more productive environment for education and skills development.

Likewise, trade liberalization is expected to have a positive effect on output growth through increased efficiency and productivity, export growth, innovation and technology transfer, knowledge transfer and access to improved imported inputs. It encourages specialization based on comparative advantages, leading to more efficient resource allocation and increased productivity. Also, increased competition from foreign firms can spur domestic firms to innovate and adopt new technologies. Trade liberalization can also allow access to cheaper and higher quality imported inputs, which can lower production costs and enhance competitiveness.

Regarding human capital development and economic growth model, it is expected that human capital development would have a positive relationship with economic growth of Sub-Saharan African countries. This is because massive investment in education, health, and skills training is crucial for driving economic growth in SSA countries. However, human capital development alone is not sufficient; it needs complementary factors like technology and infrastructure to reach its full potential.

Concerning the interaction of trade liberalization with human capital development which is presumed to be positive. Trade liberalization can boost growth by increasing export opportunities, fostering competition, and facilitating access to new technologies, managerial skills and imported inputs. In addition, foreign direct investment comes with additional capital, sophisticated technologies, and managerial expertise, which further stimulate productivity gains and growth. Also, gross capital formation contributes directly to economic growth in SSA countries through expansion of the stock of productive capital and thus increasing output capacity and productivity. On the other hand, human capital development, particularly through investments in education and skills training, is essential for long-term growth as it enhances productivity, innovation, and the ability to adapt to new technologies.

**Table 3.1:** Description and Measures of Variables

<b>Variable</b>	<b>Description</b>	<b>Expected Signs</b>
GDPGR	Gross domestic product growth (annual %)	$Y_{it} > / < 0$
GCF	Gross capital formation (% of GDP)	Positive
LABF	Total labour force	Positive
TLIB	Merchandise trade ( % of GDP)	Positive
NFDI	Net foreign direct investment (BOP, Current US\$)	Positive
TPOP	Annual total population	Positive
INFR	Inflation rate, CPI	Positive/Negative
GTEE	Government total expenditure on education	Positive
GTEH	Government total expenditure on health	Positive
SSER	Secondary school enrolment rate (% Gross)	Positive

PSER	Primary school enrolment rate (% Gross)	Positive
LER	Life expectancy at birth, total (Years)	Positive/ Negative
IMR	Mortality rate, under-5 (per 1000 live births)	Positive/Negative
HCI	Human capital index	Positive/Negative
NMGR	Net migration	Positive/Negative
NODA	Net official development assistance (Current US\$)	Positive/Negative

**Source:** World Development Indicator, 2022

### 3.4 Estimation Techniques

This study examines the effect of trade liberalization and human capital on economic growth in selected Sub-Saharan African (SSA) countries. Therefore, based on the objectives of this study, and in order to test the hypotheses stated in section one, four models are specified. The theoretical foundation for this specification is found in the Solow growth model and its extension; the endogenous growth theory which is an improvement of the Solow growth model. The endogenous growth theory assumed that economic growth is affected by some other variables aside labour and capital. In this study, it is assumed that economic growth is influenced by these conventional growth variables (Labour and Capital), human capital variables as well as trade liberalization variables. The models specified above for this study will be estimated using the Pooled Ordinary Least Square (POLLS), Panel Fixed Effect Model (PFEM) and Generalized Method of Moments (GMM).

For the Pooled Ordinary Least Square (POLS), its estimating equation is a standard linear regression model, in which the dependent variable ( $Y_{it}$ ) is regressed on the independent variables ( $X_{it}$ ) for each individual  $i$  at time  $t$ . This equation can be expressed mathematically as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \epsilon_{it} \dots \dots \dots (3.18)$$

where:

$Y_{it}$  = the dependent variable for individual  $i$  at time  $t$

$X_{it}$  = the independent variable for individual  $i$  at time  $t$ ,

$\beta_0$  and  $\beta_1$  are the coefficients that are to be estimated

$\epsilon_{it}$  is the error term

In the case of Panel Fixed Effect Model (PFEM), its estimating equation captures fixed effects to each individual (each country in this case) so as to analyze the individual-specific effects. The PFEM equation can be written as:

$$Y_{it} = \alpha_i + \beta_1 X_{it} + \epsilon_{it} \dots \dots \dots (3.19)$$

where:

$\alpha_i$  = the fixed effect for individual  $i$ ; while other variables are the same as in the POLS equation.

And for the Generalized Method of Moments (GMM), its estimating technique involves specification of moment conditions that are based on data generating process. The GMM estimator attempts to minimize the difference between the sample moments and the population moments. The equation can be expressed as:

$$E[g(W_i, \theta)] = 0 \dots \dots \dots (3.20)$$

where:

$g(W_i, \theta)$  represents the moment condition function

$\theta$  constitute the parameters to be estimated

$W_i$  is the data for individual (country)  $i$

Note that these estimating equations (3.18, 3.19, 3.20) explain how POLS, PFEM, and GMM are formulated towards estimating the relationships among the variables of interest in the panel data analysis, with each of them addressing different aspects of the data structure and their underlying assumptions. In addition, the choice of adoption of the use of any of these estimation techniques in the results analyses and discussions shall be strictly based on the specific characteristics of the data, such as the presence of individual-specific effects, endogeneity concerns, and the underlying assumptions of each model

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### Endnotes

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## **Chapter Four**

### **Results and Discussion of Findings**

This chapter presents the data analysis and interpretation on the links among trade liberalization, human capital development and economic growth in Sub-Saharan African countries. It is divided into five sections. The discussion on descriptive statistics and correlation matrix is presented in the first section. Subsequently, the second, third, fourth and fifth sections proffer answers to the research objectives raised in chapter one.

#### **4.1 Preliminary Analysis**

The preliminary analysis on descriptive statistics and correlation analysis of the variables understudied for empirical analysis based on formulated hypotheses are presented in this section.

##### **4.1.1 Descriptive Statistics and Correlation Analysis**

This sub-section presents the descriptive statistics and correlation analysis of trade liberalization, human capital development and economic growth in SSA countries. The descriptive statistics of

trade liberalization, human capital development and economic growth of SSA countries. This is followed by correlation matrix table of trade liberalization and human capital development, correlation matrix table of trade liberalization and economic growth, correlation matrix table of human capital development and economic growth and lastly correlation matrix table of trade liberalization, human capital development and economic growth.

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**Table 4.1 Descriptive Statistics**

<b>Variables</b>	<b>Mean</b>	<b>Median</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Std. Dev.</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>Obs.</b>
HCDI	0.503	0.491	0.808	0.260	0.108	0.549	3.182	1022
TLIB	56.21	47.06	175.38	7.806	29.161	1.21	4.28	1035
EXPT	30.29	25.78	105.39	1.57	18.79	1.21	4.49	927
IMPT	38.94	34.16	119.13	1.13	18.85	1.67	6.28	925
NFDI	6.10	1.57	4.07	-7.40	1.87	10.49	211.61	1032
GFCF	22.43	21.31	76.78	0.00	9.57	0.94	5.59	916
NMGR	-9849.24	-2464.00	644996.0	-866101	57171.85	-2.19	69.73	1035
NODA	7.19	3.82	1.14	-1452000	9.45	3.19	23.13	1031
GDP	2.94	9.70	5.74	3.95	7.34	4.65	25.38	1024

GTEE	3.99	3.50	13.22	0.07	2.10	1.23	4.81	766
GTEH	5.08	4.62	19.69	1.11	2.10	1.50	8.27	977
INT	29.44	23.52	119.24	2.94	18.65	1.39	5.20	1022
LABF	7811935	3968466	73389347	44913.00	11375954	2.86	12.39	1012
PSER	100.78	101.59	182.50	31.85	23.22	0.04	3.02	863
SSER	48.14	40.59	182.50	6.11	29.53	1.38	5.38	636
LER	57.73	59.11	77.24	6.75	10.13	-2.56	14.24	1035
IMR	87.12	81.50	228.40	12.30	41.85	0.46	2.91	1035
INFR	13.05	5.68	2630.12	-22.93	87.28	26.85	793.66	1024

**Note:** hcdi - human capital development index; tlib - trade liberalization; expt - export; impt - import; nfdi - net foreign direct investment; gfcf - government fixed capital formation; nmgr - net migration; noda - net official development assistance; gdp - gross domestic product; gtee - government total expenditure on education; gteh - government total expenditure on health; int - interaction variable; labf - labour force; pser - primary school enrolment rate; sser - secondary school enrolment rate; ler - life expectancy rate; imr – Infant mortality rate; infr - inflation rate  
**Source:** Author’s computation, 2025

In this section, the summary statistics of the variables on trade liberalization, human capital development and economic growth in SSA countries are reported in Table 4.1 above. From the table, the average value of human capital development index is 0.503. This implies that the level of human capital development has been moderate in the region which is estimated at 0.503. Notwithstanding, the maximum for the region lies at 0.808 (for Mauritius in 2019) while the minimum is 0.26 (for Niger in 2000). Moreover, the Kurtosis value of 3.182 suggests that the data for human capital development index (HCDI) is light-tailed relative to a normal distribution. It also indicates a flatter distribution with fewer outliers. The standard deviation measures how spread out or dispersal a set of data is relative to its mean, essentially indicating how far on average, each data point deviates from the mean value. The low value of standard deviation (0.108) implies that data points are clustered close to the mean. In respect of human capital development variables, primary school enrolment rate (PSER) has the highest mean value of 100.78 while the lowest mean value of 5.08 is traceable to government total expenditure on health (GTEH).

In addition, the mean value of trade liberalization is 56.21 for the region during the period of study. This shows that there is a moderate degree of trade liberalization by SSA countries with the rest of the world which could affect economic growth in the region positively. It is also apparent that of the measures of trade liberalization, import has the highest mean value (38.94) followed by export with an average value of 30.29. The average mean values of gross fixed

capital formation, net official development assistance and net foreign direct investment are 22.43, 7.19 and 6.10 respectively. In addition, the skewness value of trade liberalization which measures the asymmetry or distortion of symmetric distribution is 1.21 indicating that the distribution of data is moderately and positively skewed. The maximum for SSA region lies at 175.38 (for Congo Republic in 2016) and minimum value is 7.806 (for Congo Democratic in 2000).

The descriptive statistics also revealed that the mean value of economic growth proxied by GDP stands at 2.94 percent indicating low output of goods and services in the SSA region during the period of study. The standard deviation value of 7.34 indicates that the data points are not clustered around the mean. The skewness value of 4.65 indicates the direction and relative magnitude of a distribution's deviation from the normal distribution. As far as economic growth is concerned, the data is positively skewed. The Kurtosis value of 25.38 indicates that the data for economic growth are heavy-tailed relative to a normal distribution. That is, the data sets tend to have outliers or heavy tails. The maximum value of this variable lies at 5.74 (for Nigeria in 2014) and the minimum value is 3.95 (for Cameroun in 2019).

**Table 4.1.1a Correlation Matrix Table of Trade Liberalization and Human Capital Development**

	HCDI	TLIB	EXPT	IMPT	NFDI	GFCF	NMGR	NODA
HCDI	1	0.36	0.57	0.37	0.15	0.19	0.14	-0.13
TLIB		1	0.71	0.69	0.01	0.40	0.05	-0.18
EXPT			1	0.68	-0.01	0.30	0.15	-0.27

IMPT	1	0.02	0.42	0.09	-0.20
NFDI		1	0.15	0.06	-0.28
GFCF			1	0.13	0.19
NMGR				1	-0.06
NODA					1

**Note:** hcdi - human capital development index; tlib - trade liberalization; expt - exports; impt - import; nfdi - net foreign direct investment; gfcf - government fixed capital formation; nmgr - net migration; noda - net official development assistance

**Source:** Author's computation, 2025

In Table 4.1.1a, the correlation coefficient shows a weak but positive level of association between trade liberalization and human capital development in SSA countries. The correlation coefficient is 0.355 indicating that there is low level of human capital development in SSA countries arising from the region's trade liberalization policies with the rest of the world. Trade liberalization in Sub-Saharan Africa countries often fails to significantly boost human capital development due to several factors including the dominance of low-skilled export sectors, inadequate infrastructure, limited access to education and training, unequal distribution of benefits, competition from cheaper foreign goods harming local industries, and a lack of complementary policies to support human capital development when implementing trade liberalization measures. All the variables of trade liberalization exhibit direct positive correlation with human capital development except net official development assistance with a correlation coefficient of -0.134164. The results further indicate that the highest positive correlation coefficient is recorded for the association between trade liberalization and export (0.710528). This implies that exportation of goods and services from SSA countries to the rest of the world

was very high during the period of study which would have positive impact on economic growth. The Table also depicts a negative correlation between human capital development and net official development assistance with the coefficient value of -0.134164. This suggests that the development assistance received from advanced countries of the world by SSA countries has not been channeled to the development of human capital in the region.

**Table 4.1.1b Correlation Matrix Table of Trade Liberalization and Economic Growth in SSA Countries**

	GDP	TLIB	EXPT	IMPT	NFDI	GFCF	LABF	POP	INFR
GDP	1	-0.55	-0.02	-0.18	0.51	-0.03	0.50	0.50	0.00
TLIB		1	0.67	0.64	0.02	0.39	-0.18	-0.17	-0.06
EXPT			1	0.56	0.01	0.29	-0.26	-0.21	-0.04
IMPT				1	0.03	0.44	-0.30	-0.26	-0.07
NFDI					1	0.15	0.33	0.34	-0.01
GFCF						1	0.09	0.09	-0.06
LAB							1	0.97	0.07
POP								1	0.06
INFR									1

**Note:** gdp - gross domestic product; tlib - trade liberalization; expt - export; impt -import; nfdi - net foreign direct investment; gfcf - government fixed capital formation; labf - labour force; pop - population; infr - inflation rate

**Source:** Author's computation, 2025

In Table 4.1.1b, there exists a direct negative association between trade liberalization and economic growth with the estimated correlation coefficient stands at -0.55. The negative association between these variables could be due to unhealthy or unfavorable trade policies and protective measures put in place by most SSA countries during the period of study. The results also indicate that net foreign direct investment, labour force and population are positively correlated with economic growth. The correlation coefficients of these variables are 0.51, 0.50 and 0.50 respectively. However, exports, imports and government fixed capital formation all have negative association with economic growth. Their correlation coefficients are -0.02, -0.18 and -0.03. The negative correlation among these variables is traceable to the exportation of low-valued primary products to the international market and importation of high-valued capital goods from the same market by SSA countries. The Table further shows a zero correlation between inflation and economic growth. This implies that inflation rate in the SSA countries has no positive or negative impact on economic growth in the region.

**Table 4.1.1c Correlation Matrix Table of Human Capital Development and Economic Growth in SSA Countries**

	GDP	HCDI	GTEE	GTEH	PSER	SSER	LABF	LER	IMR	INFR
GDP	1	0.31	-0.15	0.03	0.18	0.61	0.75	-0.03	-0.03	0.03
HCDI		1	0.19	0.03	0.32	0.78	0.02	0.50	-0.83	0.02
GTEE			1	0.45	0.24	0.15	-0.23	-0.18	-0.28	0.07
GTEH				1	0.31	0.08	-0.15	-0.10	-0.12	0.06
PSER					1	0.31	0.07	0.06	-0.36	0.11

SSER	1	0.34	0.26	-0.55	-0.01
LABF		1	0.58	0.09	0.11
LER			1	-0.62	-
0.09					
IMR				1	0.04
INF					1

**Note:** gdp – gross domestic product; hcdi – human capital development index; gtee – government total expenditure on education; gteh – government total expenditure on health; pser – primary school enrolment rate; sser – secondary school enrolment rate; labf – labour force; ler – life expectancy rate; imr – infant mortality rate

**Source:** Author’s computation, 2025

In Table 4.1.1c, human capital development and economic growth have a positive correlation or association with their correlation coefficient of 0.31. The relationship appears to be weak due to the non-implementation of UNESCO and WHO recommendations on education and health by most SSA countries. These two sectors have suffered total neglect by different governments of SSA countries over the years. The table also reveals a negative correlation between government total expenditure on education and economic growth. The correlation coefficient of these variables is -0.15 implying that literacy rate has been on the decrease over the past few decades. The dominance of large proportion of uneducated people in a region’s population would have adverse effect on its economic growth. Furthermore, labour force, primary school enrolment rate, secondary school enrolment rate and inflation rate all have positive associations with economic growth. Their correlation coefficients are 0.75, 0.18, 0.61 and 0.03 respectively. It can also be observed from the table that life expectancy rate and infant mortality rate, whose coefficients are

-0.03 and -0.03, have negative correlations with economic growth. The prevalence of diseases due to poor budgetary allocation to health sector by SSA countries could be responsible for negative relationships among these variables.

#### 4.1.1d Table Correlation Matrix Table of Trade Liberalization, Human Capital Development and Economic Growth in SSA Countries

	GDP	TLIB	HCDI	GTEE	GTEH	INT	EXPT	IMPT	NFDI	GFCF	LABF	PSER	SSER	LER	IMR
GDP	1	-0.05	0.43	0.13	0.22	0.11	-0.02	-0.22	0.54	-0.13	0.57	0.03	0.47	0.08	0.23
TLIB		1	0.16	0.43	0.17	0.90	0.71	0.74	0.02	0.32	-0.12	0.09	0.17	-0.16	-0.06
HCDI			1	0.25	0.01	0.55	0.44	0.19	0.23	0.04	0.10	0.32	0.88	0.49	-0.85
GTEE				1	0.49	0.45	0.19	0.37	0.15	-0.02	0.04	0.31	0.39	-0.22	-0.28
GTEH					1	0.13	-0.12	0.21	0.15	-0.18	-0.13	0.32	0.19	-0.18	-0.04
INT						1	0.79	0.70	0.10	0.27	-0.08	0.18	0.50	0.06	-0.45
EXPT							1	0.69	0.01	0.19	-0.23	0.10	0.39	-0.0	-0.27
IMPT								1	-0.01	0.43	-0.33	0.18	0.23	-0.03	-0.18
NFDI									1	0.06	0.37	0.03	0.27	0.06	-0.17
GFCF										1	0.10	0.02	-0.09	0.20	-0.18
LABF											1	0.04	0.04	0.04	0.04



Human capital development, whose correlation coefficient is 0.43, appears to have a positive correlation with economic growth. It is also apparent that all the human capital variables such as government total expenditure on education, government total expenditure on health, primary school enrolment rate, secondary school enrolment rate, life expectancy rate, infant mortality rate and labour force exert positive correlations with economic growth in SSA countries. The correlation coefficients of these variables are 0.13, 0.22, 0.03, 0.47, 0.08, 0.23 and 0.57 respectively. The human capital development variable that exerts the highest level of positive contribution to economic growth is labour force whose coefficient stands at 0.57 (57%). The joint effect of trade liberalization and human capital development on economic growth is positive with the correlation coefficient estimated at 0.11(11%).

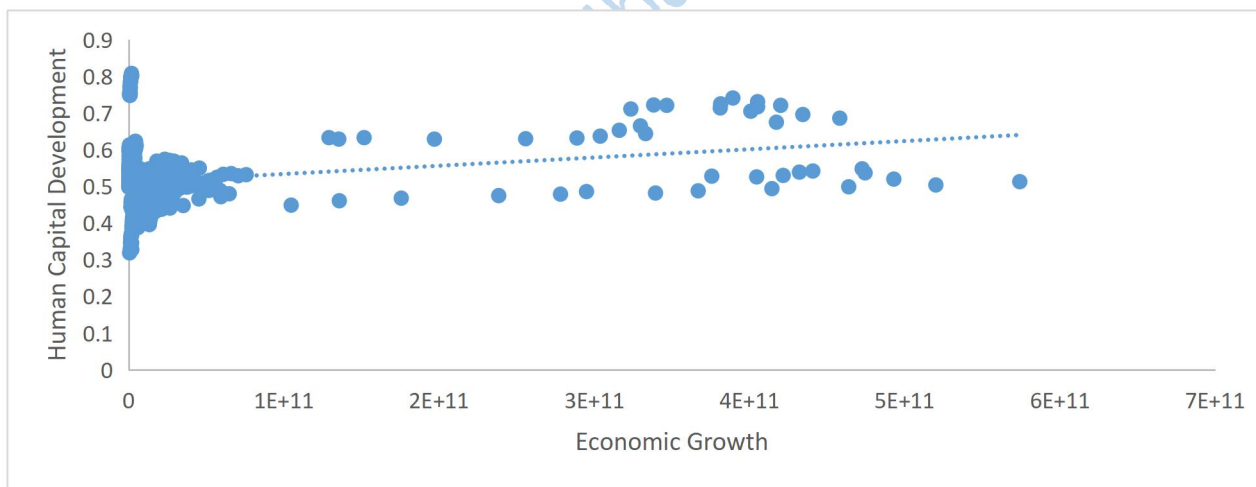


Figure 4.1a: Economic Growth and Human Capital Development Index

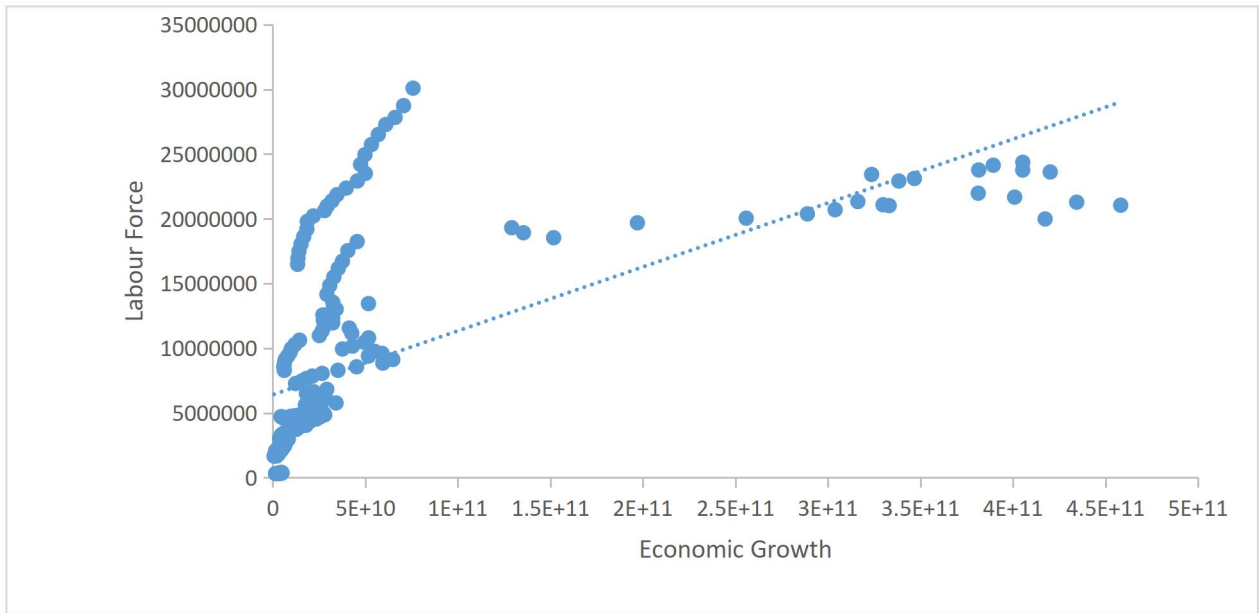


Figure 4.1b: Economic Growth and Labour Force

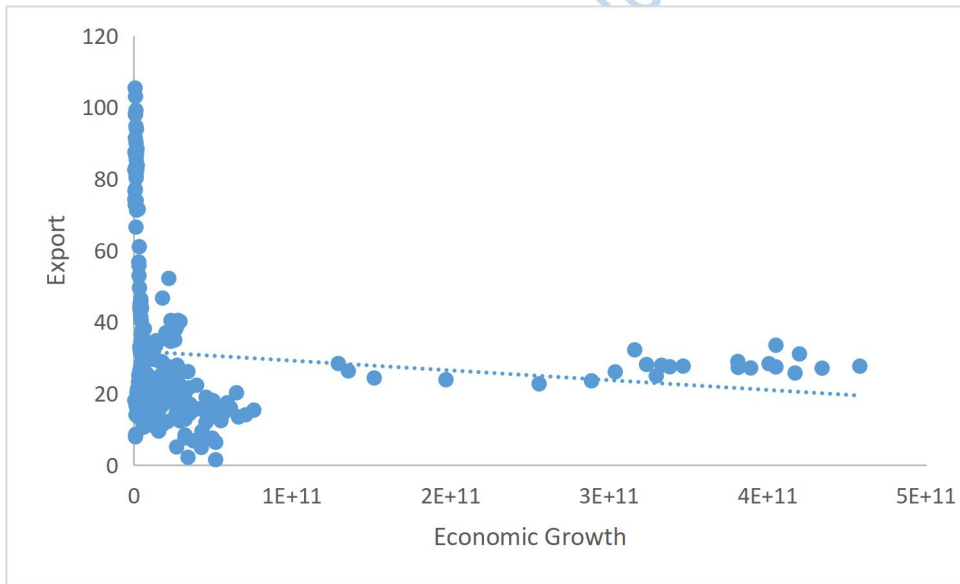


Figure 4.1c: Economic Growth and Export

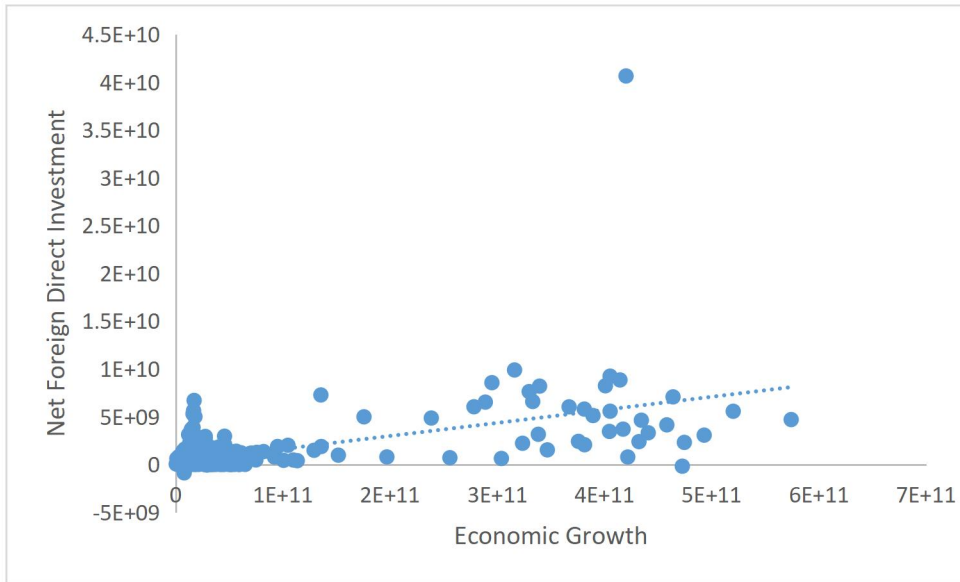


Figure 4.1d: Economic Growth and Net Foreign Direct Investment

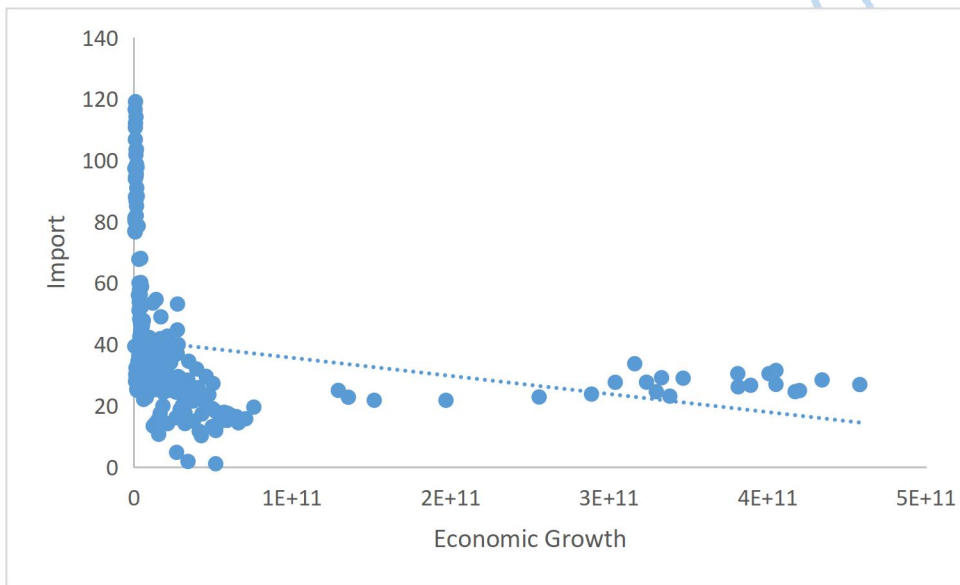


Figure 4.1e: Economic Growth and Import

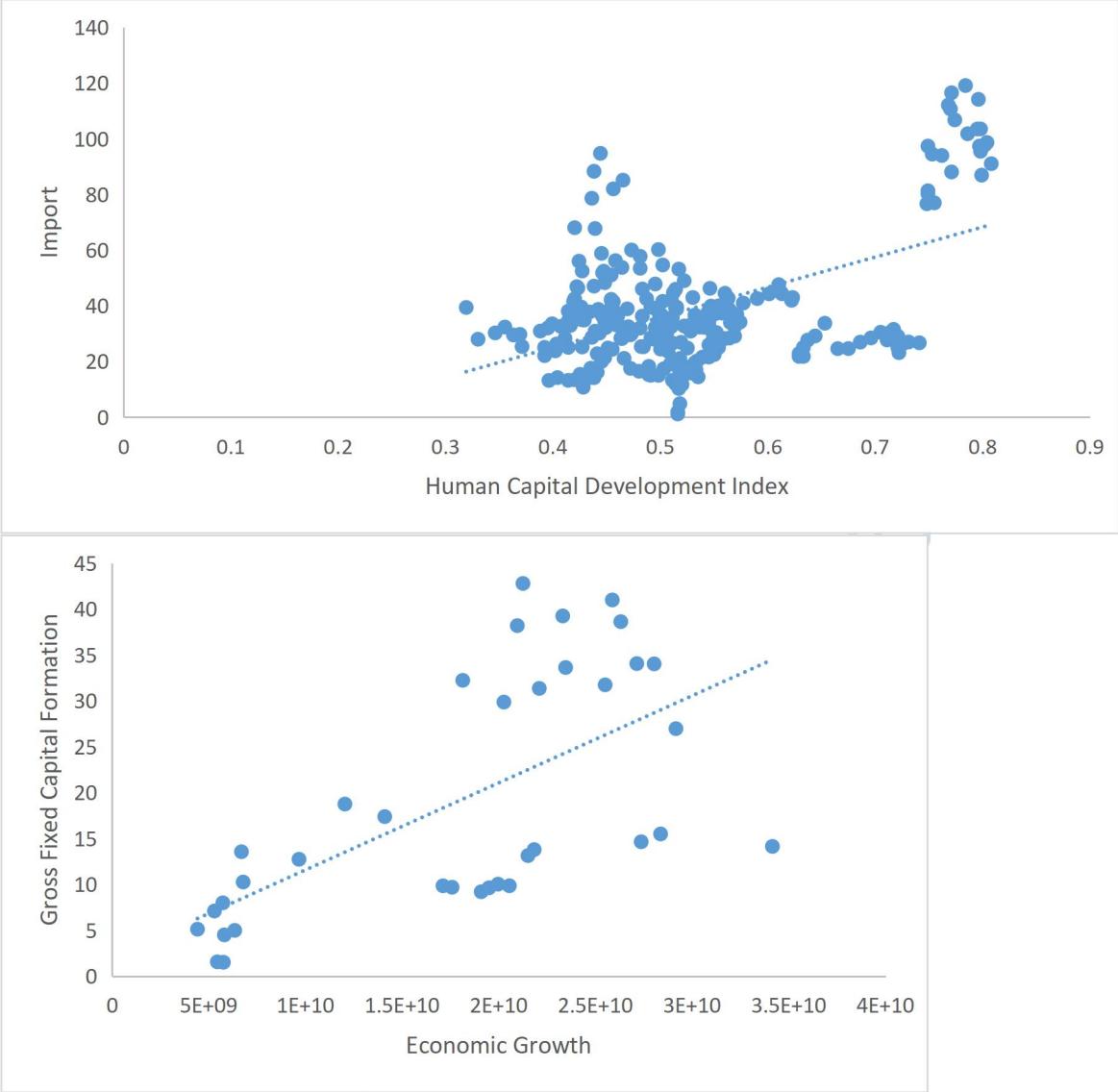
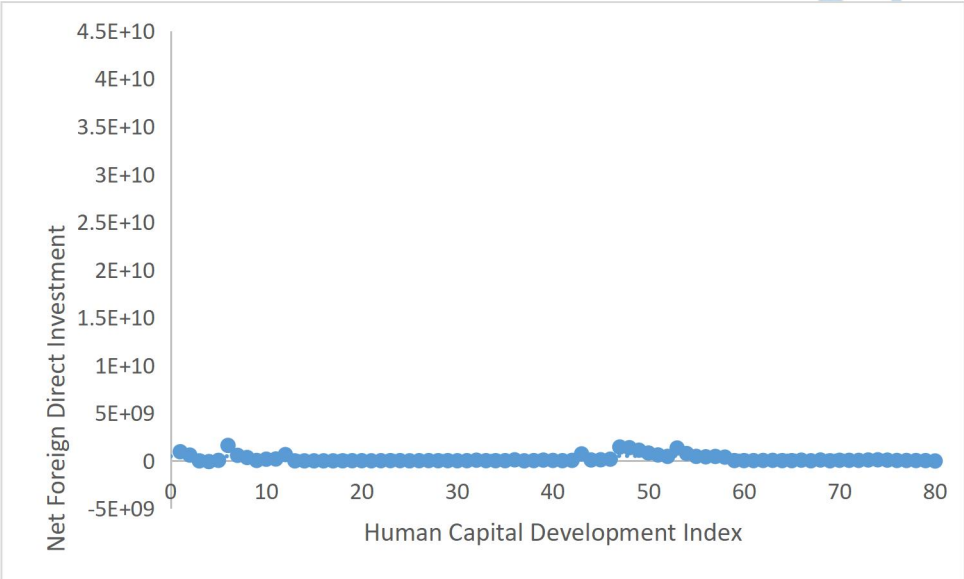
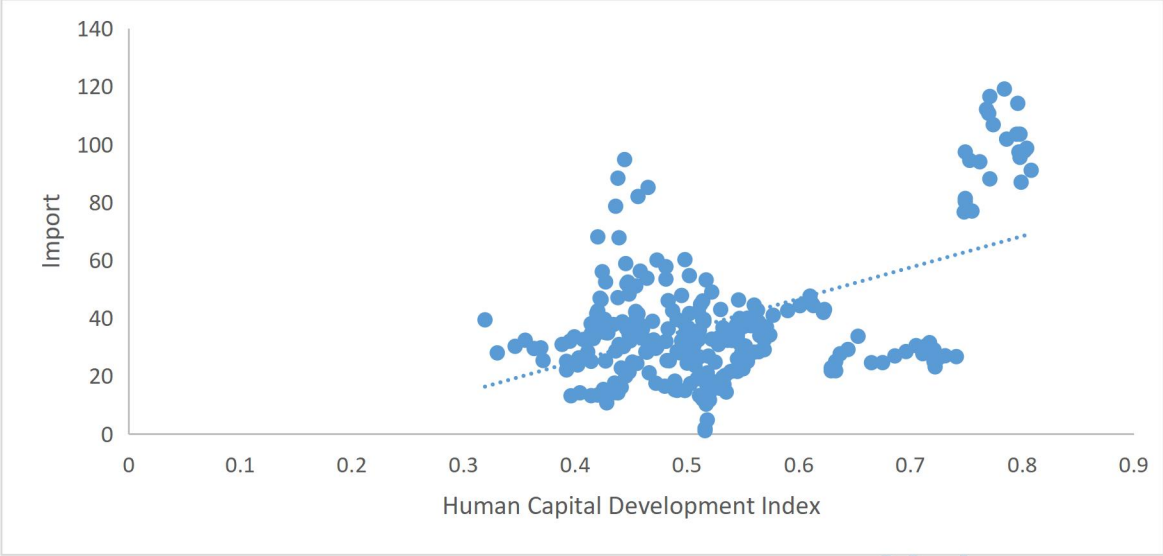
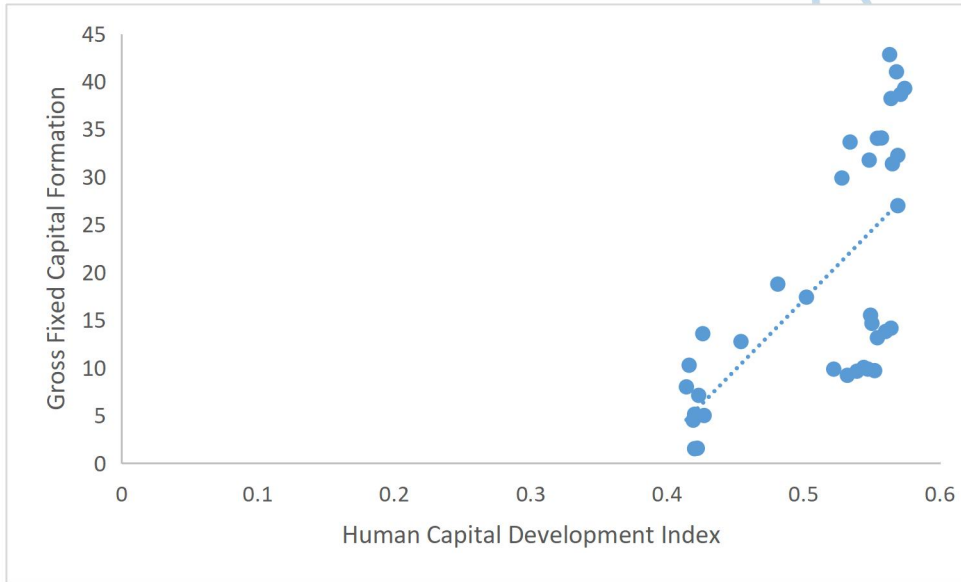
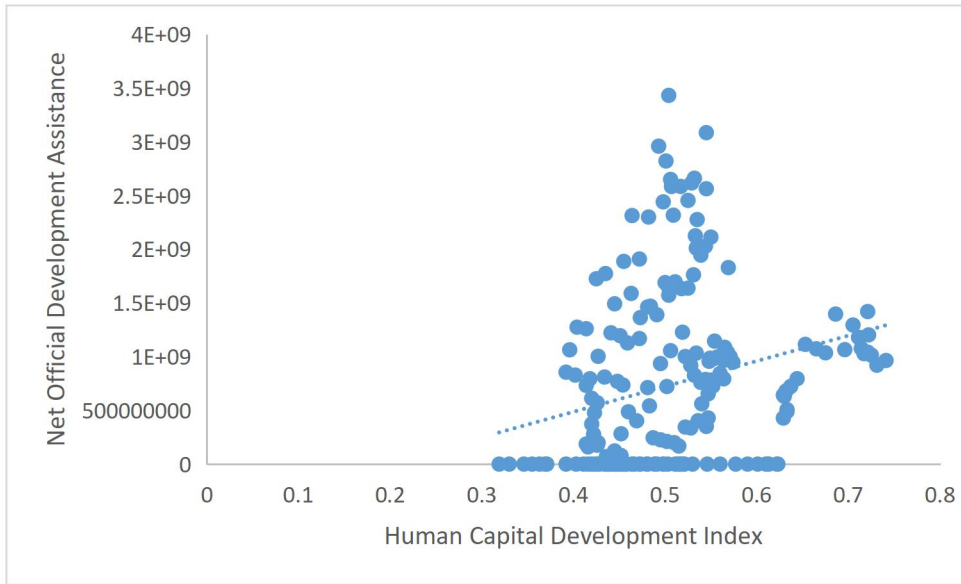
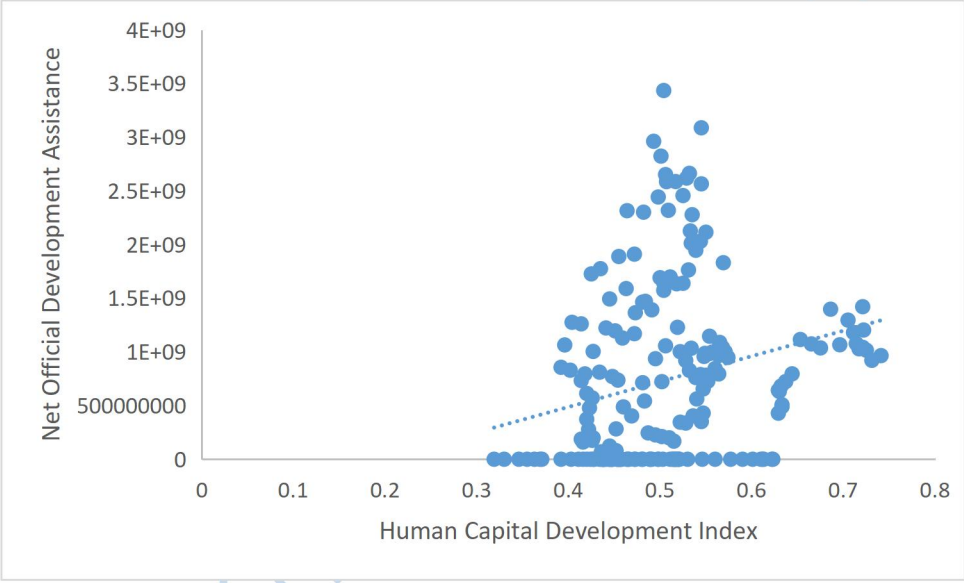
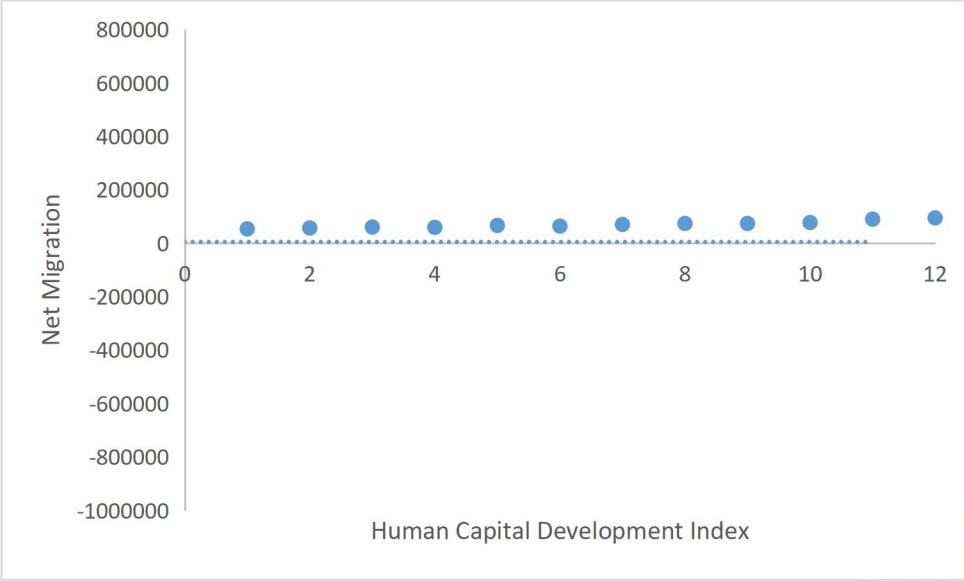
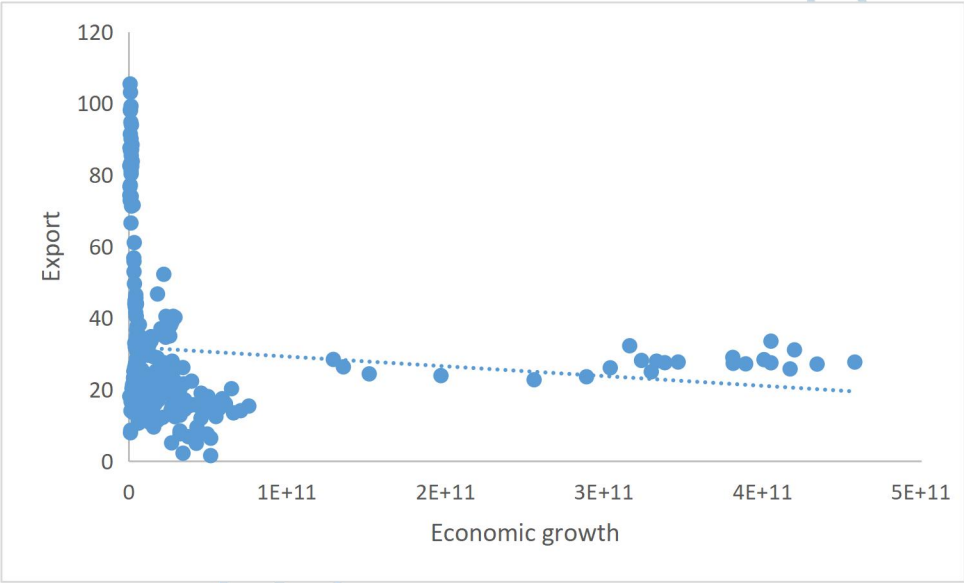
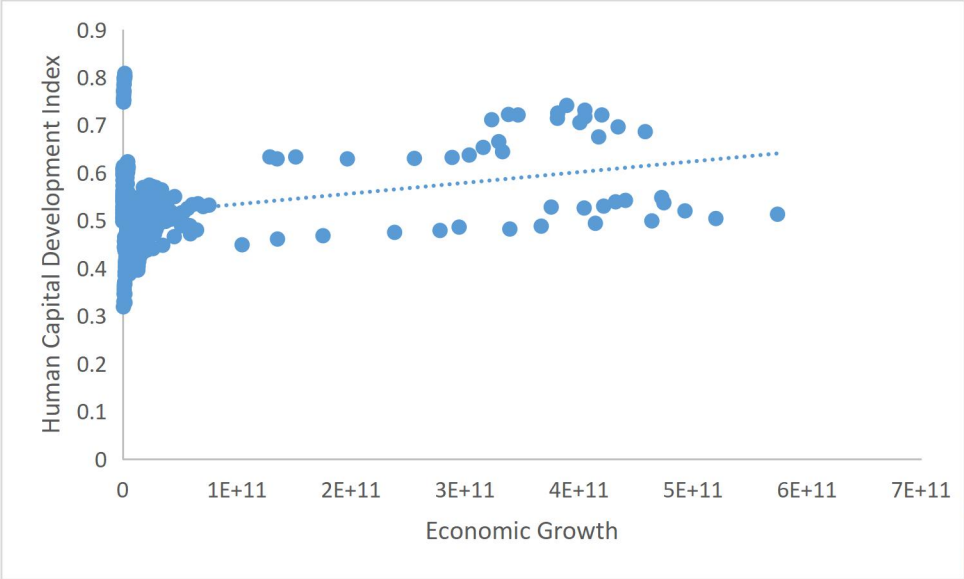


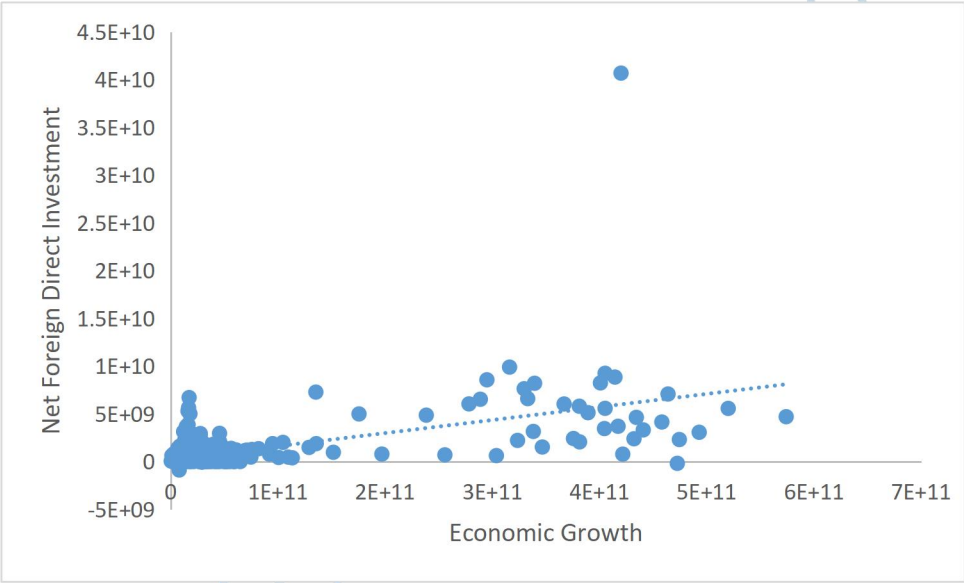
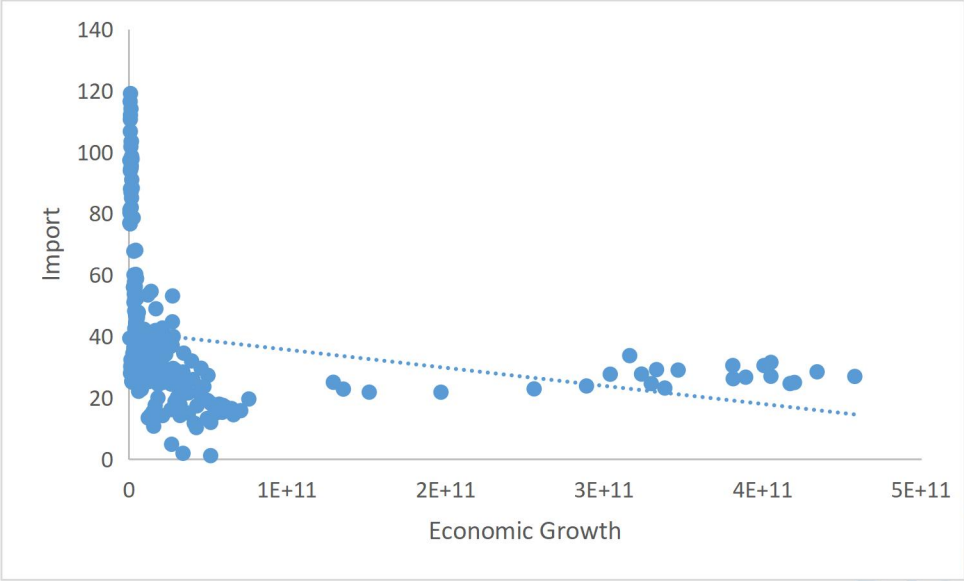
Figure 4.1g: Economic Growth and Gross Capital Formation

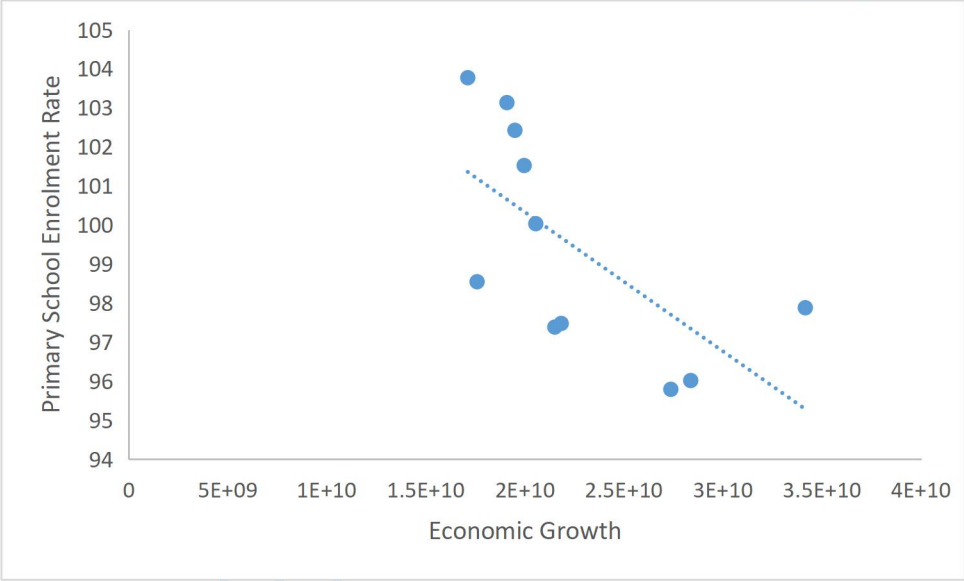
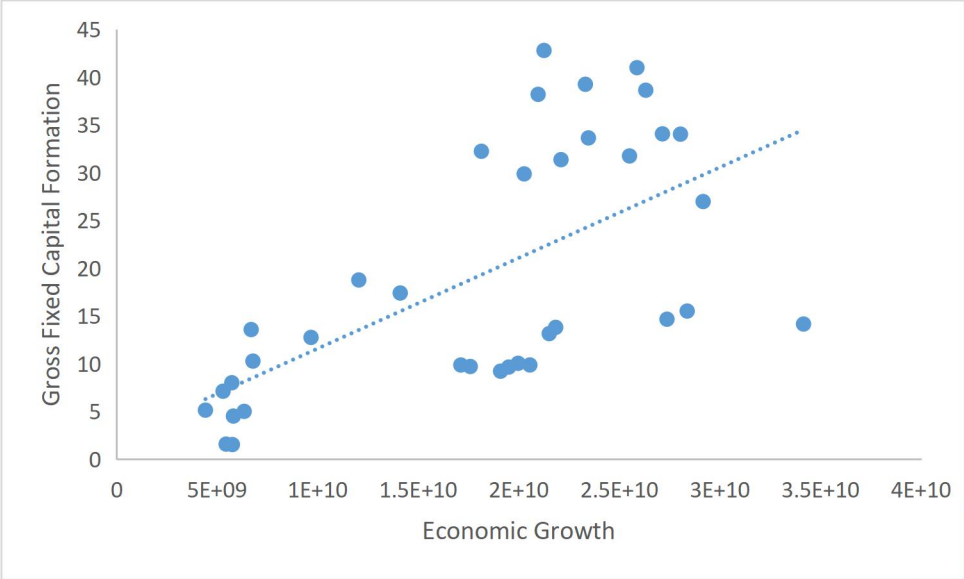


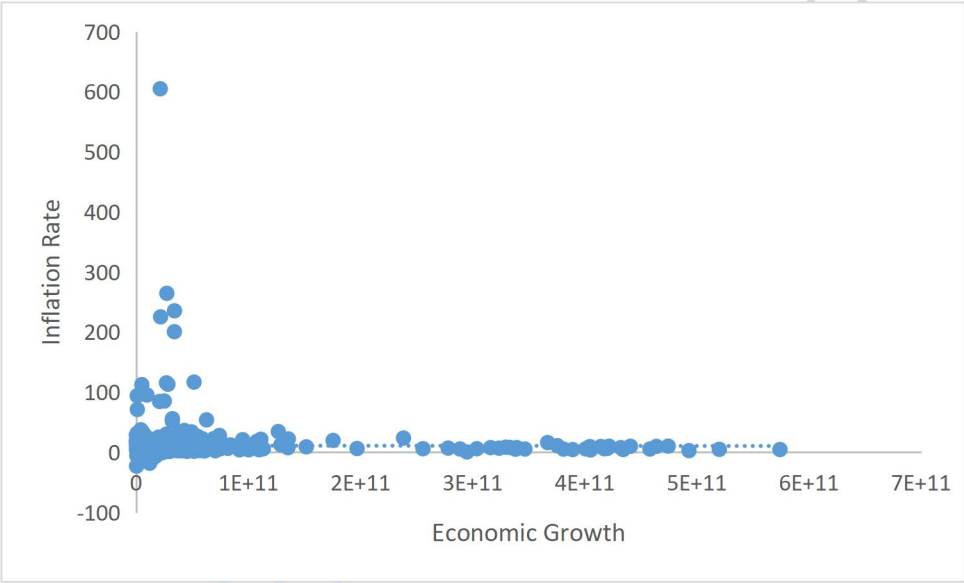
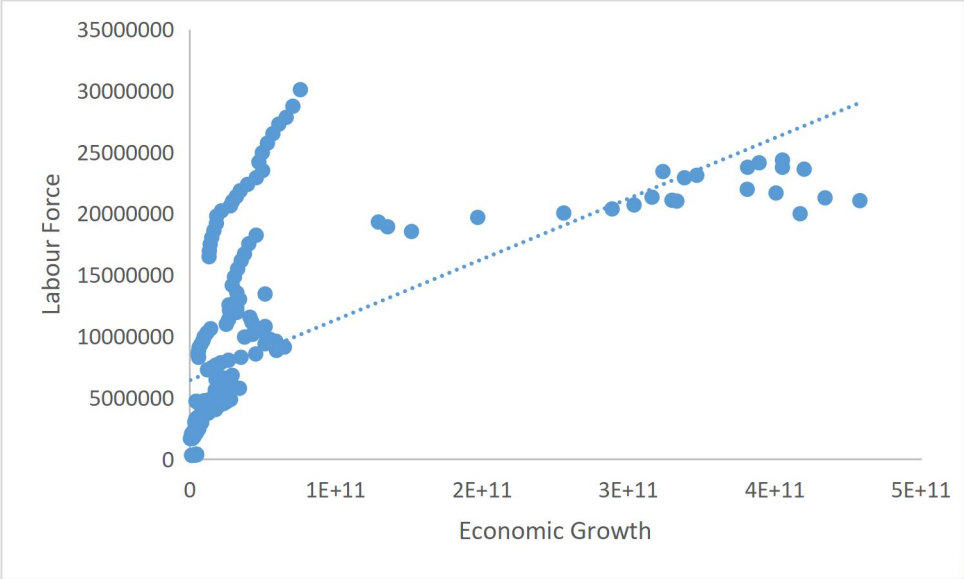


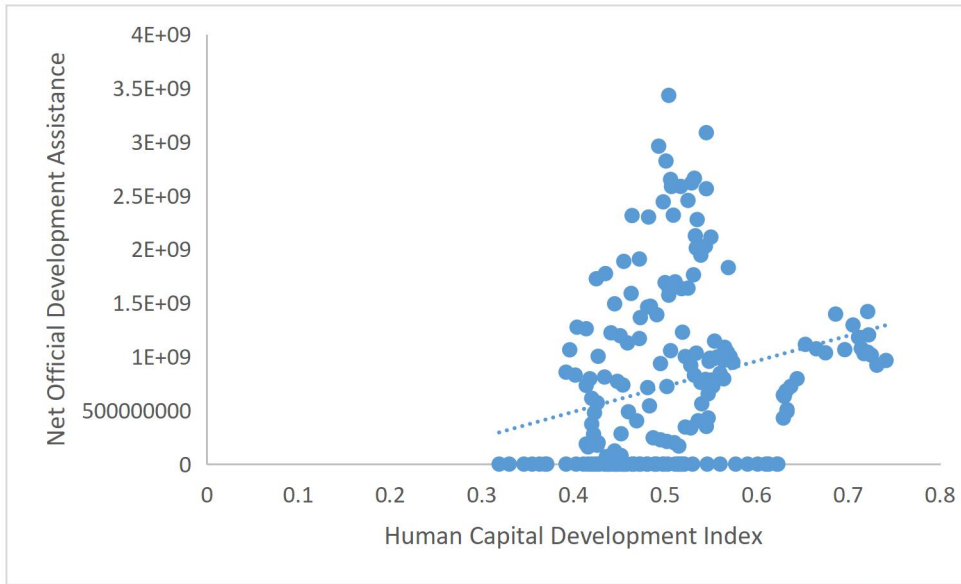












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## 4.2 Empirical results of the Links between Trade Liberalization, Human Capital Development and Economic Growth in SSA countries

This study employed the two-step difference generalized method of moment (TSDGMM) estimators developed for dynamic panel models that has received increasing attention and obtained great popularity especially in recent years. It was developed by Arellano and Bond (1991), Arellano and Bover (1995). There are certain conditions that must exist before the two-step difference generalized method of moments is used for estimating the parameters of dynamic panel models. These conditions include:

- (a) There must be a large number of individuals or units or countries (N) and short periods of time (T). In other words, number of units must be greater than periods of time, that is,  $N > T$ .
- (b) Existence of a linear functional relationship between the dependent variable and a set of independent variables.
- (c) There must be one left- hand-side variable (dependent variable) that is dynamic, depending on its own past realizations.
- (d) Availability of a set of independent variables that are not strictly exogenous, that is, they are correlated with past and possibly current realizations of the error terms.
- (e) Existence of fixed individual effects.
- (f) Presence of heteroscedasticity and autocorrelation within individuals but not across them.

The difference generalized method of moments (DGMM) alternatively called the estimation method using the first difference, was first presented by Stephen Bond and Manuel Arellano in 1991. This methodology is based on the validity of the assumption that the residuals are not serially correlated and on the validity of the instruments. Therefore, these two tests mentioned below are used for the application of two-step difference generalized method of moments

(TSDGMM). These are: (a) the Sargan-Hansen test, and (b) the Arellano and Bond first order (AR 1) test and second order serial correlation (AR 2) test.

The Sargan-Hansen test is a statistical test used for testing over-identifying restrictions in a statistical model. It was proposed by John Denis Sargan in 1958, and several variants were derived by him in 1975. The null hypothesis is that the covariance between the instrument and the error term is zero.  $H_0: Cov(z, e) = 0$ . Thus, rejecting the null hypothesis indicates that at least one of the extra instruments is not valid. Sargan p-value must not be less than 5% and greater than 10%.

The Hansen J-statistic which is computed from two-step difference generalized method of moment is used to determine the validity of the over-identifying restrictions in a generalized method of moments' model. If the model is correctly specified in the sense that  $E\{z_i u_i(\beta)} = 0$ , then the sample analog to that condition should hold at the estimated value of  $\beta$ .

The Arellano and Bond first order and second order serial correlation test is used in dynamic panel data models to determine second order serial correlation between the residuals at time (t) and time (t-2). A significant p-value for the AR (2) test suggests that the model's moment conditions are not valid, and the presence of AR (2) serial correlation invalidates the use of the first difference generalized method of moment estimator.

### **Benefits of Application of Two-Step Difference Generalized Method of Moment Estimator (TSDGMM)**

The application of two-step difference generalized method of moments has the following advantages:

(a)

The two-step difference generalized method of moments not only eliminates any bias that may

arise from ignoring dynamic endogeneity, but also provides theoretically based and powerful instruments that accounts for simultaneity while eliminating any unobservable heterogeneity.

(b) In general, the two-step difference generalized method of moments estimator has a smaller asymptotic variance.

(c) Statistical tests based on a two-step difference generalized method of moments' estimator are also asymptotically more powerful than those based on the one-step estimator.

(d) Generalized method of moments allows estimation under the restrictions implied by the theory; there is no need to add distributional assumptions that are not implied by the theory.

(e) The parameter estimates obtained with the use of two-step difference generalized method of moments are more accurate and consistent.

#### 4.2.1 Analysis of the First Objective

In this sub-section, the study presents the empirical outcomes with reference to the relationship between trade liberalization and human capital development in SSA countries. The mathematical expression of the effect of trade liberalization on human capital development of selected SSA countries is given as:

$$HCDI = F(TLIB, NFDI, GCF, NMGR, NODA) \quad (4.1)$$

The econometric form of this mathematical expression of the impact of trade liberalization on human capital development is shown below:

$$HCDI_{it} = \Delta_{1it} + \Delta_{2it}TLIB + \Delta_{3it}NFDI + \Delta_{4it}GFCF + \Delta_{5it}NMGR + \Delta_{6it}NODA + U_{it} \quad (4.2)$$

The parameter estimates  $\Delta_2$ ,  $\Delta_3$ ,  $\Delta_4$ ,  $\Delta_5$ , and  $\Delta_6$  are expected to exert positive impact on the level of human capital development. Additionally, the coefficients  $\Delta_2$  to  $\Delta_6$  represent the elasticities of the variables because they measure the rate of change.  $\Delta_{1i}$  is the intercept of the above model.

**Table 4.2a Combined Estimated Results of Pooled Ordinary Least Squares, Fixed Effect Model and Two-Step Difference Generalized Method of Moments of Trade Liberalization and Human Capital Development (Model 1)**

Variables	Pooled Ordinary Least Squares	Fixed Effect Model	Two-Step Difference GMM
Constant	0.011483*** (0.0000)	0.033385*** (0.0000)	-
HCDI(-1)	0.985532*** (0.0000)	0.941916*** (0.0000)	0.964824*** (0.0000)
TLIB	6.269582 (0.5793)	1.391166 (0.9424)	1.210697** (0.0453)
NFDI	1.230404 (0.2701)	1.831761 (0.1339)*	1.880209 (0.1840)
GCF	3.333686* (0.1961)	0.000100*** (0.0092)	0.000321*** (0.0000)
NMGR	6.651989** (0.0491)	8.114837** (0.0230)	4.860226 (0.1744)
NODA	-2.174526 (0.4134)	3.768195 (0.4900)	5.813689 (0.3539)
R-squared	0.997111	0.997637	-
Adjusted R-squared	0.997084	0.997492	-
F-statistic	36372.48	6909.067	-
Prob(F-statistic)	(0.000000)	(0.000000)	-
DW Statistic	1.224586	1.433133	-
AR(1)	-	-	-0.056905 (0.6452)
AR(2)	-	-	-0.462815 (0.5134)
Hansen J-statistic	-	-	37.68040
Prob(J-statistic)	-	-	(0.304531)
Instruments	-	-	09
Countries	45	45	45
Observations	852	852	801

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10. The values in the bracket signify significance of (a) estimated parameters and F-statistics and (b) failure to reject the null hypotheses of : (i) no autocorrelation in the AR(1) and AR(2) tests and (ii) the validity of the instruments in the Hansen over-identifying restriction OIR test

**Source:** Author's computation, 2025

In this sub-section, the empirical results of the relationship between human capital development and trade liberalization measured by exports, imports, net foreign direct investment, government fixed capital formation, net migration and net official development assistance are reported using the two-step difference generalized method of moments (TSDGMM). Before explaining the results derived from the difference GMM parameters, the findings of the baseline regression using both panel ordinary least squares (POLS) and panel fixed effects approaches are reported in the tables 4.2(a-d) and Appendixes 4(a-1). The findings of the Hausman test statistics validate the suitability of the panel fixed effects approach over the random effects method. There are noticeable differences in the results obtained from the two baseline estimators in terms of signs and significance of the parameters. In table 4.3a, above, the results from the pooled OLS revealed that: (a) the coefficient of the lagged dependent variable is statistically significant and considered to be the upper bond estimate; (b) trade liberalization has a statistically insignificant positive relationship with human capital development in SSA countries; (c) net foreign direct investment exerted statistically insignificant positive impact on human capital development; (d) government fixed capital formation and net migration have statistically significant positive relationships with human capital development; (e) net official development assistance received exert negative impact on human capital development in SSA countries.

The parameter estimates of the panel fixed effects results are also explained due to some inherent weaknesses of pooled OLS approach. Thus, findings of the panel fixed effects estimates showed that: (a) the coefficient of the lagged dependent variable is statistically significant and considered to be the lower bond estimate; (b) trade liberalization has a positive but insignificant relationship with human capital development; (c) net foreign direct investment, gross fixed capital formation and net migration exerted statistically significant positive relationships with human capital

development; (d) net official development assistance received has positive but insignificant impact on human capital development. Just like the defects of pooled OLS, this study, however, relied on the empirical findings of the parameters derived from the two-step difference generalized method of moments because of the fundamental issues of panel fixed effects estimators.

As the two-step difference GMM is appropriate for this study, its validity will be verified through the following: (i) the coefficient of the estimated lagged dependent variable ( $\phi$ ) using the two-step difference GMM must lie in-between the fixed effects (FE) coefficient and the pooled OLS coefficient ( $0.941916 < 0.964824 < 0.985532$ ), indicating the validity of the dynamic panel estimator used. Empirical findings from the Two-Step Difference Generalized Method of Moments (TSDGMM) reveal that trade liberalization (TLIB) exerts a statistically significant positive relationship with human capital development in SSA countries during the period under review, *ceteris paribus*. This can be interpreted as a one percent increase in trade liberalization activities in the SSA region would bring about 1.210697 percentage rise in human capital development. This result is consistent with new growth theory also known as endogenous growth theory which views human capital as a bridge between trade liberalization, economic growth and technological progress. The result is also similar with some previous empirical studies' findings (A. Mehtabul, 2022<sup>1</sup>; N. Zehra & S. W. Khattak, 2022<sup>2</sup>; L. Jie et. Al, 2019<sup>3</sup>). The implication of this positive relationship between these variables is that the adoption of trade liberalization by most SSA countries has boosted human capital development in the region via encouragement of economic growth, fostering job creation, and stimulating investment in education and health care.

In addition, gross capital formation (GFCF) has a statistically significant positive relationship with human capital development. The interpretation of this positive relationship is that a one unit

increase in gross capital formation would result in 0.000321 unit rise in human capital development. The implication of this result is that capital formation which is equivalent to an increase in capital stock of SSA countries, with investment in social and economic infrastructure. Gross fixed capital formation can be classified into gross private domestic investment and gross public domestic investment. The increase in these two types of gross fixed capital formation would accelerate economic growth in SSA countries, resulting in improved national incomes and engendering human capital development.

The findings also revealed that net foreign direct investment (NFDI), net migration (NMGR) and net official development assistance (NODA) all have positive but statistically insignificant relationships with human capital development, all other things being equal. The positive impact of net foreign direct investment (NFDI) on human capital development can be explained by the fact that it promotes technology transfer, job creation, and the development of skilled labour through training and new industries, leading to higher overall productivity and earnings. Moreover, net foreign direct investment enhances economic growth by ensuring improvement of various kinds of capitals, and research and development. Through means of technological transfer and its repercussions in the host SSA nations, multi-national corporations can boost industrial production, improve human capital development and enhance cooperation on research and development. Regarding the positive effect of net migration (NMGR) on human capital development, it is made possible through massive inflow of skilled migrants into SSA countries who can contribute to economic growth and innovation, while also potentially increasing returns to education and investment in human capital in the destination countries.

The positive relationship between net official development assistance (NODA) and human capital development (HCD) in SSA countries can be explained through adequate funding

interventions being received from advanced nations in key areas such as education, healthcare and economic empowerment, which collectively improve the skills, health and overall well-being of populations in SSA developing countries.

The insignificant probability values of the Arellano & Bond first order serial correlation AR (1) test (0.6452) and second order serial correlation test (AR (2) (0.5134) reveals the absence of first order and second order serial autocorrelation and the Hansen J-statistic value (37.68040) for over-identifying restrictions with the probability value of (0.303541) that is greater than 0.05 (5%), indicating that the instruments selected for the two-step difference generalized method of moments are valid. On the other hand, most of the two-step difference generalized method of moments (TSDGMM) coefficients of the estimated parameters are significant. This study includes forty-five (45) countries (N) which were analyzed over a period of twenty-three (23) years (T). Therefore, there are more countries compared to years. From the diagnostic tests conducted, it can be said that the two-step difference generalized method of moment estimator is a valid estimator.

In summary, liberalizing the economies of SSA countries through trade has been beneficial to the region in that it has brought about significant improvement in human capital development. Simply put, trade liberalization has a statistically significant positive impact on human capital development in the sample countries. All the trade liberalization variables impact on human capital development positively with the exception of exports.

#### **4.3.2 Analysis of the Second Objective**

In this sub-section, the study presents the empirical outcomes with reference to the relationship between trade liberalization and economic growth in SSA countries. In order to achieve the

second specific objective of this study, it is assumed that economic growth is influenced by gross fixed capital formation (GFCF), labour force (LABF), trade liberalization (TLIB), net foreign direct investment (NFDI), total population (TPOP) and inflation rate (INFR). The above endogenous and exogenous variables can be expressed in mathematical form as shown below:

$$RGDP = F(GFCF, LABF, TLIB, NFDI, TPOP, INFR) \quad (4.3)$$

The econometric transformation of the mathematical form of equation 4.3 is given below:

$$GRGDP_{it} = \beta_{1i} + \beta_{2i}GCF_{it} + \beta_{3i}LABF_{it} + \beta_{4i}TLIB_{it} + \beta_{5i}NFDI_{it} + \beta_{6i}TPOT_{it} + \beta_{7i}INFR_{it} + E_{it} \quad (4.4)$$

In terms of a-priori theoretical expectation about the signs and size of the exogenous variables of the model, the parameter estimates  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ ,  $\beta_5$ , and  $\beta_6$  are expected to exhibit positive relationships with economic growth while  $\beta_7$  should have negative sign.

**Table 4.2b Combined Estimated Results of Pooled Ordinary Least Squares, Fixed Effect Model and Two-Step Difference Generalized Method of Moments of Trade Liberalization and Economic Growth in SSA Countries (Model 2)**

**Dependent Variable: RGDP**

Variables	Pooled Ordinary Least Squares	Fixed Effect Model	Two-Step Difference GMM
GDP(-1)	0.777817*** (0.0000)	0.585074*** (0.0000)	0.653317*** (0.0000)
TLIB	55768052* (0.1934)	51714299 (0.2496)	2.365335*** (0.0000)
NFDI	3.165830*** (0.0000)	1.757978*** (0.0000)	1.880233*** (0.0000)
GFCF	-2.329912** (0.0142)	-1.357876 (0.1385)	-3.983894*** (0.0000)
LABF	78.32237 (0.8350)	-2651.320*** (0.0002)	-4137.808*** (0.0000)
TPOP	328.1426** (0.0376)	2544.374*** (0.0000)	3407.562*** (0.0000)
INFR	1507544 (0.8492)	-18781860*** (0.0004)	11104110*** (0.0002)
Constant	-4.674828	-1.459223*** (0.0000)	—
R-squared	0.856191	0.945169	—
Adjusted R-squared	0.854639	0.941490	—
F-statistic	551.7058	256.9416	—
Prob(F-statistic)	0.000000	0.000000	—
DW Statistic	0.615397	1.112414	—
AR(1)	—	—	-0.480478 (0.3546)
AR(2)	—	—	-0.326417 (0.5528)
Hansen J-statistic	—	—	36.73328
Prob(J-statistic)	—	—	0.299896
Instruments	—	—	10
Countries	45	45	45
Observations	844	844	788

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10. The values in the bracket signify significance of (a) estimated parameters and F-statistics and (b) failure to reject the null hypotheses of : (i) no autocorrelation in the AR(1) and AR(2) tests and (ii) the validity of the instruments in the

Hansen over-identifying restriction OIR test

**Source:** Author's computation, 2025

Table 4.2b above presents the empirical results of the relationship between trade liberalization and economic growth in SSA countries. The estimated results of Pooled Ordinary Least Squares (POLS), Fixed Effect Model (FEM) and Two-Step Difference Generalized Method of Moments (TSDGMM) for the relationship between these two variables are presented, reported and interpreted below.

The findings of the baseline regression using both panel ordinary least square (POLS) and panel fixed effects approaches are first reported. The results of the pooled OLS showed that: (a) the coefficient of the lagged dependent variable (RGDP(-1)) is statistically significant and considered to be the upper bound estimate; (b) the trade liberalization predictor influenced economic growth positively and significantly; (c) net foreign direct investment and population have statistically significant positive relationships with economic growth; (d) gross fixed capital formation exerted negative and significant relationship with economic growth; (e) labour force is the only predictor variable that influenced economic growth positively and insignificantly; (f) the R-squared value of 0.856191 indicates that eighty-five percent of the variation in the dependent variable is explained by the independent variables in the model. Due to the major weaknesses of pooled OLS approach which are: (i) the presence of unobserved individual-specific effects that are correlated with the independent variables, making pooled OLS to suffer from omitted variable bias; (ii) the pooled OLS estimates will be biased and inconsistent, as the model fails to control for the unobserved heterogeneity.

The parameter estimates of the panel fixed effects results are reported below due to the weaknesses of pooled OLS methodology enumerated above. Empirical findings of the panel fixed effects estimates showed that: (a) the coefficient of the lagged dependent variable (RGDP(-1)) is statistically significant and regarded as the lower bound estimate; (b) trade liberalization has positive but insignificant effect on economic growth; (c) net foreign direct investment and population are predictors that influenced economic growth positively and significantly; (d) gross fixed capital formation, labour force and inflation rate have statistically significant negative relationships with economic growth; (e) the R-squared value of 0.945169 indicates that ninety-four percent of the variation in the dependent variable is explained by the independent variables in the model. As a result of the primary limitation of fixed effects model which is unobserved heterogeneity due to unmeasured characteristics that do vary overtime, the two-step difference generalized method of moment estimator will be employed for this model.

From the table, the coefficient of the lagged dependent variable of difference GMM (0.653317) lies in-between the upper bound estimate (0.777817) and the lower bound estimate (0.585074) of the pooled OLS and panel fixed effects approach, signifying that the two-step difference GMM does not suffer from downward bias ( $0.585074 < 0.653317 < 0.777817$ ). The estimated results of the two-step difference GMM revealed that trade liberalization has a positive and statistically significant relationship with economic growth in SSA countries, *ceteris paribus*. The coefficient of the regressor is in line with apriori theoretical expectation about the sign and size of the magnitude. A one percent increase in trade liberalization resulted in 2.365335 percent corresponding rise in economic growth. This result is in line with the findings of some previous empirical studies (such as B. Dragusha et al. 2023<sup>4</sup>; O. O. Adeoye, 2023<sup>5</sup>; A. K. A. Ahmed & J. S. Hussein, 2023<sup>6</sup>; U. E. Ita et al. 2023<sup>7</sup>; S. Mohammed et al. 2022<sup>8</sup>; M. Ogundipe & A.

Adenekan, 2022<sup>9</sup>; I. U. Duru, 2021<sup>10</sup>; and O. A. Gideon, 2020<sup>11</sup>). The implication of this result is that the elimination of tariff and non-tariff barriers from the free flow of goods and services between SSA countries and the rest of the world has paved way for increased efficiency and specialization, access to international markets, attraction of foreign direct investment, increased competition and innovation, lower prices and increased consumption, creation of jobs, reduced poverty, integration into the global economy and encouraging domestic firms to become more competitive.

Furthermore, the estimated results also reveal that net foreign direct investment (NFDI) exerts a statistically significant positive relationship with economic growth, other things remain equal. A one unit change in net foreign direct investment results in 1.880233 units change in economic growth. This result is in line with theoretical expectation and implies that net foreign direct investment positively impacts economic growth in Sub-Saharan African countries by fostering capital formation and infrastructure development, technology transfer, increasing productivity, increased competitiveness and innovation, job creation and human capital development, and boosting exports.

Moreover, population (POP) has a positive and significant impact on economic growth in SSA countries, *ceteris paribus*. This result is consistent with theoretical expectation and can be interpreted as a one unit increase in population would result in 3407.562 units rise in economic growth. The implication of this result is that a larger, younger, and educated population in Sub-Saharan Africa can positively drive economic growth by increasing the workforce, creating demand for goods and services, and fostering innovation and technological advancement, ultimately boosting productivity and economic expansion but only if coupled with investments in education and infrastructure.

Conversely, government fixed capital formation (GFCF) and labour force (LABF) have statistically significant negative relationships with economic growth, all other factors remain constant. This result can be interpreted as a one percent increase in government fixed capital formation and labour force would bring about 3.983894 and 4137.808 corresponding percentage reductions in economic growth. Also, government fixed capital formation negatively affects economic growth in SSA countries due to factors like poor project selection, corruption and mismanagement, lack of private sector participation, poor institutional capacity, unfavorable macroeconomic conditions, and inefficient implementation, leading to wasted resources and reduced long-term productivity. Furthermore, the negative relationship between labour force and economic growth is inconsistent with a-priori theoretical expectation. The implication is that a large proportion of the workforce are aged, unproductive and dependent on the small working class population. It is also associated with slower economic growth through a range of channels including a lower worker-to population ratio.

Lastly, inflation rate (INFR) has a statistically significant positive association with economic growth contrary to economic theory. Based on the estimated results, trade liberalization has positive impact on economic growth of SSA countries, *ceteris paribus*.

The Hansen J-statistical probability value of 0.299896 which is higher than 5 percent (0.05) suggests that the over identifying restrictions imposed on the two-step difference generalized method of moments are valid. In addition, the Arellano and Bond first order serial correlation test AR(1) whose probability value is estimated at (0.3546) and second order serial correlation test with the probability value of (0.5528) conducted indicates the absence of first order and second-order serial correlations in the first differenced errors because the probability values of their chi-square statistics are greater than 0.05(5%). This suggests that the residuals are not

serially correlated. The implication of this is that the two-step difference generalized method of moments is an accurate and consistent estimator.

### 4.3.3 Analysis of the Third Objective

In this sub-section, the study presents the empirical results with reference to the relationship between human capital development and economic growth in SSA countries. The third model investigates the impact of human capital development on economic growth of the selected countries in Sub-Saharan Africa region. The explained and explanatory variables of interest include gross domestic product (GDP), labour force (LABF), government total expenditure on education (GTEE), government total expenditure on health (GTEH), human capital index (HCDI), primary school enrolment rate (PSER), secondary school enrolment rate (SSER), life expectancy rate (LER), infant mortality rate (IMR) and inflation rate (INFR). The mathematical expression of the above enumerated variables is symbolically given below:

$$GDPG = F(LABF, GTEE, GTEH, HCDI, PSER, SSER, LER, IMR, INFR) \quad (4.5)$$

The econometric form of this mathematical expression of the impact of human capital development on economic growth is shown below:

$$GRGDP_{it} = \Delta_{1i} + \Delta_{2it}LABF + \Delta_{3it}GTEE + \Delta_{4it}GTEH + \Delta_{5it}PSE + \Delta_{6it}SSE + \Delta_{7it}LER + \Delta_{8it}IMR + \Delta_{9it}NFR + U_{it} \quad (4.6)$$

The parameter estimates  $\Delta_2, \Delta_3, \Delta_4, \Delta_5, \Delta_6$  and  $\Delta_7$  are expected to exert positive impact on economic growth while  $\Delta_8, \Delta_9$  and  $\Delta_{10}$  are to influence economic growth negatively. Additionally, the coefficients  $\Delta_2$  to  $\Delta_{10}$  represent the elasticities of the variables because they measure the rate of change.  $\Delta_{1i}$  is the intercept of the above model.

**Table 4.2c Combined Estimated Results of Pooled Ordinary Least Squares, Fixed Effect Model and Two-Step Difference Generalized Method of Moments of Human Capital Development and Economic Growth (Model 3)**

**Dependent Variable: GDP**

Variables	Pooled Ordinary Least Squares	Fixed Effect Model	Two-Step Difference GMM
GDP(-1)	0.985374*** (0.0000)	0.796261*** (0.0000)	0.848521*** (0.0000)
HCDI	1.611568 (0.3402)	-5.710289 (0.9197)	1.29219*** (0.0000)
GTEE	-1.798967 (0.6550)	-3.763783 (0.5710)	-84042161 (0.6515)
GTEH	2.045281 (0.6103)	-1.670451 (0.7993)	-6.736059*** (0.0000)
PSER	-22455556 (0.5160)	1.067579 (0.1944)	-9113143 (0.3535)
SSER	55561527 (0.2753)	92179009 (0.4068)	2.825058*** (0.0000)
LABF	212.9756** (0.0285)	-547.7242 (0.2797)	-1850.255*** (0.0000)
LER	-94381812 (0.4064)	-4.493913 (0.5251)	-3.023445*** (0.0000)
IMR	28268624 (0.4553)	-91483089 (0.3761)	-4.114316*** (0.0000)
INFR	1.169366 * (0.11235)	1.327532* (0.1235)	1.964273*** (0.0000)
Constant	-5.720817	3.808939 (0.4318)	—
R-squared	0.982453	0.985753	—
Adjusted R-squared	0.982042	0.983913	—
F-statistic	2390.713***	535.5440***	—
Prob(F-statistic)	0.000000	0.000000	—
DW Statistic	1.657986	1.715779	—
AR(1)	—	—	-0.049904 (0.9602)
AR(2)	—	—	-0.193125 (0.8469)
Hansen J-statistic	—	—	27.98673
Prob(J-statistic)	—	—	0.465151
Number of Countries	45	45	45
Number of Observations	438	438	302

**Note:** \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$ . The values in the bracket signify significance of (a) estimated parameters and F-statistics and (b) failure to reject the null hypotheses of : (i) no autocorrelation in the AR(1) and AR(2) tests and (ii) the validity of the instruments in the Hansen over-identifying restriction OIR test

**Source:** Author's computation, 2025

From Table 4.2c above, the empirical results of the baseline regression models namely pooled ordinary least square (POLS) and panel fixed effects approach (PFE) are first reported below. The empirical findings of the pooled OLS methodology revealed that: (a) human capital development has a positive but insignificant impact on economic growth of SSA countries; (b) government total expenditure on health, secondary school enrolment rate and infant mortality rate have positive but insignificant relationships with economic growth; (c) government total expenditure on education, primary school enrolment rate and life expectancy rate exerted statistically insignificant negative relationships with economic growth; (d) labour force and inflation rate have positive and significant impacts on economic growth. The associated defects of this methodology which include presence of unobserved individual-specific effect that are correlated with the dependent variable, and the biasedness and inconsistent estimates generated compels the use of panel fixed effects approach. The estimated results of the fixed effects approach showed that: (a) human capital development has a negative but insignificant impact on economic growth; (b) primary school enrolment rate and secondary school enrolment rate influenced economic growth positively but with statistical insignificance; (c) government total expenditure on education, government total expenditure on health, labour force, life expectancy rate and infant mortality rate all have statistically insignificant negative relationships with economic growth of SSA countries; (d) inflation rate has a positive and significant impact on

economic growth. Due to the weakness of the panel fixed effects, the application of the two-step difference GMM becomes inevitable.

The suitability or appropriateness of the two-step difference GMM in estimating the parameter estimates of this model depends on whether the coefficient of its lagged dependent variable falls in-between the pooled OLS estimate and the fixed effects estimate ( $0.796261 < 0.848521 < 0.985374$ ), signifying the validity of the dynamic panel estimator employed. The empirical findings of the two-step difference GMM revealed that human capital development exerts a statistically significant positive effect on economic growth of SSA countries, *ceteris paribus*. A one percent change in human capital development would result in 1.29219 percentage change in economic growth. It can be interpreted to mean that there is an elastic relationship between the two variables. This result is in conformity with economic theory and the outcomes of some previous empirical studies (C. G. Eze, 2023<sup>12</sup>; F. A. Eniekez et al. 2023<sup>13</sup>; M. A. Wrajlng et al. 2023<sup>14</sup>; T. Simran & T. Saroosh, 2023<sup>15</sup>; I. Hussain & R. Chandra Das, 2023<sup>16</sup>; L. I. Euphemia, 2022<sup>17</sup>). The implication of this result is that investment in education and health of the workforce tends to boost productivity, and consequently economic growth in the region. Among the human capital development variables included in the model, only secondary school enrolment rate (SSER) has a statistically significant positive impact on economic growth, other factors remain constant. This suggests that a one unit percentage change in secondary school enrolment rate would result in 2.825058 units percentage change in economic growth, signifying an elastic relationship between the variables. This result is consistent with a-priori theoretical expectation. The implication of this result is that increased investment in education leads to increased economic growth. This includes higher salaries for individuals, greater workforce effectiveness, and higher gross domestic product. Moreover, countries with a greater proportion of their

population attending and graduating from schools experience faster economic growth than countries with less educated workers. As a result, many countries in SSA provide funding for primary and secondary education to improve economic performance.

The estimated results also reveal that labour force (LABF), life expectancy rate (LER) and infant mortality rate have statistically significant negative relationships with economic growth, *ceteris paribus*. This result can be interpreted as a one percentage increase in labour force, life expectancy and infant mortality rate would bring about 1850.255, 3.023445 and 4.114316 percentage reductions in economic growth. The negative relationship between labour force and economic growth implies that increased labour force participation, or the number of people working, does not necessarily translate to higher economic growth, and may even hinder it. This may be due to challenges in creating jobs, low productivity and vulnerable jobs, lack of innovation and industrialization, inefficient resource allocation, and poverty and inequality. Similarly, the adverse relationship between life expectancy rate and economic growth in SSA countries suggests that lower life expectancy in the region might hinder economic development, potentially due to factors like reduced labour productivity, increased healthcare costs, low human capital development and creation of circle of poverty. Furthermore, the unfavorable relationship between infant mortality rate and economic growth implies that as the region's economy grows, its infant mortality rate tends to decrease, suggesting that economic development can improve child health outcomes.

Other exogenous variables in the model such as government total expenditure on education (GTEE) and primary school enrolment rate (PSER) have statistically insignificant negative relationships with economic growth. The interpretation is that a one unit increase in government total expenditure on education and primary school enrolment rate would lead to 8.404216 and

9.113143 units decrease in economic growth. The implication of this result is that many SSA countries have not been given adequate budgetary allocation to education in general, and primary school education, in particular, leading to low human capital development and adverse economic growth. The Arellano and Bond first order AR (1) serial correlation test with the probability value of (0.9602) and second order serial correlation AR(2) test with the probability value of (0.8469) conducted indicates the acceptance of the null hypothesis that there is no first order and second order serial correlations in the first differenced errors, suggesting that the two-step difference generalized method of moments estimates are unbiased and consistent. Also, the Hansen J-statistical probability value of the chi-square (0.465151) which is greater than five percent (0.05) implies that the over identifying restrictions imposed on the two-step difference generalized method of moment (TSDGMM) model are valid.

#### **4.3.4 Analysis of the Fourth Objective**

In this sub-section, the study presents the empirical outcomes with reference to the effect of joint interaction of trade liberalization and human capital development on economic growth in SSA countries. Based on the theoretical and conceptual frameworks on the effect of trade liberalization and human capital development on economic growth of the selected Sub-Saharan African countries, an endogenous growth model that incorporates trade liberalization and human capital is specified. The specification allows for the identification of the channels through which trade liberalization, human capital development and other policy interventions affect economic growth of the SSA region over time. The dependent and independent variables of interest for the model specification include trade liberalization (TLIB), net foreign direct investment (NFDI), gross fixed capital formation (GFCF), labour force (LABF), government total expenditure on education (GTEE), government total expenditure on health (GTEH), human capital development

index (HCDI), primary school enrolment rate (PSER), secondary school enrolment rate (SSER), life expectancy rate (LER), infant mortality rate (IMR), and inflation rate (INFR). Consequently, this study specifies the trade liberalization-human capital –growth model explicitly in mathematical and econometric form as follows:

$$GRGDP = F(TLIB, NFDI, GCF, LABF, GTEE, GTEH, HCDI, PSSE, SSER, LER, IMR, INF) \quad (4.7)$$

The econometric form of the above mathematical model of the combined effect of trade liberalization and human capital on economic growth of selected Sub-Saharan African countries is depicted below:

$$GRGDP_{it} = \alpha_{1i} + \alpha_{2i}GRDGPI_{it-1} + \alpha_{3i}TPIB_{it} + \alpha_{4i}GTEE_{it} + \psi(TLIB \times HCDI)_{it} + \alpha_{5i}FDINV_{it} + \alpha_{6i}GCF_{it} + \alpha_{7i}LABF_{it} + \alpha_{8i}GTEH_{it} + \alpha_{9i}PSE_{it} + \alpha_{10i}SSE_{it} + \alpha_{11i}LER_{it} + \alpha_{12i}IMR_{it} + \alpha_{13i}INFR_{it} + \mu \quad (4.8)$$

The specification of equation (4.8) is aided by the endogenous growth theory and empirical studies as discovered from the literature. In this regard, the dependent variable in the growth equation is the RGDP, which is the value of the final goods and services produced within the territorial boundary of a country in a year when valued at constant prices. This is commonly used as an indicator of economic growth. The higher the level of real gross domestic product, the higher the level of growth of the economy while the converse is true. The parameter estimates  $\alpha_2$ ,  $\alpha_3$ ,  $\alpha_4$ ,  $\alpha_5$ ,  $\alpha_6$ ,  $\alpha_7$ ,  $\alpha_8$ ,  $\alpha_9$  and  $\alpha_{10}$  are expected, theoretically, to positively influence economic growth in the selected Sub-Saharan African (SSA) countries while  $\alpha_{11}$ ,  $\alpha_{12}$ , and  $\alpha_{13}$  should exert negative impact on economic growth of these economies.

4.2d Combined Estimated Results of Pooled Ordinary Least Squares, Fixed Effect Model and Two-Step Difference Generalized Method of Moments (Model 4)

Dependent Variable: GDP

Variables	Pooled Ordinary Least Squares	Fixed Effect Model	Two-Step Difference GMM
GDP(-1)	0.864591*** (0.0000)	0.746748*** (0.0000)	0.822869*** (0.0000)
TLIB	1.621041*** (0.0000)	1.910760 (0.4468)	5.653434** (0.0804)
HCDI	2.524281*** (0.0000)	1.959098*** (0.0001)	1.231471*** (0.0040)
GTEE	-2.513880*** (0.0087)	2.202420 (0.7556)	-1.903478* (0.0837)
GTEH	5.504429*** (0.0000)	-1.255762* (0.0755)	-1.313500* (0.0759)
INT	-3.152930*** (0.0000)	-8.029253* (0.1086)	-1.448118*** (0.0042)
NFDI	2.918773*** (0.0000)	1.576538*** (0.0000)	2.035275*** (0.0000)
GFCF	2.324549 (0.2309)	2.487074* (0.0753)	-81621678 (0.5000)
LABF	1352.800*** (0.0000)	3809.639*** (0.0000)	-292.8021 (0.6309)
PSER	-2.757079*** (0.0000)	-21497684 (0.7780)	67860363 (0.4587)
SSER	3.214199*** (0.0126)	-2.434048** (0.0325)	-74876541 (0.5467)
LER	-3.134183 (0.1285)	-5.567746*** (0.0012)	29841075 (0.9280)
IMR	71047641 (0.3308)	1.327689* (0.0727)	-1.613678*** (0.0080)
INFR	77259572 (0.5975)	1.732556** (0.0420)	88942947** (0.0238)
Constant	-1.132857*** (0.0002)	-7.371379*** (0.0155)	—
R-squared	0.915911	0.983579	
Adjusted R-squared	0.912204	0.980673	
F-statistic	247.1156	338.3773	
Prob(F-statistic)	0.000000	0.000000	

DW Statistic	0.294803	1.414556	
AR(1)	–	–	-0.000015 (0.9999)
AR(2)	–	–	-0.000264 (0.9998)
Hansen J-statistic	–	–	15.65077
Prob(J-statistic)	–	–	0.548713
Number of Countries	45	45	45
Number of Observations	380	380	247

**Note:** \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$ . The values in the bracket signify significance of (a) estimated parameters and F-statistics and (b) failure to reject the null hypotheses of : (i) no autocorrelation in the AR(1) and AR(2) tests and (ii) the validity of the instruments in the Hansen over-identifying restriction OIR test

**Source:** Author's computation, 2025

The empirical results of the baseline regression using the pooled OLS and panel fixed effects are reported below. The estimated results of the pooled OLS method revealed that: (a) trade liberalization has a positive and significant impact on economic growth at the estimated critical value of one percent (1%); (b) human capital development also influenced economic growth positively and significantly at the estimated critical value of one percent (1%); (c) government total expenditure on health, net foreign direct investment, labour force, and secondary school enrolment rate exerted statistically significant positive relationships with economic growth at the estimated critical values of one percent (1%); (d) government total expenditure on education, interactive variable, primary school enrolment rate and life expectancy rate have statistically significant negative relationships with economic growth; (e) infant mortality rate and inflation rate impacted economic growth positively with statistical insignificance; (f) the R-squared of 0.915911 indicates that ninety-one percent of the variations in the dependent are explained by the regressors in the model; (g) the probability of the F-statistic (0.000000) showed that the joint statistical significance of the explanatory variables in the model.

As a result of the demerits of pooled OLS methodology, the results obtained from fixed effects model are presented below and showed that (a) : trade liberalization has a positive and insignificant relationship with economic growth of SSA countries; (b) human capital development has a statistically significant positive impact on economic growth of SSA countries; (c) net foreign direct investment, government fixed capital formation, labour force, infant mortality rate and inflation rate all have positive and statistically significant relationships with economic growth of SSA countries; (d) government total expenditure on health, interactive variable, secondary school enrolment rate and life expectancy rate influenced economic growth negatively with statistical significance; (e) primary school enrolment rate is the only predictor that has a negative and insignificant association with economic growth; (f) government total expenditure on education has a positive but insignificant relationship with economic growth; (g) the R-squared of 0.983579 value suggests that ninety-eight percent of the variation in the dependent variable is explained by the independent variables in the model; (h) the probability value of the F-statistic (0.000000) indicates the joint statistical significance of the explanatory variables in the model.

Due to the weaknesses of the fixed effects model enumerated in the previous models, the two-step difference generalized method of moments shall be utilized for this model. From the empirical results of the joint effect of trade liberalization and human capital development on economic growth presented in table 4.4 above. The empirical findings showed that trade liberalization and human capital development separately are significant predictors of economic growth in SSA countries. However, the parameter estimates of trade liberalization and human capital development are positive and statistically significant at the 0.00 (1%) critical level. This can be interpreted as a one percent change in trade liberalization and human capital development

would lead to 5.653434 and 1.231471 percentage changes in economic growth, *ceteris paribus*. These results are in line with endogenous growth theory and human capital theory respectively. This result supports the previous empirical studies' findings (S. H. Wani, 2022<sup>18</sup>; T. K. Kerebana & I. J. Krama, 2021<sup>19</sup>; R. A. Intisar et al. 2020<sup>20</sup>). The implication of positive relationship between trade liberalization and economic growth is that the elimination of tariff and non-tariff barriers from the free flow of goods and services between SSA countries and the rest of the world has paved way for increased efficiency and specialization, access to international markets, attraction of foreign direct investment, increased competition and innovation, lower prices and increased consumption, creation of jobs, reduced poverty, integration into the global economy and encouraging domestic firms to become more competitive. The implication of positive effect of human capital development on economic growth is that investment in education, health and skills development by governments of SSA countries on their workforce tends to boost productivity, and consequently higher rate of economic growth in the region.

Similarly, net foreign direct investment (NFDI) exerts a statistically significant positive relationship with economic growth at the estimated 0.00 (1%) critical level, other things remain equal. A one unit change in net foreign direct investment results in 2.035275 units change in economic growth. This result is in line with theoretical expectation and implies that reducing barriers to international trade attracts foreign direct investment into SSA countries which positively impacts on economic growth in these economies by fostering capital formation and infrastructure development, technology transfer, knowledge spillovers, increased productivity, increased competitiveness and innovation, job creation and human capital development.

The empirical results also showed that government total expenditure on education (GTEE) and government total expenditure on health (GTEH) have statistically insignificant negative

associations with economic growth, *ceteris paribus*. A one unit change in government total expenditure on education and government total expenditure on health would result in 1.903478 and 1.373500 units' reduction in economic growth. This contracts with the expectation that investing in human capital through education and healthcare should lead to a more productive workforce and, consequently, economic growth. The implication of negative associations among government total expenditure on education, government total expenditure on health and economic growth is that increased spending in these sectors might not translate into the expected economic benefits, potentially due to factors like corruption and mismanagement, low institutional quality, ineffective policy implementation and excessive focus on recurrent spending.

The empirical findings further showed that government capital formation (GCF) has a statistically insignificant negative relationship with economic growth, *ceteris paribus*. This can be interpreted as a one unit change in government capital formation would lead to 81621678 units' reduction in economic growth, which is contrary to a-priori theoretical expectation. A negative relationship between gross capital formation and economic growth in SSA countries suggests that increased investment in capital assets like infrastructure and machinery may not lead to the expected boost in economic output, potentially hindering long-term development. The negative relationship could be due to inefficient investment, infrastructure deficiencies, inadequate financial systems, weak governance, corruption and unstable macroeconomic environments.

From the table, labour force (LABF) has a statistically significant negative impact on economic growth, all other things being equal. A one percent change in labour force would result in 292.8021 percentage reduction in economic growth. The negative relationship between the

dependent and independent variable implies that a larger, more active labour force may not translate into higher economic output, potentially due to factors like low productivity or skills mismatch, hindering overall development. There is need for SSA countries to focus on skills development, promote inclusive growth, diversify their economies, invest in infrastructure and promote women's labour force participation to change the narrative. Similarly, secondary school enrolment rate (SSER) exerts a statistically insignificant negative effect on economic growth, *ceteris paribus*. This result is not in conformity with a-priori theoretical expectation. A one percentage change in secondary school enrolment rate would lead to 74876541 percentage reduction or decline in economic growth. The implication of the negative relationship is that lower enrolment rates, rather than higher ones, are associated with economic growth, potentially due to factors like low school quality, low institutional quality, political instability, corruption and other economic predicaments.

Another predictor that affects economic growth negatively with a statistical significance of 0.00 (1%) critical value is infant mortality rate (IMR). The result can be interpreted as a one unit change in infant mortality rate would lead to 1.613678 units' reduction in economic growth. This result is in conformity with a-priori theoretical expectation, which suggests a negative relationship between the stimulus and outcome variable. A negative relationship between infant mortality rate and economic growth in SSA countries implies that as economic growth increases, infant mortality rates tend to decline, suggesting that economic development can improve child health outcomes. The mechanisms through which economic growth can lead to improvements in various factors that positively impact infant health include increased access to healthcare, improved living conditions, increased food security, increased levels of education and awareness about maternal and child health.

The empirical findings also indicate that inflation rate exerts a statistically significant negative relationship with economic growth, *ceteris paribus*. A one percentage change in inflation would result to 88942947 percentage increase in economic growth. This is contrary to a-priori theoretical expectation which suggests a negative relationship between inflation and economic growth. The implication of the adverse relationship between these variables in SSA countries is that higher inflation rates tend to be associated with slower economic growth, potentially leading to increased poverty and instability. In order to promote sustainable economic growth, SSA countries need to prioritize policies that control inflation and create a stable macroeconomic environment.

The Arellano and Bond first order serial correlation test AR (1) with the probability value of (0.9999) and second order serial correlation test AR (2) with the probability value of (0.9996) used in dynamic panel data models indicates that the null hypothesis must be accepted which states that there is no first order and second order serial correlations in the first differenced error term. This implies that the residuals are not serially correlated since the probability values of the tests are higher than 0.05 (5%). In addition, the Hansen J-statistic test of (15.65077) with the probability value of (0.548713) which is usually conducted to assess whether the over identifying restrictions imposed in a generalized method of moments model are valid or not reveals that the null hypothesis should be accepted. This implies that the instruments used are valid (exogenous) and the over identifying restrictions hold.

#### Endnotes

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## Chapter Five

### Conclusion

#### 5.1 Summary

The factors influencing economic growth in both developing and advanced countries of the world will continue to generate open discourse in the literature. Trade liberalization and human capital development have been largely recognized as two of the main drivers of economic growth recently. Several studies have been conducted in the literature to examine the effect of these variables on economic growth empirically across a broad range of economies. However, different conclusions were made by these studies owing to the methodologies employed, sample periods considered, the variables used as measurements of trade liberalization and human capital development, and most importantly country-specific effects. It is worth mentioning that the

linkage among these three variables have been examined empirically in other regions such as Asian, Europe, America and others while Sub-Saharan Africa's region has not been carried out.

Accordingly, the main objective of this research is to investigate empirically the links among trade liberalization, human capital development and economic growth in Sub-Saharan African countries for the period 2000-2022. In this study, the GDP growth rate is used as a proxy of economic growth, total trade to GDP as a measure of trade liberalization, while exports, imports, net foreign direct investment, gross capital formation, net migration and net official development assistance are other trade variables. Human capital development indicators used are human capital index, government total expenditure on education, government total expenditure on health, primary school enrolment rate, secondary school enrolment rate, life expectancy rate, and infant mortality rate. The first objective of the research was to analyze the influence of trade liberalization on human capital development in SSA countries. The study found that trade liberalization has statistically significant positive influence on human capital development in SSA countries. The implication of this positive relationship between these variables is that the adoption of trade liberalization by most SSA countries has boosted human capital development in the region via increase in government revenue from SSA exports to foreign markets which allows investment in education, health care delivery and skills development, culminating in human capital development. In addition, trade liberalization encourages transfer of modern technologies and managerial expertise from advanced foreign firms which can be adapted by local firms, resulting in increased efficiency and productivity of domestic workers, and ultimately human capital development.

In addition, imports (IMPT) and gross capital formation (GCF) have statistically significant positive relationships with human capital development. This implies that importation of high-

valued capital goods from international markets by SSA countries through trade liberalization with advanced countries resulted in increased production of goods and services in the region which affected economic growth positively, leading to acceleration of national incomes of these economies, and eventually massive investment in human capital development. The findings also revealed that net foreign direct investment (NFDI), net migration (NMGR) and net official development assistance (NODA) all have positive relationships with human capital development. The positive impact of net foreign direct investment (NFDI) on human capital development implies that it promotes technology transfer, knowledge spillovers, job creation, and the development of skilled labour through training and new industries, leading to higher overall productivity and earnings and hence, human capital development. Also, the implication of the positive relationship between net official development assistance (NODA) and human capital development (HCD) in SSA countries is that adequate funding interventions being received from advanced nations in key areas such as education, healthcare and economic empowerment, which collectively improve the skills, health and overall well-being of populations in SSA developing countries would lead to increased workers' productivity and consequently higher levels of human capital development.

The second objective of the study was to examine the effect of trade liberalization on economic growth of SSA countries. The evidence from the econometric result revealed that there is a positive and statistically significant relationship between trade liberalization and economic growth in SSA countries. The implication of this result is that reducing trade barriers leads to increased economic activity and prosperity. This can manifest in several ways, including attraction of foreign direct, increased competition and efficiency, technology transfer and knowledge spillovers, access to international markets, lower prices and increased consumption,

and creation of jobs, resulting to increased output of goods and services, and hence accelerated economic growth for the region. Furthermore, the estimated results also reveal that exports (EXPT) has a statistically significant positive relationship with economic growth which is consistent with economic theory. The implications of the positive association between these variables suggests that increased exports lead to higher economic growth, and vice versa. This relationship is often described as export-led growth, where exports serve as a key driver of economic expansion. The positive association between these variables also implies increased GDP, creation of employment opportunities, foreign exchange earnings, technological advancement, improved living standards, attraction of foreign direct investment and efficient resource allocation.

In addition, net foreign direct investment (NFDI) exerts a statistically significant positive relationship with economic growth. This implies that net foreign direct investment positively impacts economic growth in Sub-Saharan African countries by fostering capital formation and infrastructure development, technology transfer, increased productivity, increased competitiveness and innovation, job creation and human capital development, and consequently high rates of economic growth. Moreover, population (TPOP) has a positive and significant impact on economic growth in SSA countries. The implication of this result is that a larger, younger, and educated population in Sub-Saharan Africa can positively drive economic growth by increasing the workforce, creating demand for goods and services, and fostering innovation and technological advancement, ultimately boosting productivity and economic expansion but only if coupled with investments in education and infrastructure. Conversely, imports (IMPT), government capital formation (GCF) and labour force (LABF) have statistically significant negative relationships with economic growth, Regarding negative imports' coefficient, the

implication is that high imports levels in Sub-Saharan African countries owing to removal of trade barriers negatively impacted economic growth by straining the balance of payments, leading to currency devaluation, and potentially hindering the development of local industries that compete with imports. Moreover, net foreign direct investment enhances economic growth by ensuring improvement of various kinds of capitals, and research and development. Through means of technological transfer and its repercussions in the host SSA nations, multi-national corporations can boost industrial production, improve human capital development and enhance cooperation on research and development. Regarding the positive effect of net migration (NMGR) on human capital development, it implies that removal of trade barriers allows massive inflow of skilled migrants into SSA countries who can contribute to economic growth and innovation, while also potentially increasing returns to education and investment in human capital in the destination countries.

The third objective was to investigate the impact of human capital development on economic growth in SSA countries. The empirical results indicated that human capital development exerts a statistically significant positive impact on economic growth of SSA countries. The implication of this result is that adoption of trade liberalization by SSA countries enables their export products to be sold in both domestic and foreign markets, resulting in increased government revenues which allows these countries to make investments in education, health care delivery and skills development of their workforce, culminating in increased productivity, innovation and consequently accelerated economic growth in the region. Also, the positive association between the variables also implies that elimination of trade barriers would result in higher output, technological advancement, adaptability, improved standard of living and consequently higher rates of economic growth. Among the human capital development variables included in the

model, only secondary school enrolment rate (SSER) has a statistically significant positive impact on economic growth. The implication of this result is that reducing barriers to international trade leads to more exports to foreign countries, increased revenue of domestic industries, and raises the salaries of domestic workers and their ability to enroll their children in schools which have long run positive effect on economic growth. Moreover, countries with a greater proportion of their population attending and graduating from schools experience faster economic growth than countries with less educated workers. As a result, many countries in SSA provide funding for primary and secondary education to improve economic performance. The estimated results also reveal that labour force (LABF), life expectancy rate (LER) and infant mortality rate have statistically significant negative relationships with economic growth. The negative relationship between labour force and economic growth in SSA countries suggests that increases in labour force are associated with slower growth, which is counterintuitive to the typical positive relationship expected. This can arise from a combination of factors, including a mismatch between the skills of the labour force and the demands of the economy, lack of productive employment opportunities, lack of innovation and industrialization, and inefficient resource allocation.. Similarly, the adverse relationship between life expectancy rate and economic growth in SSA countries suggests that lower life expectancy in the region might hinder economic development, potentially due to factors like reduced labour productivity, increased healthcare costs, low human capital development and creation of circle of poverty. Other exogenous variables in the model such as government total expenditure on education (GTEE) and primary school enrolment rate (PSER) have statistically insignificant negative relationships with economic growth. The implication of this result is that many SSA countries have not been utilizing effectively the increased revenues derived from exportation of their products to foreign

countries owing to trade liberalization on adequate budgetary allocation to education in general, and primary school education, in particular, leading to low human capital development and adverse economic growth.

The fourth objective was to analyze the joint interaction effect of trade liberalization and human capital development on economic growth of SSA countries. Empirical findings revealed that trade liberalization and human capital development jointly have a statistically significant negative effect on economic growth in SSA countries. The implication of this negative joint effect of trade liberalization and human capital development on economic growth in SSA countries is that the combined positive impact of these two variables is less than the sum of their individual negative effects, potentially hindering overall economic progress. This could manifest as reduced efficiency gains from trade, limited capacity to adapt to new technologies, and persistent poverty. Trade liberalization, while generally beneficial, can exacerbate existing inequalities and hinder growth in countries with weak human capital development.

The implication of positive relationship between trade liberalization and economic growth is that the elimination of tariff and non-tariff barriers from the free flow of goods and services between SSA countries and the rest of the world has paved way for increased efficiency and specialization, access to international markets, attraction of foreign direct investment, increased competition and innovation, lower prices and increased consumption, creation of jobs, reduced poverty, integration into the global economy and encouraging domestic firms to become more competitive. The implication of positive effect of human capital development on economic growth is that elimination of trade barriers increases government revenues due to the disposal of exports goods at foreign markets which allows investment in education, health and skills development to be made by governments of SSA countries on their workforce, thus raising

productivity, and consequently higher rate of economic growth in the region. It also implies that elimination of trade barriers attracts foreign direct investments from abroad, resulting in transfer of modern technologies and managerial expertise from advanced countries which can be mimicked by local workers in domestic firms in SSA countries, culminating in higher level of human capital development. Similarly, net foreign direct investment (NFDI) exerts a statistically significant positive relationship with economic growth. This result is in line with theoretical expectation and implies that reducing barriers to international trade attracts foreign direct investment into SSA countries which positively impacts on economic growth in these economies by fostering capital formation and infrastructure development, technology transfer, knowledge spillovers, increased productivity, increased competitiveness and innovation, job creation and human capital development.

The empirical results also showed that government total expenditure on education (GTEE) and government total expenditure on health (GTEH) have statistically insignificant negative associations with economic growth. This contracts with the expectation that investing in human capital through education and healthcare should lead to a more productive workforce and, consequently, economic growth. The implication of negative associations among government total expenditure on education, government total expenditure on health and economic growth is that increased spending in these sectors might not translate into the expected economic benefits, potentially due to factors like corruption and mismanagement, low institutional quality, ineffective policy implementation and excessive focus on recurrent spending. The empirical results also revealed that exports (EXPT) and imports (IMPT) have statistically insignificant negative relationships with economic growth which is inconsistent with economic theory. A negative relationship between exports and economic growth suggests that lower exports might be

associated with slower economic growth due to non-diversification of export products and uncompetitive nature of export sector leading to export price volatility and lower export revenues. Similarly, the adverse relationship between imports and economic growth implies that higher imports might be associated with slower economic growth due to trade deficit and over-reliance on imported goods, making SSA countries vulnerable to global price fluctuations and supply disruptions.

The empirical findings further showed that government capital formation (GCF) has a statistically insignificant negative relationship with economic growth which is contrary to a-priori theoretical expectation. A negative relationship between gross capital formation and economic growth in SSA countries suggests that increased investment in capital assets like infrastructure and machinery may not lead to the expected boost in economic output, potentially hindering long-term development. The negative relationship could be due to inefficient investment, infrastructure deficiencies, inadequate financial systems, weak governance, corruption and unstable macroeconomic environments.

The negative relationship between labour force and economic growth implies that a larger, more active labour force may not translate into higher economic output, potentially due to factors like low productivity or skills mismatch, infrastructure deficit, unattractive remunerations, hindering overall development. There is need for SSA countries to focus on skills development, promote inclusive growth, diversify their economies, invest in infrastructure and promote women's labour force participation to change the narrative. Similarly, secondary school enrolment rate (SSER) exerts a statistically insignificant negative effect on economic growth, *ceteris paribus*. The implication of the negative relationship is that lower enrolment rates, rather than higher ones, are

associated with slower economic growth, potentially due to factors like low school quality, low institutional quality, political instability, corruption and other economic predicaments.

Another predictor that affects economic growth negatively with a statistical significance of 0.00 (1%) critical value is infant mortality rate (IMR). This result is in conformity with a-priori theoretical expectation, which suggests a negative relationship between the stimulus and outcome variable. A negative relationship between infant mortality rate and economic growth in SSA countries implies that as economic growth increases, infant mortality rates tend to decline, suggesting that economic development can improve child health outcomes. The mechanisms through which economic growth can lead to improvements in various factors that positively impact infant health include increased access to healthcare, improved living conditions, increased food security, increased levels of education and awareness about maternal and child health.

The empirical findings also indicate that inflation rate exerts a statistically significant negative relationship with economic growth, *ceteris paribus*. The implication of the adverse relationship between these variables in SSA countries is that reduction of trade barriers makes SSA export products more expensive than the imported ones from developed countries that enjoy lower rate of inflation. These local industries cannot compete favourably with well-developed foreign industries, resulting into reduced demand for locally produced goods, dwindling revenues for local industries, low investment, and consequently, slower rate of economic growth. Higher inflation rates tend to be associated with slower economic growth, potentially leading to increased poverty and instability. In order to promote sustainable economic growth, SSA countries need to prioritize policies that control inflation and create a stable macroeconomic environment.

## 5.2 Conclusion

The study investigated the links among trade liberalization, human capital development and economic growth in SSA countries over the period of 2000 to 2022. Empirical findings revealed that trade liberalization exerted a statistically significant positive relationship with human capital development in SSA countries. Specifically, imports, gross capital formation, net foreign direct investment, net migration, and net official development assistance, all have positive impacts on human capital development while exports had statistically significant negative relationship with human capital development in SSA countries during the reviewed period.

Furthermore, empirical evidence from the econometric results revealed that there is a positive and statistically significant relationship between trade liberalization and economic growth in SSA countries. The implication of this result is that reducing trade barriers leads to increased economic activity and prosperity. For simplicity sake, exports, net foreign direct investment, total population and inflation rate influenced economic growth positively while imports, gross capital formation and labour force impacted economic growth negatively.

In addition, empirical results from the study also indicated that human capital development exerted a statistically significant positive effect on economic growth in SSA countries. For clarification, human capital index, secondary school enrolment rate and inflation rate have significant positive impacts on economic growth while government total expenditure on education, government total expenditure on health, primary school enrolment rate, labour force, life expectancy rate and infant mortality rate exerted negative impacts on economic growth. The interactive effect of trade liberalization with human capital development on output growth was

negative and statistically significant. Although, each of these variables exerted positive influence on economic growth individually but collectively, they impacted negative influence on economic growth in SSA countries.

### **5.3 Recommendations**

In order to enhance economic growth in Sub-Saharan African countries, the following policy measures are recommended to improve both trade liberalization and human capital development:

**a.** The governments of SSA countries should invest massively in education and skills development, particularly in areas related to the needs of a more open and globally integrated economy. This includes strengthening vocational training programs, promoting science, technology, engineering, and mathematics (STEM) education, and ensuring access to quality education for all citizens. Additionally, governments should implement policies that support the transition of workers from declining sectors to more competitive industries, through retraining programs and social safety nets.

**b.** There should be implementation of complementary policies that address potential challenges and enhance the benefits of trade liberalization by SSA countries. This includes strengthening domestic revenue mobilization, investing in infrastructure, and providing targeted support for small and medium enterprises (SMEs) to mitigate the negative impacts of increased competition. Additionally, fostering regional cooperation through frameworks like the Central African Economic Community (CEMAC) can enhance intra-regional trade and economic stability.

**c.** There should be prioritization of investments in quality education and skills development, while also ensuring these investments are free from corruption and implemented effectively by SSA countries. This includes expanding access to secondary and higher education, enhancing the

quality of education through teacher training and curriculum development, and promoting vocational training programs that align with labour market needs.

**d.** Governments of SSA countries should prioritize trade liberalization alongside investments in quality education and skills development alongside trade liberalization. This means focusing on enhancing the skills and knowledge of the workforce to effectively participate in and benefit from increased international trade. SSA governments should invest in education systems that equip citizens with the skills needed for a globalized economy. This includes vocational training, technical skills development, and higher education focused on areas relevant to international trade and technological advancements. Also, reduction of trade barriers (tariffs, quotas, and embargo) can boost economic growth by increasing competition, fostering innovation, and improving access to global markets.

**e.** Another recommendation that will enable SSA countries to maximize the positive impact of trade liberalization and human capital development on economic growth is massive investment in trade infrastructure and technology. Improvement in trade infrastructure reduces logistic costs, enhances trade efficiency, and promotes regional connectivity. The unavailability of critical infrastructure in most Sub-Saharan African countries necessary for attraction of local and foreign investors has been adversely affecting their rates of economic growth. Also, there should be encouragement of investment in research and development that can help SSA countries innovate and adapt to new technologies, further enhancing their competitiveness in the global market. Thus, for these economies to experience rapid economic growth, there should be massive investments in infrastructural development such as construction of roads, provision of uninterrupted power, communication, railways, airports, pipe-borne water and others that have caused many multi-national corporations to leave these countries.

f. Another recommendation by this study is that Sub-Saharan African countries should ensure that there exists sound macroeconomic stability that will foster positive economic growth by creating a predictable and stable environment for businesses and investors. This stability reduces uncertainty, encourages private investment, and supports overall economic activity. Specifically, stable inflation, low interest rates, and a stable exchange rate can boost growth by making it cheaper to borrow, and more predictable for businesses to plan long-term investments. For these economies to continue to experience high rates of economic growth, a sound macroeconomic stability is key. This will make it possible for these countries to attract both domestic and foreign investments. Investors are less likely to invest in countries with high inflation, volatile exchange rates, or unpredictable government policies. Econometric evidence suggests that private investment is significantly and negatively influenced by uncertainty and macroeconomic instability. In addition, a stable exchange rate encourages international trade and foreign direct investment, which are key drivers of economic growth in Sub-Saharan African countries. In essence, macroeconomic stability will create a fertile ground for economic growth in SSA countries by reducing uncertainty, encouraging investment, and supporting overall economic activity.

g. Sub-Saharan African countries should establish strong institutions that promote good governance, transparency, and the rule of law that are vital for creating a stable environment for both trade and human capital development.

#### **5.4 Contributions to Knowledge**

1. This study made significant contribution to knowledge by examining the interaction effect of trade liberalization and human capital development in Sub-Saharan African countries in order to find out whether high level of human capital development will make trade liberalization have a better significant impact on economic growth in these economies. The study found from empirical analysis that trade liberalization affects economic growth more significantly when there is high level of human capital development in these countries. Due to the low level of human capital development in Sub-Saharan African countries as evident from the data released by World Development Indicators (WDI) for this variable, the empirical result of the joint effect of trade liberalization and human capital development showed a statistically significant negative impact on economic growth for this region. It is this area that this study makes significant contribution.

2. The theoretical literature holds the view that human capital development is important in determining the impact of trade liberalization on economic growth. In other words, the extent of the impact of trade liberalization on economic growth depends on the level of human capital development in the country. Therefore, by investigating the links among trade liberalization, human capital development and economic growth, this study had been able to validate this theoretical assertion because using empirical data from the Sub-Saharan African countries, it was observed that the level of human capital development affects the effect of trade liberalization on economic growth.

3. The level of human capital development goes a long way in influencing the rate of economic growth of any country. It is this light that this study investigated how human capital development level in SSA countries has impacted on their rates of economic growth. This study made its

contribution to knowledge in this area as just a few studies have attempted to examine this combination. The few studies in this area are country-specific.

4. Another area where this study has made significant contribution is in methodology. The existing studies in this area, even though they are country specific, have never employed Pooled Ordinary Least Squares (POLS), Fixed Effects Model (FEM) and Generalized Method of Moments (GMM) in estimating the parameters of their models. This study utilized these techniques in estimating the parameters of the four models developed for examining the impact of trade liberalization and human capital development on economic growth in Sub-Saharan African countries.

5. The empirical results obtained from this study would assist governments of SSA countries in policy formulations in respect of trade liberalization, human capital development and economic growth. This is crucial for attracting domestic and foreign investments needed to accelerate economic growth in this region. This means that SSA countries have to ensure the effective implementation of policies that would promote trade liberalization such as reduction in tariffs and eliminating non-tariff barriers; promoting regional trade integration through the formation of regional trade agreements to foster trade and investment within the region; diversification of their economies by navigating beyond heavy reliance on exportation of raw materials and commodities into higher-value-added sectors like manufacturing, technology and services. These countries would also implement policies to promote human capital development such as prioritization of education, healthcare, and skills development to enhance workforce quality and productivity. This area has not been extensively researched into, especially in SSA countries. This study is making a significant contribution in this aspect, in order for the government authorities in these countries to put in place reasonable measures that will promote trade

liberalization as well as measures that will improve human capital development. Consequently, there will be acceleration in their rates of economic growth if this is done.

### **5.5 Suggestions for Further Studies**

This study investigated the effect of trade liberalization and human capital development (focusing on total trade to GDP ratio, exports, imports, net foreign direct investments, gross capital formation, net migration, net official development assistance, inflation rate, human capital index, government total expenditure on education, government total expenditure on health, primary school enrolment rate, labour force, total population, life expectancy rate, infant mortality rate and secondary school enrolment rate) on economic growth in Sub-Saharan African countries. Since there are other measures of trade liberalization and human capital development apart from the ones employed in this study, the researcher suggests further research in this other indicators of trade liberalization and human capital development on economic growth.

Methodologically, further research can be carried out on the impact of trade liberalization and human capital development in Sub-Saharan African countries using different estimating techniques such as Two Stage Least Squares (TSLS), Vector Auto Regression (VAR), Autoregressive Distributed Lag Model (ARDLM) which are different from the Pooled Ordinary Least Squares (POLS), Fixed Effects Model (FEM) and Generalized Method of Moments (GMM) estimating techniques employed by this study.

In terms of data utilization, this study made use of both cross-sectional and time series data and it focused on forty five (45) countries in SSA region. Further research can be carried out using the case of a single country like Nigeria, Mauritius, Seychelles, South Africa, Ghana, Mozambique or any other country of interest or examining two countries in a comparative manner to carry out

an in-depth case study. This will enable the researcher to see what the outcome of the study would look like and will entail using only time series data. The one-country or two-country study would be country-specific unlike the result that borders on the combination of countries.

Lastly, another suggested area in which further research can be done is in the area of investigating the effect of trade liberalization on national income. This is imperative in order to find out empirically whether elimination of tariffs and non-tariff barriers on international trade in a country has any significant effect on its national income. It is expected theoretically that exposure of a country's goods and services to international markets would have positive effect on her national income because of increased demand of such products both domestically and internationally.

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## Appendix

### Appendix 4a

#### Presentation of Panel Ordinary Least Squares Regression Result (Model 1)

Dependent Variable: HCDI

Method: Panel Least Squares

Periods included: 23

Cross-sections included: 45

Number of Observations: 852

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HCDI (-1)	0.985532***	0.002274	433.4134	0.0000
TLIB	6.269582	1.13E-05	0.554664	0.5793
EXPT	2.182826	1.92E-05	1.136952	0.2559
IMPT	-1.807382	1.66E-05	-1.091265	0.2755

NFDI	1.230484	1.12E-13	1.103672	0.2701
GFCF	3.333686*	2.58E-05	1.293909	0.1961
NMGR	6.651989**	3.37E-09	1.970984	0.0491
NODA	-2.174526	2.66E-13	-0.818270	0.4134
C	0.011483***	0.001132	10.14370	0.0000
R-squared	0.997111	Adjusted R-squared	0.997084	DW= 1.224586
F-statistic = 36372.48	Pro(F-statistic)= 0.000000			

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10. The asterisk values signify significance of the estimated parameters and F-statistics. **Appendix 4b**

### **Presentation of Panel Fixed Effect Model Result (Model 1)**

**Dependent Variable: HCDI**

**Method: Panel Least Squares**

**Periods included: 23**

**Cross-sections included: 45**

**Number of Observations: 852**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HCDI(-1)	0.941916***	0.005205	180.9478	0.0000
TLIB	1.391166	1.92E-05	0.072297	0.9424

EXPT	-4.083251	3.35E-05	-1.219612	0.2230
IMPT	-1.293376	3.64E-05	-0.355689	0.7222
NFRDI	1.831760*	1.22E-13	1.500446	0.1339
GFCF	0.000100***	3.84E-05	2.612062	0.0092
NMGR	8.117483**	3.56E-09	2.277581	0.0230
NODA	3.761953	5.44E-13	0.690696	0.4900
C	0.033385***	0.002758	12.10611	0.0000
R-squared = 0.997637	Adjusted R-squared = 0.997492	DW = 1.433133	F-statistic = 6909.067	Prob(F-statistic) = 0.00000***

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10 signify significance of the estimated parameters and F-statistics

#### Appendix 4c

#### Presentation of Two-Step Difference (GMM) Estimated Result (Model 1)

**Dependent Variable: HCDI**

**Method: Two-Step Difference Generalized Method of Moments**

**Periods included: 23**

**Number of Cross-sections included: 45**

**Number of Observations: 801**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HCDI(-1)	0.934824***	0.003837	243.6036	0.0000
TLIB	1.210697**	6.044206	2.004887	0.0453
EXPT	-4.920651**	2.301105	-2.140437	0.0326
IMPT	5.173297***	1.990205	2.599408	0.0095
NFDI	1.880209*	1.412113	1.329677	0.1840
GFCF	0.000321***	2.914405	11.02476	0.0000
NMGR	4.860226*	3.582209	1.359408	0.1744
NODA	5.813689	6.277113	0.927595	0.3539
J-statistic= 37.68040	Pro(J-statistic)= 0.304531	Instrument rank = 42		

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10. The asterisk values signify significance of the estimated parameters, a J-statistics and the validity of the instruments in the Hansen over-identifying restriction OIR test

#### **Appendix 4d**

#### **Panel Ordinary Least Squares Estimated Result (Model 2)**

**Dependent Variable: GDP**

**Method: Panel Least Squares**

**Periods included: 23**

**Number of Cross-sections included: 45**

**Number of Observations: 844**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.777817***	0.015662	49.66405	0.0000
TLIB	55768052.09*	42848352	1.301522	0.1934
EXPT	1.484971**	64689479	2.285529	0.0225
IMPT	-1.085093*	67234251	-1.601132	0.1097
NFDI	3.165830***	0.454482	6.965801	0.0000
GFCF	-2.329912*	94278656	-2.456538	0.0142
LABF	78.32237	375.8779	0.208372	0.8350
POP	328.1426**	157.5520	2.082757	0.0376
INFR	1507544	7925659	0.190211	0.8492
C	-4.674828	2.51E-09	-0.186309	0.8522
R-squared = 0.856191	Adjusted R-squared = 0.854639	R- =	F-statistic = 551.7058 Pro(Fstatistic) = 0.000000	DW = 0.615397

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10 signify significance of the estimated parameters and F-statistics

#### Appendix 4e

#### Panel Fixed Effect Model Result (Model 2)

**Dependent Variable: GDP**

**Method: Panel Least Squares**

**Periods included: 23**

**Cross-sections included: 45**

**Number of Observations: 844**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.585074***	0.026601	21.99449	0.0000
TLIB	51714299	44883626	1.152186	0.2496
EXPT	2.319552***	71913932	3.207939	0.0014
IMPT	-1.634618**	78547954	-2.081045	0.0378
NFDI	1.757985***	0.308998	5.689290	0.0000
GFCF	-1.357876*	91021304	-1.482936	0.1385
LABF	-2651.320***	701.56401	-3.779156	0.0002
POP	2544.374***	291.5545	8.726926	0.0000
INFR	-18781860***	5301709	-3.542605	0.0004
C	-1.459224***	2.91E-09	-4.984471	0.0000
R-squared = 0.945169	Adjusted R-squared = 0.941490	F-statistic = 256.9416 Pro(F- statistic) = 0.000000***	DW = 1.12414	

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10 signify significance of the estimated parameters and F-statistics

## Appendix 4f

### Two-Step Difference Generalized Method of Moments Result (Model 2)

Dependent Variable: GDP

Method: Two-Step Difference Generalized Method of Moments

Periods included: 23

Cross-sections included: 41

Number of Observations: 788

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.573317***	0.000893	641.8738	0.0000
TLIB	2.365332***	13829649	17.03249	0.0000
EXPT	5.723353***	15824874	36.16682	0.0000
IMPT	-5.461207***	19281533	-28.32351	0.0000
NFDI	1.880233***	0.016526	113.7734	0.0000
GFCF	-3.983894***	35233275	-11.29157	0.0000
LABF	-4137.808***	94.31298	-43.87315	0.0000
POP	3407.562***	100.0694	34.05198	0.0000
INFR	11104110***	3016514	3.681106	0.0002
J-statistic =	Pro(J-statistic) =	Instrument rank =		
36.73328	0.299896	42		

**Note:** \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$ . The asterisk values signify significance of the estimated parameters, a J-statistics and the validity of the instruments in the Hansen over-identifying restriction OIR test

**Appendix 4g**

**Pooled Ordinary Least Squares Result (Model 3)**

**Dependent Variable: GDP**

**Method: Panel Least Squares**

**Periods included: 23**

**Cross-sections included: 45**

**Number of Observations: 438**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.985374***	0.014313	68.84486	0.0000
HCDI	1.611568	1.69E+10	0.954870	0.3402
GTEE	-1.798966	4.00E+08	-0.447124	0.6550
GTEH	2.052809	4.01E+08	0.510046	0.6103
PSER	-22455556	34541375	-0.650106	0.5160
SSER	55561527	50863193	1.092372	0.2753
LABF	212.9756**	96.91873	2.197466	0.0285
LER	-94381812	1.14E+08	-0.831145	0.4064
IMR	28268624	37825493	0.747343	0.4553

INFR	1.169366*	74015108	1.563109	0.1188
C	-5.720817	1.41E+10	-0.405670	0.6852
F-statistic = 2390.713	Pro(F-statistic) = 0.000000***	DW = 1.657986	R-squared = 0.982453	Adjusted R-squared=0.982042

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10 signify significance of the estimated parameters and F-statistics

#### Appendix 4h

#### Panel Fixed Effect Model Result (Model 3)

**Dependent Variable: GDP**

**Method: Panel Least Squares**

**Periods included: 23**

**Cross-sections included: 45**

**Number of Observations: 438**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.796261***	0.027562	28.88946	0.0000
HCDI	-5.715029	5.66E+10	-0.100862	0.9197
GTEE	-3.762678	6.63E+08	-0.567125	0.5710
GTEH	-1.670451	6.55E+08	-0.254474	0.7993
PSER	1.067569	81456046	1.299789	0.1944
SSER	92179009	1.11E+08	0.830374	0.4068

LABF	-547.7242	505.9238	-1.082622	0.2797
LER	-4.493913	7.06E+08	-0.636131	0.5251
IMR	-91483089	1.03E+08	-0.886157	0.3761
INFR	1.327532*	85493762	1.543684	0.1235
C	3.809391	4.83E+10	0.786934	0.4318
R-squared = 0.985753	Adjusted squared = 0.983913	R- =	F-statistic = 535.5440	Pro(F-statistic) = 0.000000*** DW = 1.715779

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10 signify significance of the estimated parameters and F-statistics

#### Appendix 4i

#### Two-Step Difference Generalized Method of Moments Result (Model 3)

**Dependent Variable: GDP**

**Method: Two-Step Difference Generalized Method of Moments**

**Periods included: 23**

**Cross-sections included: 45**

**Number of Observations: 302**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.798521***	0.000444	1799.438	0.0000
HCDI	1.202196***	5.672208	21.13228	0.0000

GTEE	-84042161	1.862208	-0.452196	0.6515
GTEH	-6.728606***	44660041	-15.06628	0.0000
PSER	-9113143	9806688	-0.929278	0.3635
SSER	2.825608***	6648207	42.39497	0.0000
LABF	-1850.255***	57.60066	-32.12212	0.0000
LER	-3.023445***	45831069	-65.96933	0.0000
IMR	-4.114316***	9717913	-42.28718	0.0000
INFR	1.964273***	5611313	35.00559	0.0000
J-statistic = 27.98673	Prob(J-statistic) = 0.465151	Instrument rank = 38		

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10. The asterisk values signify significance of the estimated parameters, a J-statistics and the validity of the instruments in the Hansen over-identifying restriction OIR test

#### Appendix 4j

#### Panel Ordinary Least Squares Estimated Result (Model 4)

**Dependent Variable: GDP**

**Method: Panel Least Squares**

**Periods included: 23**

**Cross-sections included: 45**

**Number of Observations: 380**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.684591***	0.023972	28.55740	0.0000
TLIB	1.621040***	3.324408	4.875552	0.0000
HCDI	2.524280***	5.253410	4.809413	0.0000
GTEE	-2.513880***	9.536208	-2.636673	0.0000
GTEH	5.504429***	8.705608	6.326181	0.0087
INT	-3.152930***	6.704208	-4.707590	0.0000
EXPT	3.622554**	1.796708	2.025374	0.0436
IMPT	-6.451033***	1.465808	-4.404525	0.0000
NFDI	2.918773***	0.547328	5.332770	0.0000
GFCF	2.324549	1.947208	1.200035	0.2309
LABF	1352.800***	215.9464	6.264519	0.0000
PSER	-2.707973	68575582	-3.931003	0.0001
SSER	3.214199	1.287708	2.508451	0.0126
LER	-3.134182	2.065408	-1.523363	0.1285
IMR	71047641	72963266	0.973745	0.3308
INFR	77259572	1.465308	0.528444	0.5975
C	-1.132857	3.068510	-3.701675	0.0002
R-squared = 0.915911	Adjusted R-squared = 0.912204	R- =	F-statistic = 247.1156 Pro(F-statistic) = 0.000000***	DW = 0.294803

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10 signify significance of the estimated parameters and F-statistics

## Appendix 4k

### Panel Fixed Effect Model Estimated Result (Model 4)

**Dependent Variable: GDP**

**Method: Panel Least Squares**

**Periods included: 23**

**Cross-sections included: 45**

**Number of Observations: 380**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.746748***	0.028245	26.43857	0.0000
TLIB	1.915808	2.513608	0.761763	0.4468
HCDI	1.952411***	4.746810	4.105207	0.0001
GTEE	2.209408	7.075308	0.311465	0.7556
GTEH	-1.255709*	6.994208	-1.782919	0.0756
INT	-8.025508*	4.987708	-1.608871	0.1086
EXPT	4.085408***	1.433508	2.855961	0.0046
IMPT	-2.726408**	1.365408	-1.998000	0.0466
NFDI	1.576538***	0.275709	5.718126	0.0000
GFCF	2.486608*	1.395608	1.784621	0.0753

LABF	3809.639***	383.0773	9.944831	0.0000
PSER	-21497684	76188145	-0.282166	0.7780
SSER	-2.432508**	1.139408	-2.147095	0.0325
LER	-5.564408***	1.715808	-3.257816	0.0012
IMR	1.324408*	73062170	1.800890	0.0727
INFR	1.7386**	84693734	2.041775	0.0420
C	-7.378710**	3.034410	-2.433887	0.0155
R-squared = 0.983579	Adjusted R-squared = 0.980673	F-statistic = 338.3773	Prob(F-statistic) = 0.000000***	DW = 1.414556

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10 signify significance of the estimated parameters and F-statistics

#### Appendix 4I

**Two-Step Difference Generalized Method of Moments Estimated Result (Model 4)**

**Dependent Variable: GDP**

**Method: Two-Step Difference Generalized Method of Moments**

**Periods included: 23**

**Cross-sections included: 45**

**Number of Observations: 247**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.822869***	0.005202	158.1968	0.0000
TLIB	5.653208*	3.225108	1.756172	0.0804
HCDI	1.235511***	4.224610	2.904760	0.0040
GTEE	-1.909347*	1.094409	-1.737116	0.0837
GTEH	-1.313500*	7.374308	-1.782976	0.0759
INT	-1.448183***	4.975208	-2.893288	0.0042
EXPT	-79070662	94679439	-0.835141	0.4045
IMPT	-1.610664	1.276408	-1.262318000	0.2081
NFDI	2.035275***	0.029120	69.89237	0.0000
GFCF	-81621678	1.217508	-0.675489	0.5000
LABF	-292.8021	608.6598	-0.481060	0.6309
PSER	67860363	91430984	0.742203	0.4587
SSER	-74876541	1.243308	-0.603662	0.5467
LER	29841075	3.305408	0.090465	0.9280
IMR	-1.619841***	60353551	-2.673708	0.0080
INFR	88942947**	39079631	2.275941	0.0238
J-statistic = 15.65077	Pro(J-statistic) = 0.548713	Instrument rank = 33		

**Note:** \*\*\*p<0.01, \*\*p<0.05, \*p<0.10. The asterisk values signify significance of the estimated parameters, a J-statistics and the validity of the instruments in the Hansen over-identifying restriction OIR test

## Biodata

### A. Personal Information

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Oyo State College of Arts and Social Sciences	1987-1989
Baptist Secondary Grammar School, Koso, Iseyin	1982-1986

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### Date

National Institute of Management of Nigeria (NIM)	2001
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### Work Experience with Dates

### Date

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**Publications (if any)**

- Aderoju, B. R. & Odunsi-Oyewole O. A. (2019). Empirical Analysis of Monetary Policies and Balance of Trade Dynamics in Nigeria. *International Journal of Poverty, Investment and Development* 50, 78-91
- Aderoju, B. R. & Mosobalaje, R. O. (2019). Interface of Service Sector and Economic Growth in Nigeria: An Empirical Investigation. *International Journal of Poverty, Investment and Development*, 49, 51-62
- Aderoju, B. R. (2018). An Empirical Investigation of Foreign Direct Investment, Export, Import and Government Revenue Generation in Nigeria. *Journal of Resources Development and Management* 51, 32-47
- Aderoju, B. R. (2018). External Debt, Debt Servicing and Economic Services Provision in Nigeria: An Empirical Exploration. *Journal of Economics and Sustainable Development* 9:6, 88-97

**Conference attended with dates and papers presented, if any:**

- 3rd National Conference of School of Arts and Social Sciences, Oyo State College of Education, Lanlate, Oyo State, Nigeria, 2025
- 4<sup>th</sup> International Conference of Faculty of Management and Social Sciences, Lead City University, Ibadan, Oyo State, Nigeria, 2025
- 3<sup>rd</sup> International Conference of Faculty of Management and Social Sciences, Lead City University, Ibadan, Oyo State, Nigeria, 2024

Signature

Date

### **University Compliance Certificate**

This is to certify that thesis written by Bolanle Rahmon ADEROJU with matriculation number LCU/PG/002590 in the Department of Economics, Faculty of Management and Social Sciences, Lead City University, Ibadan, is in full compliance with the approved University format and style.

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Signature

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Date

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