THE EFFECT OF HUMAN CAPITAL ON ECONOMIC GROWTH IN SOME SUB SAHARA AFRICAN COUNTRIES (SSA)

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Abstract

Purpose: This research looked into debate on the possible impact of human capital on economic growth in Sub-Saharan Africa (SSA) and considers two alternative measures of human capital: health and education.

Methodology: The research used a dynamic model based on the system generalized method of moments (SGMM) and analysed a balanced panel data covering 35 countries from 1986–2018. The research used Microsoft excel to record all the data gotten from the world indicator data base from world bank, penn world table data base and CANA database. The analysis was presented in a tabular form.

Findings: This study found that human capital has an overall positive and statistically significant impact on economic growth in the SSA region, although, democracy has a negative and statistically significant impact on economic growth in the region. This finding shows the importance of both measures of human capital and aligns with the argument in the literature that neither education nor health is a perfect substitute for the other as a measure of human capital.

Unique contribution to theory, practice and policy: Generally, the finding emphasised that both education and health measures of human capital are important, and that policymakers must consider the level of economic development while formulating policies that can enhance the impact of human capital on economic growth in the Sub-Saharan Africa region.

Keywords: *Human capital (health and education), economic growth, sub-Saharan Africa (SSA).*

1.0 INTRODUCTION

Human capital has brought so many changes and improvement over the years. History has shown that African economy used to be poor due to low income levels, lack of skills and trainings, lack of education and knowledge and poor health systems. But now there is a better economy because there is an improvement in the health sector, increased knowledge and demographic transition.

Economic growth can be defined as the growth or expansion in commodities and merchandise manufactured in a country. It is also known as a steady rise in gross domestic product per capita. Growth like this shows the extent of development every country wants, especially in an internationally competitive environment (Koc, 2013). Labour on the other hand is a manufacturing component used for the betterment of economic growth through manufacturing goods and services. Investing in labour helps in the enhancement of the productiveness of human capital. The understanding, skills, expertise, training and similar benefits of independent individuals seriously influence the manufacturing components through labor and promote economic development (Koç, 2013). Therefore, every additional benefit to labor increases economic growth. The hypothesis of human capital considers the individual not only as a part of the manufacturing process but as a vital process in the development of economic progress (Özşahin & Karaçor, 2013).

1.1 Human capital

Oxford English Dictionary defines human capital as "a craft or an expertise obtained by the labor force which is considered as a benefit or resource." In other words it can be defined as an act of investment (such as; education, training, health) that can increase an individual's productivity. Schultz (1961) and Becker (1964) defined human capital as a skill or ability that can be obtained over time by means of training, migration, medical care, education and work experience. Human capital can therefore be segregated into three major components: health, education and experience/training; and these could increase through better education, higher health status and new learning.

Human capital can be defined as knowledge, skills, and abilities through training, education, experience and also medical care. These can be modified into three elements. (Health, Education and Training experience). Human capital's supply can be expanded through investing in better education, better health care and learning new things. According to Romer (1990) human capital is the origin of economic regulation. The OECD (Organisation for Economic Co-operation and Development) describes human capital as the benefactors of learning, understanding and expertise manufactured by someone to a nation's economy thereby developing socially and economically (Eser & Gökmen, 2009). Human capital can also be described as all types of learning, understanding and experience obtained by an individual.

Investing on human capital is very important in the aspect of economic competition among countries. Past studies like world economic survey United Nations (UN, 1968) and the contributions of education to economic growth (Catherine, 2017) showed that economic growth could not be attained by only upgrading physical conditions. Also, the knowledge and skills earned by working and manufacturing people should also be welcomed as a weapon for economic development.

Education

Education is a way of learning, understanding, acquiring skills, expertise, values, morals, beliefs, and habits. Ways of acquiring education are tutoring or teaching, mentoring, training, storytelling, discussion and directed research. Education mostly happens under the supervision of tutors; although some individuals are self-taught. Education or learning in general can happen in a casual environment or a formal environment like schools. Any type of experience that affects or changes the way one thinks, feels, or acts may be considered educational CD Lamichhane (2018), Wikipedia (2020).

Health

Health is a state of physical, mental and social well-being in which disease and infirmity are absent. There are certain ways of ensuring good health or living healthy, these are eating healthy, regular physical exercise, avoiding unhealthy activities like smoking, and taking in substances that may be harmful to the body system. Some of the factors affecting health can be due to an individual's negligence, while other factors can be due to government's negligence such as inadequate health care services. There are other factors that surpass both government and individual doings, such as genetic disorders World health organization (WHO 2020), Wikipedia (2020).

1.2 Human capital and economic development in Africa

According to economic theory, one of the major elements of economic development is the sustenance in Gross Domestic Product (GDP) growth. King and Ramlogan-Dobson (2015) noticed a rapid growth in the GDP of some vital African economies as indicated in the world bank (2015), some sub Saharan African (SSA) economies had an average GDP growth of about 4.5% in 2013 and 4.2% in 2014. The cumulative growth of the real GDP in SSA has increased to a certain level as indicated by Sala and Trivin (2014) from about 3.5% in the 1980s to the phenomenal level of 29% in the 2000s. These growth was compared with other GDP per capita growths from other regions of the world showingsome significant difference e.g the average growth rate for East Asia was 4.9%, while that of Latin America is 0.5%, and Middle East 1.2%, then South Asia 3.6% over the period 1980–2000, (Glewwe et al., 2014; Sala & Trivin,2014).

According to Appleton and Teal (1998), Health and education are both elements of human capital that benefits the human welfare. They also further explained in their article that according to one index of human welfare, which includes income, education and health, reveals that Africa's level of "human development" is the lowest of any area around the globe.Comparing Africa with South Asia, it has a higher per capita income than South Asia but a lower level of human development than South Asia. Also Africa's bad economic production has been compared to that of South Asia and found to have half the growth rate of South Asia's economic growth rate Appleton and Teal (1998). In 1980, Africa discovered that slow economic growth gravely restricts the capability of governments and households to finance further expenditure or investments in health and education. After gaining independence, Africa has attained massive growth of some parts of human capital- especially in the development of education- despite starting from a low level of income (Appleton and Teal 1998).Economic theory recommends consistency in growing the Gross Domestic Product (GDP) as a vital part of economic development. Although it differs a lot among Sub Saharan African countries, GDP per capita growth has risen up in the region since late 1990s (Ogundari &Awokuse, 2018). The health sector of the Sub Saharan African countries is better than the Educational sector as the

spending on the health sector is higher than that of the Educational sector (Ogundari & Awokuse, 2018)

1.3 Research Questions

1. What is the effect of human capital on African economy?
2. Has the improvement of Human capital in Africa impacted the African economy?
3. What sort of effect did the human capital bring to African economy? Positive or Negative impact?

Aim: This paper is aimed at finding out the type of impact human capital has brought to the African economy, also to find out if over the years there has been any changes in the African economy since the improvement of health and education sectors.

2.0 LITERATURE REVIEW

Human capital experimentation was initiated by Lucas (1998) and Romer (1986)when they included human capital in their models. Sacerdoti, Brunschwig, and Tang (1998), carried out a study in West Africa, looking into possible consequences that human capital has on the widening of economies across the countries. These exploitations lead them to some interesting findings showing the outcome of physical capital to be more effective on economic growth than human capital. Incompetent workers and people that took advantage of the technology and became too lazy to work contributed to the cause of ineffectiveness of human capital as shown in their analysis.

A study done by Taban and Kar (2006) shows the magnitude of human capital in a typical endogenous growth model. They carried out a yearly minor test in Turkey from 1969-2001 showing a productive and reciprocated association between human capital and economic growth. They also checked causes and effects of human capital on economic growth and the connection between them within the period of 1926-1994 by adding integration Kar and Ağır (2006). Raul Ramos et al (2012) showed the consequence of educational level on human capital. Education has a productive result on employment. Spain and a lot of southern European countries have shown the effectiveness of education on employment rate in modern development, these countries have proven that education can lead to higher growth rates in an economy. Jan Cadil et al (2014) tried to attest to the fact that human capital can breed a new form of economy to replace the economic growth, to avoid an increase in joblessness that pervades the outcome and unfairness in the labour market.

The 1st Industrial Revolution was quoted by Cinnirella et al., (2017) shows that it has connections with change. Then the 2nd Industrial Revolution was the transformation times that lead to the part of human capital, just like in the 20th century, the standard of every basic education was linked with organizational experimentation and expanding processes. It was concluded that literacy has an unfavourable consequence on fertility as shown in their work and that it can be useful if it is transformed. Lastly, they indicated the significance of primary human capital piled up together as an important tool for change in modern economic growth. De la Fuente and Doménech (2000, 2006) analysed the connection between manufacturing and human capital, both of which reveal first order distinction in both productivity and important statistical correlation (demonstrated by the Temple, 1999). Bassanini and Scarpetta (2001) showed in a series of OECD data for the period 1971 to 1998 that additional period of schooling by one year give on to an expansion in GDP per capita by 6%.

Funke and Strulik (2000), highlighted the consequences of unrelated result of human capital in the stage of evolution of a country through using a model that integrate sides of the classical

theory of economic development with the new hypothesis of economic extension. However the representation issued by Uzawa-Lucas gave us an idea on evolution appliance where productiveness is adequately high in a collective understanding, but Grossman Helpman model for an economy with a broad diversity of outcomes can be described bearing in mind the technological extension as an endogenous factor, which requires important spending on research and development. Bundell et al., (1999) analysed the influence of human capital on economic expansion trusting the evolution cost of production to be dependent on the cost of collectiveness of human capital and innovation, whose origin is the commodities of human capital; education level impacts the labour productivity.

More secured lives are generated by human capital resources such as technology, education and income as attested by United Nations Human Development (UNDH, 2014). The gross domestic product GDP is said to be an estimate of a nation's total economic production based upon the position while the gross national income GNI is the complete rate that is manufactured within a country, which is made up of GDP alongside the earnings gained from other nation's cuts and profits.

In a study done by Appleton and Teal (1998), they discovered a shortage or decrease in human development in Africa, in spite of the swift growth of some features of human capital, especially the growth in education, despite kicking off with very little funds. The development of human capital stock has not been complemented by an equivalent increase in physical capital due to insufficient income growth and decrease in the returns of the education investment. East Asia on the other hand displayed an economic execution that has led to numerous literatures in studying the "miracle growth". The Sub-Saharan Africa has enticed observation for precisely the wrong reasons.

Consistent development in the Sub-Saharan Africa human development has been established as one of the least in rankings as evaluated by UNDP (2013) and World Economic Forum (2013). Comprehending and facing the obstacles associated with human capital is very essential to the short term steadiness and long term growth, providing success and competitiveness of nations.

2.1 The Effects of Human Capital on Economic Development

Human and Physical Capital

Human capital is a wide range of notion that recognizes human characteristics which can be obtained and also increase income. Knowledge, skills, strength and vitality acquired partly through education mostly rely on health and nutrition. Human capital theory canters on health and education as inputs to economic production. This however contradicts the notion of human development which views health and education as an essential valuable outcome to be included in the economic production as measures of human well-being. To fully understand the part that human capital plays as an input into development, the possible relationships between human capital, other forms of capital, income and growth should be put into consideration. While the value of education cannot be over emphasized , there is no lie to the fact that in most countries with data, more educated individuals earn more than the less educated ones, but it still does not mean that there is an assurance that investing in educating people makes a country richer.

2.2 Africa's Human Development

The whole idea of human development focuses on the idea that human welfare rely on several dimensions, although a lot of which are not well expressed by conventional measures of economic income (Griffin & Knight, 1990; UNDP, 2013). Health and education are the most

common measures used as welfare indicators for human resource in addition to GDP per capita. The evaluation of both health and education is a little tough as both are goods with characteristics that differ from the types of commodities manufactured in an economy. Health and education are often subsidized by the state and in some nations education is a most for a certain period of time. A lot of health and education services are formed by the public sector.

Health results are determined mainly through mortality statistics of a particular region. Of these, life expectancy at birth is probably the most comprehensive, considering the current age specific mortality rates for all age groups. Stock measures of educational indicators has a lot to do with what the populations comprises of, in any region which includes the educational level of the population, the mean number of the years the people attended school and the level of every individuals last qualification. These measures are suitable for evaluating the cumulative accomplishment of a nation or for estimating the benefits of education to economic performance. Flow measures are the ratios of enrolled pupils and students, and a measure investment in the next generation's capabilities, which in return should have a commiserating impact on the countries growth if significant Appleton and Teal (1998).

A composite indicator had been created by the UNDP, the human development index (HDI), which provides same amount of weight to three indicators: life expectancy at birth, real GDP per capita and educational attainment, which is determined by the level of education of adults (2/3 weight) and the combination of 3 enrolment ratios (which are the primary, secondary and tertiary) (1/3 weight) (UNDP, 1997, p122). Africa's performance on the three dimensions differs and the dimensions are quite independent. There is a report from the UNDP Human Development Report that although Africa's income per capita is more than that of South Asia and other continent of the world, Africa is still lagging behind in terms of human development. This comparison gives us a good reference, giving the similarity in income and development between South Asia and Africa. Africa's low life expectancy at birth might be a reason.

2.3 Comparison with Other Developing Countries

Life expectancy in Africa is 53 years; while in South Asia is 61years (Appleton and Teal, 1998.). The lower the life expectancy in Africa, the higher the child death rates (mortality). Children below the age of 5 have a death rate percentage of 31% in Africa, while infants have a percentage of 19% which is higher than South Asia. Also, adult mortality rate in Africa is much higher than anywhere else (World Bank, 1993). Under-nutrition is usually not the only reason for a high death rate in children of Africa, poor health sector or medical services can cause that too (UNDP, 1997).

The well-being of Africans increased in both the 1960s and 1970s, whether evaluated by GDP per capita or by the wider HDI. In the period between 1960 and 1980 there had been an increase in the US dollar price due to the population weighted mean that was taken for 33 African countries for GDP per capita in 1987. For the five South Asian countries, the increase in incomes was lesser, resulting to less than 1/3 of GDP per capita in 1960. After 1980, the circumstance changed entirely. South Asia's per capita income increased by half in 1994 while Africa suffered a decrease. Since 1960, Africa has witnessed lots of development in the composite human development index than in GDP per capita. This was specifically marked in 1980, when the human development index continued to grow despite economic decline. Although, the increase in the HDI around that time was slower than past periods/time (Appleton & Teal, 1998).

Even thou health in Africa, compared with other continents is still poor, it had a little change in 1960, it got much better when the life expectancy was still just 41 years in the continent.

Life expectancy in South Asia is higher than in Africa by just a little in 1980. Thereafter, irregularities in the two regions divided instantly. From 1980-1994 life expectancy in Africa increased by only 3.5 years. While in South Asia, the rate of increase in longevity sped up by increasing from 51.5 to 61.3 (Appleton & Teal, 1998). This is the period that was considered the greatest division in economic performance among the two areas.

For over 27 African countries in the sub-Sahara, there had been an increase in the gross primary school enrolment ratios from 38% in 1960 to 83% in 1980. The adult educational level multiplied by 2 between 1970 and 1994. Despite all these increases in Africa, adult education in South Asia increased by just a little more than half, in the same period South Asia's educational level remained lower than Africa. However, when it comes to registration (enrolment) South Asia has an upper hand than Africa; it has a higher enrolment rate than Africa. The 1994 combined educational enrolments are more than the 1980 levels by just 3 points; and it had been increased by 16 points in South Asia. Since 1980 there had been a decrease in the gross primary school enrolments in some countries. Although there is a little increase or rise in the enrolment rate of students in secondary school level and girls in the primary school level, it is barely noticeable because of its slow speed level. Unfortunately for the educational expenditures, it faces a huge fall in real terms per student (Sahn, 1992).The data set that is consistent from the period of 1965 to 1990 can be used in the evaluation of the flow expenditure result of the stock of human capital.

South Asia beats Africa in the completion of primary school statistics with a percentage of 32% while that of Africa is 25% in the year 1990. Africans are very good in enrolling their children into primary school, but bad at making sure they finish. Children dropping out of school became a major issue in lots of African countries: lots of money is wasted on children that are most likely not interested in learning or getting an education making the pupils to quit in the middle of the term without finishing or getting any sort of qualification. Poor education system may be a reason for some of the drop-outs. In Africa, not just primary school pupils drop out, even some secondary school students drop out midway without completing, the dropout rate at secondary level had been recorded to be 4% which happens to be less than half that of south Asia, 1/3 that of South-East Asia and less than 10% that of East Asia. In the 1980s there was a decrease in the growth rates of income which is suspected to have caused the decrease in the enrolments and growth rate of educational sector that is affecting Africa. East Asia's educational level surpassed other developing regions in the periods 1965 and 1990 respectively (Appleton & Teal, 1998).

2.4 Variation within the Continent

Africa has a considerable difference in human and economic development within the continent. There have been differences in the rankings of African countries; they are ranked according to HDIs and GDP per capita. There should be a separate analysis of North African countries bordering the Mediterranean from others in the continent. This separate analysis should also apply to South Africa and some smaller states. They are typically classified as having medium human development by UNDP, whereas the World Bank classifies them as being middle income countries. The ones having low incomes and low human development make up the remaining 2/3 of the countries. Although the ranking of their poor performances differs, the remaining 2/3 countries performances are ranked based on the usage of the HDI or GDP per capita. The HDI had ranked countries like Democratic Republic of Congo, Madagascar, Tanzania and Zambia, under the list of countries with very low GDP per capita.

Some countries are ranked by income, they happen to be in the middle third rank and are not by any chance ranked by human development, and examples of such countries are Djibouti,

Guinea, Senegal, and Uganda. These shows that even with their incomes, some countries, like Tanzania whom before the 1980s promoted health and education when other countries were neglecting it, still have some caution over their level of human development. Marked economic decrease can cause some countries to have high HDI figures relative to income rather than good social sector policies; example of such country is Democratic Republic of Congo. Countries like Uganda may not overcome their legacy of poor human development for a while until they benefit from economic recovery. Malawi on the other hand, despite its low income, its educational indicators is much better although it has low life expectancy (Appleton and Teal, 1998).

2.5 Life expectancy

Life expectancy differs across the continent. In about 8 countries, life expectancy exceeds world average of 63 years, even though it is around 50 years in the sub-Sahara. Adult literacy rates and gross educational enrolments are not much correlated with life expectancy in Africa, but rather with GDP per capita. Surprisingly, given the income level of some countries, their life expectancy differs from what can be predicted.

Rwanda and Sierra Leone both have very low life expectancies at birth with 23 and 34 respectively, not a surprise thou as they are said to be the two least developed African countries. Uganda's low life expectancy rate may come as a surprise considering its income. Even though it has similarities with the civil war legacy and early times of AIDS, its decrease in spending on public health says much about the situation. Botswana's low life expectancy rate is also a surprise considering the level of its income. In Lesotho, the reverse is the case; it has high life expectancy despite its income level.

Every country in Africa has its own education level, Niger and Burkina Faso has a 20% percentage, while countries like in Mauritius, the Seychelles, South Africa and Zimbabwe have more than 80%. School enrolment statistics also show similar differences. There are countries that have children that attended and completed primary education, while other countries especially in the Sahelian regions have little number of children that ever attended school.

Looking at the income level of some of the Southern African countries, the increase in their enrolment rate is surprising although not all Southern African countries fall into this category, Angola Botswana and Mozambique are exceptions; meanwhile a lot of nations have lower enrolment rates beyond expectations especially the countries bordering the Sahara desert. Every African country deals with gender inequalities differently. Countries with more educated people have lesser marked inequalities, although they have a persistent variation (Appleton & Teal, 1998).

2.6 Macroeconomic performance and education

The quantitative relationship between the level and growth of per capita GDP and investing in education and training is shown in a couple of economic growth models studies. The classical growth models were first developed in the year 1950, several researches started with those classical growth models through the endogenous growth models. These models are still helpful and used for empirical studies by many. Over the years, there had been a massive improvement in data sets and econometric modelling techniques. There had also been quite a number of suggestions on the types of model specification to be used and it had been empirically tested too. The data used for the models are mostly sourced from a cross-section of nations, at times only for developed nations but mostly for a larger set. Sometimes obtaining data of educational variables for certain period of time may be difficult due to inconsistency in the econometric time series analyses. In current years, most developed countries combine their cross-sectional

and time series data into a panel set to facilitate an extensive evaluation of link between economic growth and human resources. The contributions of the knowledge acquired through the undertaking of research and development (R&D) have also been of significance to this research. Other subsections pay more attention to the technical research associated with the link between factor inputs (both tangible and intangible, such as knowledge) and economic outputs.

These showcases the determinants of economic growth in a big way, paying more attention on human capital inputs. The new growth models came with different types of features, prolonging the previous and existing models. These new models also did some technological changes which sometimes are referred to as endogenous growth theories. This contradicts the traditional neoclassical models. In neoclassical model, an increase in factor inputs (i.e population growth) and the exogenous rate of (labour augmenting) technological change is used in determining economic growth. Recent models permits rise in returns to scale, where growth is unlimited and the consistency in growth rates rise endlessly over time.

2.7 The role of human and physical capital in growth

Both physical and human capitals have a direct effect on the productive capacity of an economy. Although the effects are not usually of much significance. More human capital can influence the growth rate of physical capital. If human and physical capitals are connected, then the rise in human capital increases the rate of return on physical capital. Comparing the stock of both human and physical capital in Africa with non-African countries, Barro and Lee (1994) showed the difference by presenting the physical capital stock as a measure of the non-residential capital stock per worker and growth rates, over the period 1965 to 1990, for income per worker and for human and physical capital investment the growth rate for the average number of pupils and students that have completed primary and secondary school in Africa and the growth rate income is half, compared to that of South Asia. The growth rate for human capital is based on the average growth rate level of students and pupils that have successfully completed their primary and secondary education in which the weight is taken from 1980. The average growth of education in South East Asia and East Asia is higher than Africa. Africa's growth rate is still lagging behind even at secondary level compared to other developing areas. This is the level where the gap broadened between Africa and other developing regions. It has been proven that education at secondary school level has helped in the increase of productivity in manufacturing. This incompetence or poor performance may cause major consequences, and can ruin Africa's hope to take part in the global market place and buttress some of the problems caused by globalization and the invention of new technologies.

Africa has a much lower growth rate level of the physical capital stock at 1 per cent per annum, compared to other regions, physical capital stock also created a huge breech between Africa and other developing countries (Appleton & Teal, 1998). There is a study that proposed that the growth rate and level of education is of paramount significance: *"Given the initial level of per capita GDP, the growth rate is firmly connected to the starting amount of human capital. Under developed nations with high human capital per person (in relation to their level of per capita GDP), have tendencies of catching up or measuring up to rich countries. Low fertility rates and physical investment to GDP with high ratios are found in countries with high human capital have* (Barro, 1991, p.437).

If this theory is correct, then the reason for the differences across the countries is not due to the changes that occurred but the increased rate of school completion by secondary school students and primary school pupils in 1965.One of the great benefits of education, which a lot of micro studies have mentioned, is the flexibility amongst workers. It is said that it is good to have

different levels amongst workers and also changes in those levels. The stock of human capital in East Asia in 1965 was doing way better than Africa even at year 1990.In 1965 Africa was slightly ahead of South Asia. Although there are few regions in East Asia that did not experience the massive growth of East Asia, nonetheless, East Asia still outperformed Africa. This only tells us that despite the important role human capital plays, it is still not enough until policies ensure rapid investment in other forms of capital (Appleton & Teal, 1998).

2.8 Human capital externalities

It has long been recognized that not only direct beneficiaries of human capital benefit from investing in it, others in society also benefit. Investing in education does not just help in having a well-trained and functional workforce which improves productivity but also means the better-educated ones will assist their less educated work colleagues. Acemoglu (1996) proposes that firms often anticipate growth and also invest more in physical capital, research and development when they notice an increase in the average level of human capital. In a circumstance where an imperfect matching process is given, workers that have invested more in education may not be associated with firms that have more investments. Although, some workers can benefit by getting employed by firms using more physical capital than before. Growth models sometimes are incapable of capturing external effects caused by increase in average level of human capital.

McMahon (2000) mentioned that externalities and indirect effects can be separated from the direct effect of education on economic growth. These externalities are not measured like the GNP, because about 75% of them are non-market outcomes, although they feed back into economic growth. Non-market externalities comprises of: Health (which covers infant mortality, fertility and longevity) Environmental impact (which covers deforestation and different forms of pollution) Crime (which covers property and human crimes, rule of law) Poverty and better income distribution, political stability, human rights and democratization.

It is obvious that human capital externalities are not just an overflow effect from education in the economy but much more than that. They are a whole series of net outcomes, although some take a very long time span before they take full effect while others are only partially realized after initial impact. Investing in human capital as well as these externalities are very vital, because returns on physical capitals are revived thereby ensuring a good and positive future in per capita growth rates. Indirect externalities can be created by investing in education and training which eventually contribute in the growth process, investing in education and training is not just beneficial to growth alone.

2.9 Social Capital and Economic Growth

Human capital is also known to be a measure of education, usually average years of schooling at primary, secondary or tertiary levels. Temple (2000) recognizes the importance of adding vocational training to the definition of human capital. Broadberry and Wagner (1996) have shown that there is a close connection of vocational training between corporate production strategies and national output growth. The reason why it might seem as though it's difficult to measure and quantify vocational training in other to facilitate and include it in a country's comparative growth model is because of extreme variability in vocational training approaches. McIntosh (1999) explained some of the issues affecting vocational training when compared between six EU countries. Lots of countries have an existing large spectrum of training, some of which were not recorded and measured systematically; an example of such informal trainings is the "on-the-job training". Hopefully in a near future, measured training variables will be added to some nation's comparative growth models.

Social capital can be a little tricky when it comes to definition, but it can be referred to as the social norms and networks that facilitate collective action. It holds on to the relationships between civil society and the state, nature of social ties within communities, and the quality of governing institutions.Improvements can be obtained in not just growth in per capita GDP but also in economic well-being, when social capital is developed. Recently the OECD had published more contents on social capital, unlike previous years when literature on social capital lies mostly outside mainstream economics. These literatures can still be found in a lot of social science and political publications.

There are 2 researches that tried linking economic variables (productivity inclusive) with a quantitative indicator of social capital that was constructed by them. La Porta et al. (1997), Knack and Keefer (1997) and, most recently, a world value survey was carried out across 28 market economies, this survey provided the index of trust that Green et al. (2003) used. Although La Porta et al. thinks that the association of the country comparative growth from 1970 to 1993 with the trust index is weak, but has a low explanatory power and measurement concerned serve to limit the significance of the findings. Knack and Keefer report a strong correlation between trust and average years of schooling. The production of another external effect from investment in human capital is seen as a strengthening trust and civic norms, so is education. Until there is a better method of measuring social variables, social capital and vocational training variables will probably have only marginal role in quantitative growth analyses and the literature on social capital and growth will remain at an early stage.

3.0 METHODOLOGY

3.1 Data and Methodology

This study used the neoclassical growth model as the abstract and logical structure. In the Solow (1956) neoclassical growth model, per capita gross domestic product (GDP) is identified as a purpose of human resources, technology, work and man-made goods. The Solow model is common and has been through a lot of tempering and moderation, so current researches adhere to a modified form as seen in Dulleck and Foster, 2008; Tiwari and Mutascu, 2011:

$$\Delta y_{it} = f(h_{it}, k_{it}, y_{it-1}, z_{it}) \tag{1}$$

where Δy_{it} symbolizes growth in real GDP per capita, h_{it} is a vector of education and health human capital interpreted as $h_{it} \approx Edu_{it}, Health_{it}$; k_{it} symbolizes physical capital; y_{it-1} symbolizes lagged real GDP per capita (i.e. initial real GDP per capita); z_{it} is a vector of other standard macroeconomic variables donating to Δy_{it} (e.g. population growth, trade openness, and democracy index).

3.2 Data Sources

This Study used the secondary data collection method. A panel data that covers the period of 1990 to 2018 for 35 countries in Sub-Saharan Africa (SSA). The Data were collected from the world development indicator data base of World Bank (World Bank, 2020), penn world table (10.0) database (PWT, 2021) and Castellacci and Natera database (CANA, 2017).The panel data method is usually used to analyze data that has multiple countries and years. A panel data and long period data sets are seen as very important method of determining economic growth.

3.3 Model Specification

This research went after a dynamic model identification that clearly outlines the endogenous growth regression model of Eq. (1). Just like former researches, this research used a vital identification to evaluate the variables of Eq. (1) because informal association between

economic development and policy variables, such as school and medical human capital, shows an informal vigorous form (Belke and Wernet, 2015). In this research, the vital model is:

$$\Delta y_{it} = \varphi_i \Delta y_{it}-1 + \tau_i h_{it}-1 + \beta_i k_{it}-1 + \phi_i y_{it}-1 + \delta_i z_{it} + \gamma_i + \eta_{it} \qquad (2)$$

where Δy_{it} stands for economic growth described as growth in real GDP per capita; lagged human capital, denoted by $h_{it}-1$, is symbolized by education and health; $k_{it}-1$ is lagged physical capital and is described as expenditure share of purchasing power parity (PPP) modified GDP per capita; y_t-1 is lagged per capita GDP; γ_i symbolizes a nations specific effects ; and η_{it} is the error term of the regression. Systematic dissimilarities among countries will be checked by adding relevant macroeconomic components of Δy_{it} represented by z_{it}. These macroeconomic variables comprises of population growth, trade openness, and democracy index (a measure of civil liberties and political institutions). A lag of the dependent variable was added.

The 3 alternative measures of education used in this research are school enrolment ratio (i.e. enrolment for primary, secondary and tertiary levels), mean years of the population of adult schooling, and government spending on education. For the indicator of health, former researches were used as reference (Bloom et al., 2004) by using life expectancy. Higher life expectancy is commonly linked with an improved health status and lower morbidity (Murray and Lopez, 1997).

The addition of the trade openness variable is very significant because of the carefully recorded positive effect of trade expansion on economic development. A democracy index was also added to apprehend the effect of the quality of political institutions on economic growth by enforcing private contracts and providing social stability and public services. The population growth variable shows the contribution of the labor force and also effects of capital diffusion, especially when the population of a country increases, it makes workers earn less (Weil, 2013). Lastly, lag of GDP per capita (y_t-1) was added to test the convergence theorem that progressively nations with less per capita money are liable to have a quicker development in GDP per capita compared to wealthier nations (Hanushek, 2013).

Eq. (2) is approximately working with the system-generalized method of moments (SGMM) evaluator for dynamic panel model suggested by Blundell and Bond (1998). Hauk and Wacziarg (2009) said that the application of the SGMM estimator can help in creating valid instruments that will show how current period shocks in the error term do not affect previous regression values and previous regression values have no direct effect on present dependent variables. Some cross-sectional dependence nations go through econometric issues, luckily the system-dynamic GMM helps in resolving these issues (Arellano and Bond, 1991).

3.4 Description of Variables

Gross Domestic Product: This is the monetary value of all completed commodities and services manufactured within a nation's margin in a given time space. In entering the specified model in Log form, Log GDP apprehends economic growth.

Life expectancy rate: This is the mean number of years expected of an individual to live at current age specific mortality rate.

Total Government expenditure on education: This is the expenditure the government spends on education.

Total Government Expenditure on Health: This is the expenditure the government spends on health.

School Enrolment: This is the total enrolment in school education, irrespective of age, demonstrated as a percentage of the population of official primary school age.

4.0 DATA ANALYSIS AND DISCUSSION

4.1   GRAHPICAL ANALYSIS

This section provides a brief graphical analysis of some selected variables under investigation using scatter diagram. Figure 1 presents a scatter plot of GDP growth rate and life expectancy for the SSA countries.

Fig. 1: Scatter Graph of Average GDP Growth Rate and Life Expectancy for SSA 2010 -2018
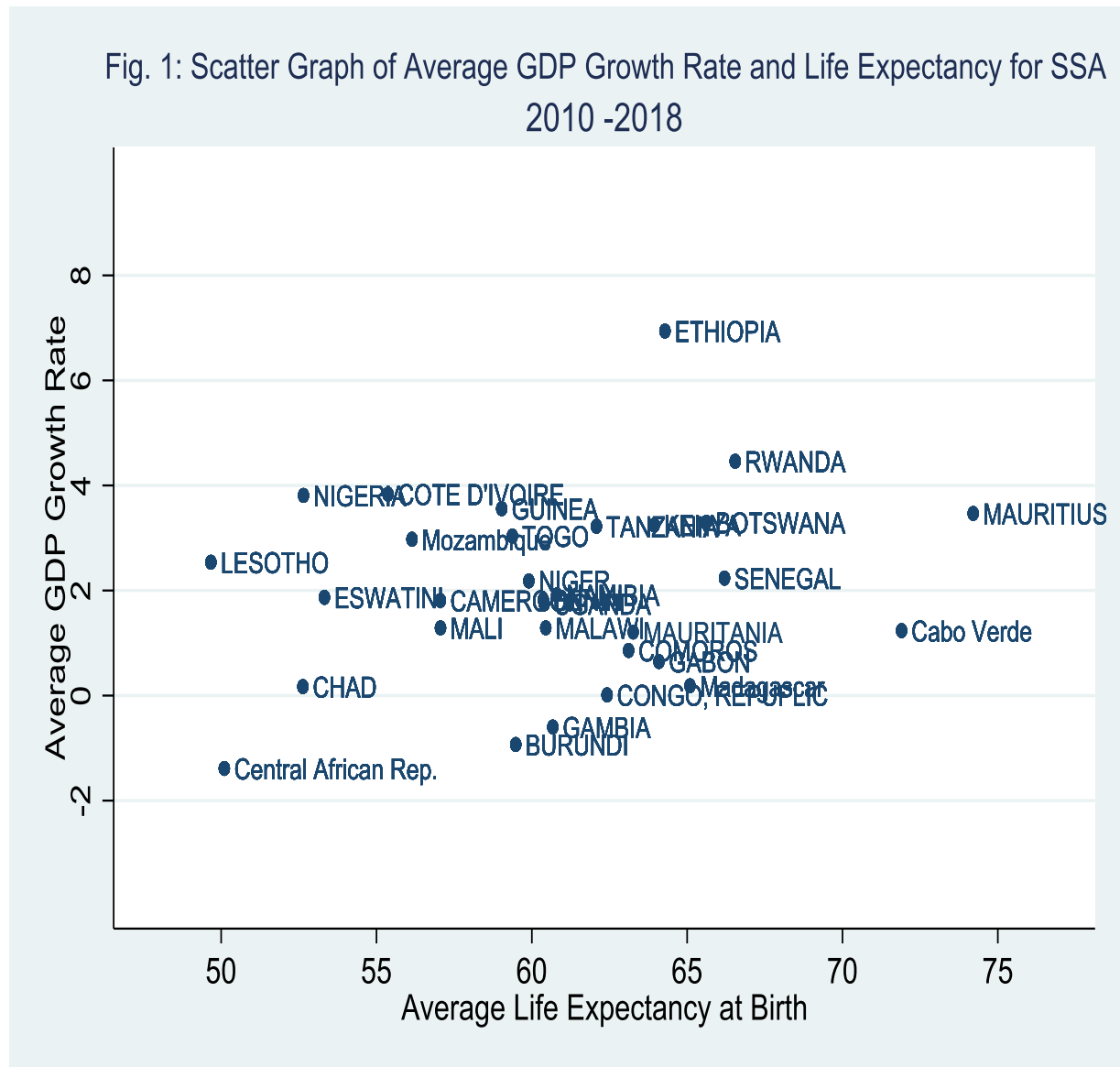
The scatter diagram shows that Ethiopia has the highest GDP per capita growth rate of about 7 percent per annum followed by Rwanda with about 4.5 percent, followed by Nigeria and Cote D'ivoire. However, Central African Republic appears to have the lowest GDP per capita growth rate with a negative GDP per capita growth rate of about -1.8 percent; followed by Burundi and Gambia both with negative growth rates of GDP per capita.

In terms of life expectancy, Mauritius has the highest life expectancy of 74.4 years at birth among the Sub-Saharan African countries included in the analysis. This is followed by Cape

Verde which is having about 73 years of life expectancy at birth. Botswana,Rwanda and Senegal are the third, fourth and fifth countries with the highest life expectancy of 69.3 years, 68.7 years and 67.7 years respectively.

4.2   DESCRIPTIVE STATISTICAL ANALYSIS

Table 4.1 provides the summary statistics of the variables used for the analysis in this study. The result of the summary statistics shows that the average annual GDP per capita growth rate in Sub-Saharan African countries is about 2 percent with a minimum of -36.56 percent and a maximum of 10.10 percent.

TABLE 4.1: Summary statistics

VARIABLE	OBS	MEAN	STANDARD DEVIATION	MIN	MAX
GDP Per Capita Growth Rate	264	2.033	3.760	-36.557	10.103
GDP per capita(PPP)	264	7.909	0.847	6.493	9.956
Population growth	264	2.447	0.869	0.055	3.907
Life expectancy at birth	264	60.354	5.824	45.100	74.416
Government health expenditure	264	5.464	1.982	1.852	11.579
Government education expenditure	255	4.520	2.223	0.480	13.149
Primary school enrollment	264	4.675	0.191	4.138	4.999
Secondary school enrollment	264	3.780	0.422	2.568	4.604
Tertiary school enrollment	263	1.990	0.733	0.039	3.690
Democracy index	255	3.529	5.267	-22	16

Note: PPP is an acronym for purchasing power parity. Min and Max stand for minimum and maximum respectively.

This average growth rate appears to be low especially considering the need for the region to grow and cope with developmental challenges. The average growth rate of the GDP is below the annual population growth rate of 2.45 percent, with a maximum growth rate of about 4 percent.

Similarly, the average life expectancy at birth is 60.35 years with a minimum of 45 years and a maximum of 74.42 years. This suggests that on average, SSA countries have a relatively high life expectancy which is essential for long term economic growth of the region.

In the same vein, the average government education expenditure as a percentage of GDP is 4.52 percent with a minimum of 0.480 percent and a maximum of 13.15 percent. This suggests a low government allocation to education in the SSA region and this is not healthy for human capital development vis-à-vis economic growth. The government health expenditure as a percentage of GDP is also low with an average of 5.46 percent. The minimum of government spending on health is 1.85 percent and the maximum is 11.58 percent.

Based on school enrollment, tertiary school enrollment appears to be very low in SSA with an average annual percentage of only 0.039 percent and the maximum of 3.69 percent. Similarly, both the average primary and secondary school enrollments are just about 4.67 percent and 3.78 percent respectively. The minimum annual enrollments are 4.14 percent and 2.57 percent for the primary and secondary schools respectively. The maximum enrollments for these categories are 5.00 percent and 4.60 percent indicating low school enrollment in the region. This low school enrollment is detrimental to economic growth in the Sub-Saharan African countries.

The democracy index shows SSA has an average of 3.54 indicating deficient democracy in the region. Deficiency in democracy means poor performance regarding virtually all indices of democracy which is detrimental to development of the SSA region. The low democracy performance in SSA has the potential of distorting and hampering of natural working and interactions of economic variables both in the short run and long run.

4.2   RESULTS OF DYNAMIC PANEL ANALYSIS

We estimate a dynamic panel of the impact of human capital on economic growth in SSA and present the results in table 4.2. The estimate was carried out in different scenarios considering the fact that some variables could not enter the estimation due to multicollinearity.

It is evident based on the results in table 4.2 that economic growth (GDP growth) in SSA depends on its past values indicating that the relationship estimated is well specified by capturing the dynamic effect of economic growth. The coefficients on lagged dependent variable (lag value of GDP growth) in all the three scenarios (column 1 to column 3) are positive and statistically significant at 1 percent level of significance. It shows that previous values of GDP growth have a strong positive impact on their current values. More statistically, on average, an increase in the past values of GDP growth by 1 percent leads to about 0.481 to 1.029 percent, holding other variables in the model constant.

Table 4.2: Dynamic panel estimation result of impact of human capital on economic growth

	(1)	(2)	(3)
Dependent Variable		GDP Per Capita Growth	
Constant	0.325*** (0.025)		0.729*** (0.006)
Regressors			
GDP per capita growth, lagged	1.029*** (0.016)	0.961*** (0.002)	0.481*** (0.002)
GDP per capita (PPP)	−0.0005*** (0.00003)		
Primary school enrollment	0.491*** (0.056)		
Secondary school enrollment	−0.076*** (0.057)	−0.590*** (0.006)	−0.037*** (0.0003)
Tertiary school enrollement	0.279*** (0.037)		0.085*** (0.0006)
Govt education expenditure		0.258*** (0.002)	
Life expectancy			0.041*** (0.0001)
Primary school enrollment, lagged	−0.519*** (0.053)	0.007*** (0.0001)	−0.0097*** (0.00004)
Secondary school enrollment, lagged		0.561*** (0.007)	
Government heath expenditure, lagged	0.202*** (0.026)		0.104*** (0.0003)
Life expectancy, lagged	0.076*** (0.004)		

Democracy index			-0.065^{***}
			(0.0000009)
Year effect	Yes	Yes	Yes
Country effect	Yes	Yes	Yes
Observations	240	232	232
Number of instruments	51	48	50
Number of groups	29	29	29
AR(1)	$-1.41[0.157]$	$-1.59[0.113]$	$-1.62[0.105]$
AR(2)	0.85[0.396]	1.12[0.261]	0.79[0.430]
Sargan Test	0.02[0.988]	0.10[0.992]	3.13[0.373]
Hansen Test	5.4e + 07[0.291]	2.3e + 08[0.00]	8.9e + 05[0.00]

Note: *** indicates significance at 1 percent level. AR stands for autoregression. AR (1) and AR (2) test for   the presence of first and second order autocorrelation respectively. The number of years (T) was reduced to capture the more recent data from 2010 to 2018 since the estimation of system GMM using xtabond2 requires that N >T. That is the number of cross sectional units should be greater than the number of years.

The result in column 1 consists of the estimates of the indicators of health and education with GDP per capita as the only control variable included in the estimation. Some of the other variables included were automatically dropped due to multicollinearity. The result in column 1 shows that GDP per capita has a negative and statistically significant impact on economic growth (GDP growth per capita). Although the magnitude of the coefficient is very small (-0.0005), such magnitude is significant.

Among the indicators of education as a component of human capital, primary school enrollment and tertiary school enrollment have positive coefficients and they are statistically significant at 1 percent level of significance. The result indicates that on average, a 1 percent increase in primary school enrollment leads to 0.491 percent increase in economic growth, holding other factors constant. Similarly, increasing tertiary school enrollment by 1 percent, on average, economic growth will increase by 0.279 percent, holding other variables in the model constant. This shows that primary and tertiary enrollments paly a significantly positive role in increasing the GDP growth rate of SSA. This is consistent with the theory of human capital development which emphasizes the role of education in facilitating long term economic growth. This result is also consistent with the findings of Ogundari and Awokuse (2018) who found that both primary and tertiary school enrollments have a positive impact on GDP growth in SSA region. However, while the findings from this study reveals a statistically significant impact of both primary and tertiary school enrollments, in Ogundari and Awokuse (2018), tertiary school enrollment was not statistically significant.Similarly, this result is in conformity with the findings of Sala-i-Martin et al (2004) as well as Artadi and Sala-i-Martin (2003).

However, secondary school enrollment and lagged primary enrollment have negative and statistically significant coefficients thereby exerting a negative impact of economic growth. Though poor educational policies and poor funding can lead to such result, it is contrary to expectation and inconsistent with the theory. The coefficients of health indicators which are government expenditure on health and life expectancy at birth are positive and statistically significant. The coefficient on the lagged value of government health expenditure is 0.202 which indicates that on average, a 1 percent increase in government health expenditure in the previous period is associated with 0.202 percent increase in economic growth in SSA, holding other variables constant. Similarly, the coefficient on lagged of the life expectancy is 0.076

indicating that, on average, for every 1 year increase in life expectancy, economic growth will increase by about 7.6 percent, holding other variables in the model constant. This shows that life expectancy plays a significantly positive impact on economic growth in SSA. This is also in agreement with the findings of Ogundari and Awokuse (2018) who found that life expectancy has a positive and significant impact on economic growth in SSA region. The positive coefficients on the health indicators are in agreement with the theory of human capital development GDP and it shows that increasing health spending and life expectancy in SSA is good for the economy of the continent. In another scenario (column 2), government education expenditure was included in the estimation as an important component of human capital. In this case, the coefficient on government education expenditure is positive and statistically significant at 1 percent level of significance. The result indicates that on average, for every 1 percent increase in government expenditure on education, GDP growth rate increases by 0.258 percent, holding other variables constant. This confirms that education spending in SSA has a positive and significant impact on economic growth which is also consistent with the theory.

Interestingly, when government education expenditure variable was included in the estimation (column 2), the lag value of the primary and secondary school enrollments become positive and statistically significant at 1 percent level of significance. This reveals that it takes time for the positive impact of primary and secondary enrollments to manifest on the economic growth of SSA countries. Some other variables included in this estimation were automatically dropped due to multicollinearity.

It is generally clear that the overall benefit of human capital in Sub-Saharan African countries is positive and statistically significant as indicated in table 4.2. The findings from this study also agrees with the results of Ahumada et al (2020) in a study of human capital formation and economic growth using panel analysis for 52 countries across the globe and found that human capital impact significantly on economic growth.

The result in column 3 includes the democracy index but excludes other variables because high collinearity. In this case, the coefficients on life expectancy and lagged value of government health expenditure are also positive and statistically significant at 1 percent level of significance. This confirms that the result obtained in column 1 where these variables appeared to be positive and statistically which is further justifying the essential role of health on economic growth in SSA.

We notice that the coefficient on democracy index is negative (-0.065) and strongly significant at 1 percent level of significance. This means that democracy has a strongly negative impact on economic growth in SSA. Although the magnitude of the democracy index is very small, indicating good democracy in the continent, the negative sign is an indication that democracy affects GDP growth per capita negatively. Taking the various components of democracy into account, SSA countries are not performing badly. Democracy indices include representative government – clean elections, inclusive suffrage, free political parties, and elected governments. Another important index is the fundamental human rights which encompasses access to justice, civil liberties, social rights and equality. Similarly, checks on government through effective parliament, judicial independence and media integrity are also essential indicators of democracy. Impartial administration where there is absence of corruption and predictable enforcement have been considered by the democracy index. More importantly, a participatory engagement in the forms of civil society participation, electoral participation, direct democracy and local democracy are essential indicators of a good democracy.

Taking the democracy index into account during estimation of the impact of human capital on economic growth in SSA is very crucial. This is due to the fact that under a good democratic

institutions and governments, all macroeconomic and other variables are expected to perform well and interact better thereby improving the wellbeing of the society, increasing life expectancy, quality of education and improved health care services. However, the negative coefficient on the democracy index means that SSA countries have to further strengthen their democratic institutions.

Heterogeneity and Autocorrelation Issues

Literature has shown that in the estimation of panel data, it is possible to encounter the problem of heterogeneity due to differences across the cross sectional units and there may be changes over time due to changes in policies that may result in changes in macroeconomic variables. This implies that there are always country specific effect and time effect which must be accounted for during estimation of panel data. Failure to account for these differences may lead to wrong estimation results thereby affecting the inferences to be made from the analysis. In line with suggestions in the econometric literature which have been applied in many previous studies, the study addressed the potential problem of country specific effect by including country dummies in the estimation as reported in table 4.2.Similarly, the time effect resulting from changes over time has been addressed by including year dummies in the estimation of the impact of human capital on economic growth in SSA.

In the same vein, the problem of serial correlation is not taken lightly in the estimation of dynamic models. The presence of autocorrelation in dynamic model estimation will render the estimates inefficient and inconsistent thereby making the relationship spurious. Based on the AR (1) and AR (2) tests, the estimation results in this study appear to be free from the problem of serial correlation because the null hypotheses of no first order and second order autocorrelation could not be rejected. We failed to reject the 'no autocorrelation' hypotheses in both cases because the probability values for the AR(1) and AR(2) are greater than 0.05. The Sargan test statistic indicates absence of over identifying restrictions as reported in table 4.2 and this is also consistent with the Hansen test statistics. This shows that the internally generated instruments are good and there is no proliferation of instruments in the estimation.

5.1   CONCLUSION

This study examined the impact of human capital on economic growth in Sub-Saharan African countries by deploying different indicators of human capital and controlling for democracy in the region. The human capital indicators used are life expectancy at birth, government expenditure on health, government expenditure on education, primary school enrollment, secondary school enrollment and tertiary school enrollment. The study controlled for the strength of democracy using democracy index and also included GDP per capita (PPP). The proxy for economic growth is the GDP per capita growth.

The study estimated the dynamic panel using system GMM and found that the school enrollments, government education expenditure, government health expenditure, and life expectancy at birth have positive and statistically significant impact on economic growth in SSA. Although the current value of secondary school enrollment indicated a negative impact, there was evidence that its lag value impact positively and significantly on economic growth.

This study entered the existing debate in the literature which emphasize the role of human capital in increasing economic growth. It is evident from the literature that developing countries especially in Africa are still having a great challenge with their economies in terms of increasing GDP growth despite the abundance of labour and natural resources. While there have been many studies in this regard in developing countries, in this case of Africa, most of the researches focused on country specific studies with only few on regional or panel studies.

This study contributes to the existing debate on the impact of human capital on economic growth by focusing on Sub-Saharan African region using dynamic panel approach. In line with many previous findings, this study found that human capital has an overall positive and statistically significant impact on economic growth in the Sub-Saharan African region. However, democracy has a negative and statistically significant impact on economic growth in the region.

5.2   RECOMMENDATION

This study has found that human capital has a positive and statistically significant impact on economic growth in Sub-Saharan African countries. Despite this finding, the following recommendations are offered to further improve the condition of the existing human capital indicators so as to further re-enforce their contribution to economic growth.

1. There is a need for the governments in the Sub-Saharan Africa to significantly increase expenditures on both health and education as this study reveals that expenditures on these variables are considerably low.
2. Although the average life expectancy at birth is about 60 years in the region, policies that will improve the wellbeing of the people to keep them healthy and improve their contribution to the economy is very crucial.
3. School enrollments at all levels have to be encouraged and policies that will induce people to enroll in schools are very necessary considering the backwardness of the region in terms of education.
4. Although SSA appears to have performed well based on the small coefficient on democracy index in table 4.2, the negative sign calls for more efforts to ensure that such performance translate to a better economic performance by increasing GDP per capita.There is a need to provide more enabling environment for the economic activities to take place efficiently and effectively with a huge potential to increase long term economic growth.

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