EDUCATION INEQUALITY AND POVERTY: EVIDENCE FROM SUB-SAHARAN AFRICAN COUNTRIES

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EDUCATION INEQUALITY AND POVERTY: EVIDENCE FROM SUB-SAHARAN AFRICAN COUNTRIES

ABSTRACT

Following the critical argument about education, human capital, growth and poverty, this study examined the levels of education inequality and further investigated how wealth was distributed across educational levels in twenty-five Sub-Saharan African (SSA) countries. It further determined the relationship between the education inequality and poverty, based on the SSA regional perspective and with the sampled twenty-five countries for comparative analysis. The study progressed to examine the proportion of dropout from schooling and the status of its spread. Methodologically, the thesis used cross-sectional data of Demographic Health Survey (DHS) where statistical procedures were followed. Furthermore, time series data on dropout were used to achieve the speed and the spread of the dropout. Using the educational attainment, the thesis measured the inequality of education with education inequality Gini, Lorenz Concentration Curve for wealth distribution and Generalised Lorenz Curve for gender decomposition. Due to the hierarchical characteristics of the data, structural equation modelling was used to estimate the coefficients of education inequality and poverty relationships for the 25 sampled countries. Furthermore, polynomial regression equation was used to determine the rate of dropout and used equilibrium point condition (EPC), the discriminant of the quadratic function to determine the status of the dropout spread. Firstly, the thesis findings on the levels of education inequality showed that 16 of the sampled countries representing 64% had education inequality (higher than 50%). Burkina Faso was at the extreme of over 90% of the inequality while Zimbabwe had 24% at the lower boundary of the distribution. About 32% of the sampled countries had their inequality skewed to female, including Cameroon, Cote D'Ivoire and Nigeria of the oil producing countries. Surprisingly, Comoros' wealth was concentrated at lower boundary of education distribution while the

remaining 24 countries were located at the upper boundary of the distribution - that is, higher levels of education. Nevertheless, the finding was still consistent with the existing assumption of educational promises. Secondly, findings showed that poverty significantly affected education inequality. Minding the oil producing countries, three of the six sampled countries had poverty impact above 50%. In general, Cameroon, Cote D'Ivoire and Mali had above 80% poverty impact. Thirdly, the dropout findings showed an inverted U-shaped curve, which displayed increasing and decreasing tides of dropout. However, the rate of dropout reduction fell below the rate of increase. Moreover, although large number of the countries had their dropout uncontrolled, but it was severely uncontrolled in Ethiopia. About gender, findings showed that only Ethiopia and Zambia have their rates of dropout higher for male than for female. Therefore, the thesis suggested, among others, that those oil producing countries affected with higher educational inequality should concentrate on equal distribution of oil rent proceeds. Likewise, because development depends on the human capital stock, before treating out-of-school problem, poverty that triggered educational inequalities should be addressed and speedily treated to accommodate development that people deserve. Finally, the pull and push strategies suggested in the thesis could be adopted to control the schooling dropout.

Keywords: Education Inequality, Poverty, Educational Attainment, Human Development, Sub-Saharan African

KETIDAKSAMAAN PENDIDIKAN DAN KEMISKINAN: BUKTI DARIPADA NEGARA-NEGARA SUB-SAHARA AFRIKA

ABSTRAK

Berdasarkan pandangan kritikal terhadap pendidikan/modal insan, pertumbuhan and kemiskinan, tesis ini mengkaji ketidaksamaan pendidikan dan juga mengkaji bagaimana kekayaan diagihkan melalui pendidikan di dua puluh lima negara di Sub-Sahara Africa (SSA). Tambahan pula, kajian menjelaskan hubungan antara ketidaksamaan pendidikan dan kemiskinan berdasarkan perspektif serantau SSA. Kajian menganalisa dua puluh lima negara daripada SSA sebagai sampel untuk analisis perbandingan. Seterusnya, kajian juga menilai jumlah keciciran daripada alam persekolahan dan juga tahap keciciran yang merebak di SSA. Kajian menggunakan data kaedah rentas keratin daripada Survei Kesihatan Demografi dan kaedah statistik yang lain juga digunakan. Serta, data siri masa untuk tahap keciciran digunakan untuk mengetahui dengan lebih lanjut mengenai tahap keciciran persekolahan. Kajian telah menggunakan pencapaian pendidikan untuk menilai pendidikan yang tidak seimbang bersama dengan Gini ketidaksamaan pendidikan, keluk konsentrasi Lorenz untuk pengagihan kekayaan dan keluk *Generalised* Lorenz untuk jantina. Tambahan pula, memandangkan data mempunyai ciri-ciri hierarki, maka kajian menggunakan Model Persamaan Struktur untuk tujuan penganggaran koefisien ketidaksamaan pendidikan dan juga hubungan kemiskinan untuk dua puluh lima negara daripada SSA. Kajian, menggunakan Persamaan Regresi Polinomial untuk menentukan kadar keciciran dan menggunakan fungsi kuadratik *Equilibrium Point Condition* (EPC) untuk menentukan tahap penyebaran keciciran. Hasil kajian pertama ialah mengenai tahap ketidaksamaan pendidikan, dimana ia menunjukkan bahawa enam belas negara mempunyai pendidikan yang tidak seimbang iaitu sebanyak 64 % (yang melebihi 50%). Burkina Faso adalah negara tertinggi yang mempunyai tahap pendidikan yang tidak seimbang iaitu sebanyak 90 % manakala, Zimbabwe negara yang terendah yang

mempunyai tahap pendidikan yang tidak saksama iaitu 24 %. Terdapat sebanyak 32% daripada negara yang dikaji mempunyai ketidaksamaan terhadap wanita iaitu negara seperti Cameroon, Cote, D'Ivoire dan Nigeria. Yang mengejutkan adalah kekayaan negara Comoros yang hanya tertumpu kepada pengagihan pendidikan yang rendah berbanding dua puluh empat negara yang lain. Walaubagaimanapun, hasil penemuan kajian ini masih konsisten dengan pandangan terhadap pendidikan. Hasil kajian yang kedua menunjukkan bahawa kemiskinan memberi kesan yang signifikan terhadap ketidaksamaan pendidikan. Dari konteks negara pengeluar minyak, empat dari enam negara sampel mempunyai kesan kemiskinan melebihi 50%. Secara umum, Cameroon, Cote D'Ivoire dan Mali mempunyai kesan kemiskinan melebihi 80%. Hasil kajian yang ketiga menunjukkan tahap keciciran berbentuk keluk U terbalik yang memperlihatkan peningkatan pada mulanya dan kemudian penurunan. Walau bagaimanapun, kadar pengurangan keciciran jatuh di bawah kadar kenaikan. Walaupun banyak negara mengawal tahap keciciran, namun negara seperti Ethiopia masih gagal berbuat demikian. Penemuan terhadap jantina menunjukkan bahawa hanya Ethiopia dan Zambia mempunyai kadar lebih tinggi untuk lelaki berbanding wanita. Oleh itu, tesis ini menyarankan negara-negara pengeluar minyak yang mempunyai ketidaksamaan pendidikan harus menumpukan pada pengagihan yang saksama dalam hasil sewa minyak. Hal ini kerana pembangunan bergantung kepada stok modal insan dan juga harus menangani masalah kemiskinan yang juga penyebab kepada pengagihan pendidikan yang tidak saksama. Semua masalah ini harus dikenalpasti dan diperbetulkan dalam kadar yang segera supaya perkembangan modal diperkukuhkan. Akhir sekali, strategi penarikan dan penolakan yang dicadangkan dalam tesis boleh digunakan untuk mengawal kadar keciciran.

Kata Kunci: Ketidaksamaan Pendidikan, Kemiskinan, Kerentanan, Pencapaian Pendidikan, Pembangunan Manusia, Sub-Sahara Afrika.

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LIST OF SYMBOLS AND ABBREVIATIONS

SSA	:	Sub-Sahara Africa
UN	:	United Nations
IDA	:	World Bank International Development Association
GNI	:	Gross National Income
OECD	:	Organisation of Economic Cooperation and Development
ICT	:	Information Communication and Technology
UNESCO	:	United Nations Educational, Scientific and Cultural Organisation
EFA	:	Education for All
MDG	:	Millennium Development Goal
UNDP	:	United Nations Development Programme
UNICEF	:	United Nations International Children's Emergency Fund
R & D	:	Research and Development
UPE	:	Universal Primary Education
HDR	:	Human Development Report
SED	:	Social Education Disease
UNDP-HDR	:	United Nations Development Programme – Human Development Report
MMM	:	Mixed mode method
EIG	:	Education Inequality Gini
FLS	:	Functional living standard
SET	:	Social Emergency Treatment
RDT	:	Relative deprivation theory
HDT-CA	:	Human Development Theory - Capability Approach
MYS	:	Mean Years of Schooling

SDS	:	Standard Deviation of Schooling
PCI	:	Pearson Cramer Inequality
WAP	:	Weighted Average Probability
RSI	:	Reardon Segregation Index
BTI	:	Between-Type Inequality
CP	:	Cumulative Probability
CPP	:	Cumulative Population Probability
AFO	:	Adjustment to the Field and Ok
WHO	:	World Health Organisation
US	:	United States
HIV/AIDS	:	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
OLS	:	Ordinary Least Square
LDC	:	Less developed countries
FGLS	:	Feasible Generalized Least Square
IQ	:	Intelligent Quotient
MIT	:	Middle Income Trap
DV	:	Dependent Variable
IV	:	Independent Variable
SEM	:	Structural Equation Modelling
USAID	:	United States Agency for International Development
DHS	:	Demographic Health Survey
EIA	:	Energy Information Administration
SS	:	Sample Size
FEFA	:	Functional Education for All
SD	:	Standard Deviation

AV	:	Accuracy Value
NP	:	Size of the Population
PLS	:	Partial least square
EDINQ	:	Education Inequality
LCC	:	Lorenz concentration curve
GLC	:	Generalized Lorenz curve
CFA	:	Confirmatory Factor Analysis
AmosSPSS	:	Amos statistical package for social scientist
SmartPLS	:	Smart partial least square
WarpPLS	:	Warp Partial least square
IQR	:	Interquartile range
DK	:	Don't Know
CMAR	:	Completely missing at random
UB/LB	:	Upper Boundary / Lower Boundary
MAR	:	Missing at Random
MNAR	:	Missing not at random
EM	:	Expectation Maximisation
CSIG	:	Content Search Instrument Guide
PVLT	:	Poverty
VULT	:	Vulnerability
VAF	:	Variance Accounted For
IDE	:	Indirect Effect
PRE	:	Polynomial regression equation
EPC	:	Equilibrium Point Condition
RCE	:	Regression curve estimation
SEM-CFA	:	Structural equation modelling-confirmatory factor analysis

LV / MV	:	Latent variable / manifest variable
LVS	:	Latent variable scores
VIF	:	Variance inflation factor
CA	:	Cronbach Alpha
AVE	:	Average Variance Extracted
CR	:	Composite reliability
CVT	:	Convergent validity test
LVC	:	Latent Variable Correlation
DVT	:	Discriminant Validity Test
EFAGMR	:	Education for All Global Monitoring Report
SVT	:	Structural vulnerability theory
NLSS	:	Nigeria Living Standard Survey
CI	:	Cumulative Incidence
CCE	:	Continuous of child education
GDP	:	Gross domestic product
PPP	:	Purchasing power parity
VEM	:	Vulnerability eyebrows model
VEI	:	Vulnerability to education inequality
SCV	:	Single construct variable
DE	:	Direct effect
SE	:	Standard error
SoCAP	:	Social care in prison
CEE	:	Centre for equal education
CSGD	:	Centre for student's graduation and dropout
ESSN	:	Education social security net
SIR	:	Susceptible infection recovery

IQ	:	Intelligent Quotient
CQ	:	Creativity Quotient
WEF	:	World Economic Forum
OPEC	:	Organization of the Petroleum Exporting Countries
TFP	:	Total Factor Productivity
WEFR	:	World Economic Forum Report
HDI	:	Human Development Index
CEMAC	:	Central Economic and Monetary Community
AfDB	:	African Development Bank
GNI	:	Gross National Income (per capita)
IDP	:	Internally Displaced People
UIS	:	UNESCO Institute of Statistics
LPG	:	Liquefied Petroleum Gas
PSE	:	Plan Senegal Emergent
UWS	:	Uganda Wildlife Society
ZDA	:	Zambia Development Agency
CRC	:	Civil Rights of Children
LDC	:	Less Developed Countries
HD	:	Human Development
ADANCO	:	Advance Analysis of Composites

LIST OF APPENDICES

CHAPTER 1: INTRODUCTION

1.1 Background of the Study

This researched thesis was sparked by four independent arguments in the development literature. Firstly, studies showed that increase in educational attainment was proportional to the level of growth expected in the country (Barro 2001; Becker 1964; Krueger & Lindahl, 2001; Todaro & Smith, 2012). Each country's education measured by mean years of schooling (MYS) explained the level of human capital stock required in the growth achievement (Potančoková & Goujon 2014; Thomas, Wang, & Fan, 2001).

Secondly, the rate of growth measured by gross national income (GNI) per capita explained the extent that household was benefitting from the proceeds of growth (Nesiba, 2014). In other words, in 2000, a study claimed that growth was good for the poor people to move them out of poverty captivity (Dollar & Kraay, 2000). Subsequently, other independent studies also confirmed the role of growth in poverty reduction (Aigbokhan, 2008; Fatah, Othman, & Abdullah, 2012). In 2013, there was a revisit on issue of growth as a driver for poverty reduction claiming that growth was still good for the poor (Dollar, Kleineberg, & Kraay, 2013). If growth was still good for the poor and growth is driven by education, why were the developing countries left behind in educational distribution?

Thirdly, as growth was so emphasised by Dollar et al. (2013), growth had a significant relationship with human capital (as well as physical capital) (Solow, 1956; Lucas, 1988). Surprisingly, in the late of 1990s and early 2000s, total factor productivity (TFP) was alternatively correlated with economic growth against the human and physical capital of Solow and Lucas' findings (Hall & Jones, 1999; Parente & Prescott, 2000; Bils & Klenow, 2000). However, in over a decade to the 2000 argument of TFP, there was a new finding that reversed TFP proposition to the earlier argument of Solow and Lucas that

human and physical capital had higher significant effect on the cross countries economic output than TFP (Manuelli & Seshadri, 2014).

Finally, much studies were devoted to the examination of education, income inequality where poverty was the target variable (Apata, Apata, Igbalajobi & Awoniyi 2010; Bonal, 2007; Digdowiseiso, 2009; Wu et al., 2008). These studies concluded that poverty was influenced by low education and inequality of education. In consequence, the United Nations had been calculating education index to measure the movement of education across countries. With this measuring rod, many countries were found being deprived of education particularly in the developing countries of Africans and the Sub-Siberians of Asia (Hume, 2014). At this juncture, the thesis was not worried about the human capital and growth arguments but on the inequality arising from educational distribution and poverty in the Sub-Saharan African countries.

Thus, the lacuna in the development of African countries particularly the Sub-Saharan African (SSA) has passed through a standard diagnosis with past diagnoses largely paradoxical. On the one hand, poor governance that resulted in numerous wars and other social crisis such as civil war in Rwanda in 1994 (where the Prime Minister, during the genocide, Jean Kambanda was convicted (United Nations, n.d), the Boko Haram insurgency in Cameroon, Niger and Nigeria, to an extent, are the pull factors inhibiting the Sub-Saharan African development (Sachs, 2004). Despite governance problem, Sachs expressed optimism that governance challenges, sometimes, do not affect some countries' development. Sachs argued that the countries with good government failed to provide material well-being to improve people's consumption. As such, the well-governed countries are severely trapped in poverty (Sachs, 2004). On the contrary, development challenges were attributed to the failure of people to utilize the economic resources around them (Lewis, 1966). Although Dollars and Kraay (2000) argued that growth was good to reduce poverty, in Lewis perspective, the ineptitude of the poor people makes

them to contribute less to economic growth. Although the growth assumption regarding poverty reduction had been consistent (Dollar & Kraay, 2000; Dollar et al., 2013), but a good proportion of savings were expected to drive the growth. As expected, the savings – as a driver of growth - is usually lacked among the poor households in the developing countries (Chauvin & Golitin, 2016; Sachs, 2004; Kuznets, 1955).

Hence, the poor development of the Africa region and Sub-Siberian Asia countries has increased the thought to raise pertinent questions about man existence (Hume, 2014). What puzzled man and commonly expressed go with the pertinent questions of 'why are we here?' 'Why do certain groups remain poor and others richer?' (Manuelli & Seshadri, 2014). 'What created the difference between the poor and the rich?' 'How has the gap between the rich and the poor narrowed overtime?' (Reinert, 2008). These questions about the challenges of man revolve around the word, '*inequality*' (Fryer, 2016). Previous answers provided - across the scholars and the technocrats - led to several approaches that gave varieties of solutions to man's problems of Why? What? and How? Those approaches suggested and adopted resulted in different achievements across countries. While substantial achievements were recorded in some areas leading to affluence, most developing countries are critically vulnerable to poor development. For example, comparing the world continents, the West is the richest than the South. The South comprises of Asia and Africa continents. In the South, according to official data, Africa is the least poor while the Sub-Saharan African countries are the poorest (Worldbank-IDA, 2016). As such, the SSA regional economies consistently demonstrates fragility (World Bank-IDA, 2016).

At this juncture, we begin to query rhetorically: why should SSA be the poorest? What made the region the poorest? Is inequality the problem? And inequality in what?

1.1.1 Some Historical Perspectives of the Sub-Sahara Africa

Historically, the region was colonized by the British and the French. Political freedom began in 1957 when Ghana became the first Sub-Saharan African country to gain independence while other countries of the region queue for independence until 1994 when South Africa became the last independent nation.

The region comprises of forty-nine countries out of fifty-four African countries. The forty-nine Sub-Saharan Africans have a combined population of 1.001 billion people (WorldBank, 2015b). In 2014, the gross national income (GNI) per capita was $1,720 but decreased to $1,628.17 in 2015 (WorldBank, 2015c). The region maintained 4.63% growth rate in 2014 but reduced to 2.98% and 1.3% in 2015 and 2016 respectively (WorldBank, 2015c). This economic downturn was not unlikely to be global oil shock of 2015/2016. As at 2017, there was a recuperation of SSA growth where the growth rate increased from 1.3% in 2016 to 2.4% in 2017. In 2015, the SSA reached a peak of 69.12% in primary education completion (WorldBank, 2015c) while the life expectancy at birth was below sixty years in the same year. Virtually all the countries of the SSA are rich in natural resources such as oil, gold, diamond, iron ore and other mineral resources to sustain growth and development. Most of the countries have access to seaports for globalising their economies. For example, there are six countries whose economies are driven by oil (Takebe & York, 2011; Zhan & York, 2009). Among these countries are Angola, Cote d'Ivoire, Cameroon and Nigeria, Finally, the region is known for its access to arable land for different agricultural productions to provide sufficient food for the population (Van, Schubert, & Nguyen, 2010).

In the recent times, most of the governments in the SSA financed their budget through the shortlived window of Eurobond financing (Alby, 2016). The window was closed due to the slowdown of the Chineese market thereby discouraged investment by the

international investors. Nevertheless, the open window definitely increased the debt profile for many of the borrowing countries who exploited the opportunity (Chauvin & Golitin, 2016). The rational for the indebtedness was due to the persistent of low savings, which was not sufficient to sustain growth and developmental programmes. Besides the Eurobond, the World Bank through International Development Association (IDA) had been providing finacial support for many of the low-icome countries of the SSA to improve their developmental projects in specific areas. Among others, including Burkina Faso, Comoros, Ethiopia, Ghana, Mozambique, Namibia, Niger, Senegal, Sierra Leone and Nigeria. (World Bank, 2018).

Despite the Eurobond and the IDA assistance, the SSA countries have been struggling with persistent low development regarding poverty, poor infrastructure, low education, low technological development compared with upper middle and high-income countries (Awan, Malik, Sarwar, & Waqas, 2011). Other factors were attributed to structural indicators such as fall of oil price in 2014/205, income inequality (Nesiba, 2014; Gregorio & Lee, 2002), the "collapse in commodity prices and the slowdown in Chinese demand" (Alby, 2016, p.17; Christensen, 2016), societal beliefs and individual perception of development. Most important of the problem was the position of Fryer (2016) when he argued: "When there's inequity in learning, it is usually baked into life." The argument was that if inequality exists from the pre-primary education to the basic primary education, to live a satisfactory and quality life is at higher risk.

1.1.2 Recent Development on Educational Inequality and Poverty

Education is a public good, non-rivalry and non-exclusive (Anomaly, 2018; Moşteanu, & Cretan, 2011). The promises of education are evident as an ingredient for human development. Education promotes human welfare through income and increases the individual capabilities which enhances their freedom or autonomy (Sen, 1999; Welzel,

Inglehart & Klingemann, 2001). For example, evidence showed that "private returns to education estimated in microeconomic studies give a clear indication of the positive impact of education for the individual" (Michaelowa, 2000, p. 25) and the updated private return to education was 9% at international comparism (Psacharopoulos & Patrinos, 2004). Besides the education promises that would increase individual freedom, the society benefits from the substantial education accumulated because education has externalities' characteristics (Agrawal, 2014). Recognising the importance of education in economic development (Fisher, 1946), earlier studies emphasised that economic dimension should be instrumental to educational policy because Fisher (1946) argued that there was a noticeable neglect of human capital (Teixeira, 2014). After the Fisher proposition of education as instrument for economic change, Becker (1964) opined that: "Nowadays a primary determinant of a country's standard of living is how well it succeeds in utilizing the skills, knowledge and health of its people. These skills, knowledge and health are necessarily developed though investment in the people, and are used in an economic environment, in a sound structure, the market structure." Becker (1964, p. 4)

Since the idea of human capital was promoted by Becker (1964) and Fisher (1946), nations shifted focus from pursuing growth through physical capital to human development as currently reflected in development literature. In fact, the enormous development challenges of the developing economies call attention for shifting towards "rapid quantitative expansion" of education (Todaro & Smith, 2012; p.1). The belief was that education enhances rapid development (OECD, 1997). Also, improvement in education investment would increase technological know-how in agriculture, administration and replace expatriates in the colonial territories (Todaro & Smith, 2012). At the upper-level education, it will improve professionalism and expertise in

administration, industry, service sector and, information and communication technology (IT).

However, the shifting towards education expansion in SSA countries was not highly noticeable because of the crawling political structure that affects education distribution (Sachs, 2004). The little attention paid to the relevance of education in the development of SSA countries made education a sacred cow to people's standard of living as advanced by Becker (1964). Also, in economies where market forces control public utility such as housing distribution, an indicator of standard of living, low education pushes many households to social deprivation (Zhang & Rasiah, 2016).

Thus, the SSA education distribution and poverty had been reported since 1999 by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and World Bank. Because education had been proposed as the solution to the increasing poverty in the developing countries (Acemoglu & Autor, 2011; Gregorio & Lee, 2002), education for all (EFA) was proposed to suppress the prevalence of education inequality across household and reduce poverty level since the 2000 World Education in Dakar, Senegal (Lincove, 2009). At the 2000 Millennium development goal (MDG, 2000), the underlying hypothesis on education distribution was that by 2015, irrespective of region or country, children (boys and girls with no differential), are expected to satisfy a full course of primary education (Lewin, 2009; Lincove, 2009; UNDP, 2014). Assessing this EFA goal, official data showed that considerable improvement had been made in primary education enrolment. In 2016, the SSA attained 99.6% of enrolment (World Bank, 2016b). Interestingly, the SSA made the best improvement in the net primary school enrolment with 20% increase in 2015 (UN-MDG, 2015). The global and SSA achievement in primary education enrolment was presented in Fig 1.1.

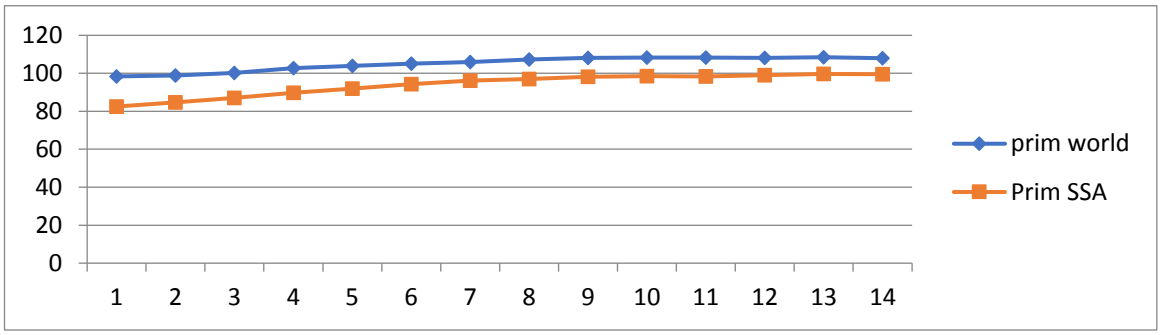

Figure 1.1: The World and SSA Primary School Enrolment

Source: World Bank Data (2016b).

However, the focus of the MDG on education for all (EFA) regarding primary enrolment which is almost achieved seems uncorrelated with the level of secondary and tertiary education enrolments. Figure 1.2 explained the enrolment of the three levels of education for the SSA.

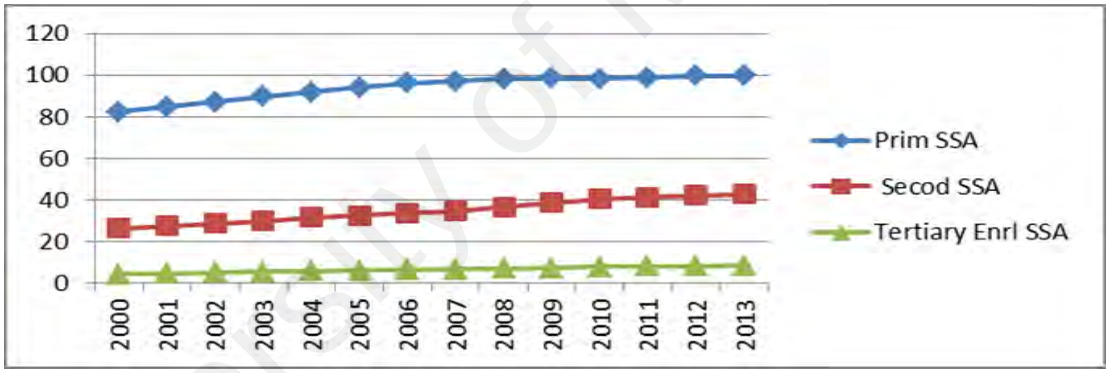

Figure 1.2: SSA Three levels education enrolments

Source: World Bank Data (2016b).

The Figure 1.1 showed that though enrolment at primary school level was higher in the SSA, however, the Table 1.2 showed that the transition gap from primary to secondary was considerably wider as well as transition gap equally existed between the secondary and tertiary. In other words, there was a disequilibrium in the school enrolment and school completion indicating inequalities in educational attainment.

Also, on a global scale, the education inequality analysis of secondary education completion, grouped into three (Asia, Western world and Sub-Sahara Africa), as

computed from United Nations International Children's Fund (UNICEF, 2017) databases is presented in Figure 1.3.

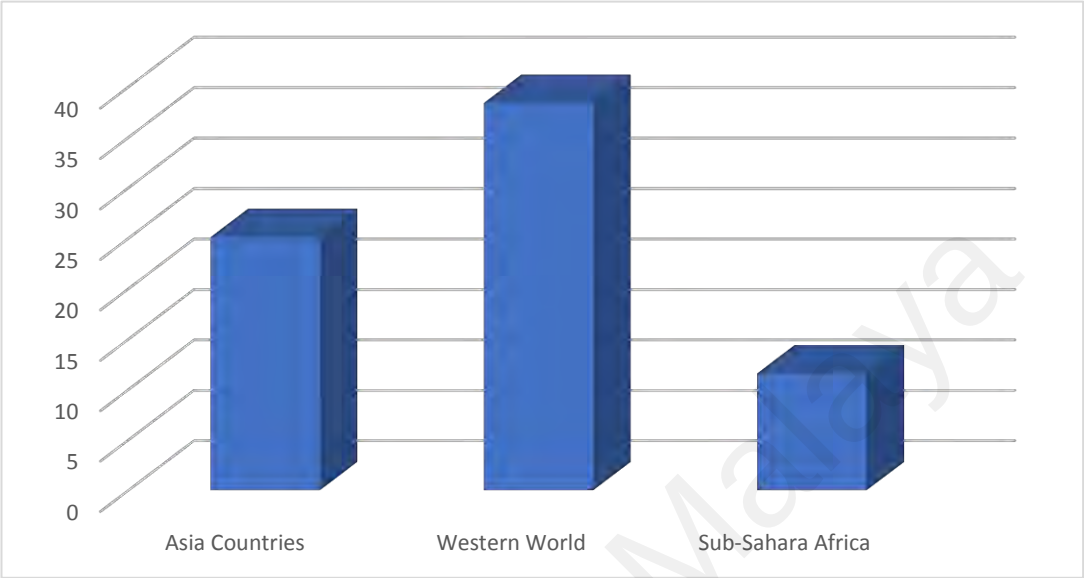

Figure 1.3: World Education Inequality

Source: Author's computation from UNICEF (2017) Database on educational attainment of the population aged 25 years and older.

Figure 1.3 showed that there was a low educational attainment in the SSA countries compared with Asia and Western world. The gap in the educational attainment would have been caused by the substantial number of dropouts. In 2012, 58 million children dropped out from school globally, out of which over 30 million were from SSA. In 2013, it increased to 31 million children out of school. Among them, 50% of these children were vulnerable to 'never go back to school' (Lewin, 2009; UNESCO-EFA, 2015a). In most times, female counterpart often bears the incidence of the unequal education (Cooray & Potrafke, 2011). This problem - dropout – is a social crisis resulting to various social vice' consequences such as thuggery and imprisonment (Burrus & Roberts, 2012; Sum et al., 2009). The available data provided a set of reasoning that a more substantial number of

the household's children of the primary school-age in the SSA countries were affected by the dropout (Balfanz, Bridgeland, Fox, DePaoli, Ingram, & Maushard, 2014).

On the other hand, globally, poverty remains a challenge to most developing countries. The first Millennium Development Goals (MDG1) aimed at reducing extreme global poverty. However, the direction of poverty in the SSA seemed no change for better. Since 1990, the Human Development Report (HDR) with multidimensional indices had substantial improvement in other continents, leaving SSA to desperate for survival, an absolute poverty stigma (Handley, Higgins, Sharma, Bird, & Cammack, 2009). Despite foreign intervention channeled to the region, the proportion of households affected by poverty kept on increasing over the years which made the growth and poverty debate somewhat paradoxical (Ahluwalia, Carter, & Chenery, 1979). For example, in 1999, 22% of the SSA population were poor. However, in 2015, the poverty incidence has increased to over 48% (World Bank, 2016a). In 2011, The World Bank dataset showed that over 415 million people lived below the poverty line (WorldBank, 2015b). Hence, SSA remained the region that the actual headcount of the poor steadily risen overtime (Fosu, 2010). The rising of the household headcount poverty was buttresses by the SSA poverty data of 1981 compared with 2011. The 1981 poverty incidence only accounted for 205 million people below poverty line, whereas 2011 poverty incidence accounted for 51% increase compared to 1981. Although the poverty increase could have been accounted for by the population increase, still, the argument of the population increase showed that more children were having poverty as inherited property (Kohli, 2004).

Furthermore, the headcount of the population in poverty could have been exercabated by the income inequality between the rich (5^{th} quintile) and the poorest (1^{st} quintile). For example, the chart of Figure 1.4 explained income inequality gap for some selected countries of SSA.

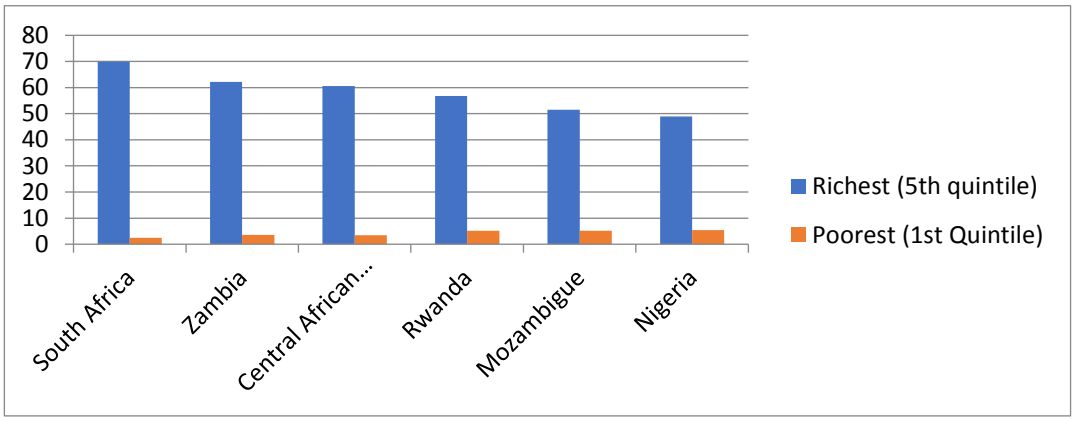

Figure 1.4: Selected SSA Income Inequality Gap

Source: Author's computation

The Figure 1.4 explained that the 1st quintile representing the poor group had a sharp gap of income inequality compare with the 5th quintile in the income distribution. In so doing, the official data and empirical findings showed that poverty was more akin to the female household than the male-headed household (Baliamoune–Lutz & & McGillivray, 2009). Since the larger population was poor - living below $1.25 a day - and the share of the poor of the income was highly dispersed from the rich, the condition indicated poverty prevalence and the deprivation in having access to productive resources, basic social services, employment, markets and information for the SSA countries (Nesiba, 2014).

1.1.3 Growth, Innovation and Poverty Argument

This section discusses further the argument that growth is good for the poor (Dollar et al., 2013). In over five decades, evidence showed that gross domestic product (GDP) as a measure of growth correlated with the living standard for the middle and emerging economies like China and Malaysia (Fatah et al., 2012; OECD, 2016). The general assumption placed emphasis on growth value chain indicating that growth effect would trickle down to the least poor (Dollar & Kraay, 2000; Fatah et al., 2012). In consequence, the growth vision led the developed, and the middle-income countries invest in infrastructure such as electricity and, research and development (R&D), leading to

economic diversification (Fei & Rasiah, 2014). The consistent changes in economic parameters provided an opportunity for the household to explore the economic environment. Thus, this economic opportunity was assumed to increase productivity and wellbeing. No doubt that Dollar and his research team were optimistic that growth is still good for poverty reduction (Aigbokhan, 2008; Dollar & Kraay, 2000; Dollar, et al., 2013).

Essentially, evidence showed that there was an impressive aggregate growth in the SSA countries (see Figure 1.5). However, the growth of the SSA which had been on the annual growth rate of 4.6% since 2009 (WorldBank, 2015b) did not explain the region's poverty (Ahluwalia et al., 1979; Bonal, 2007). The crawling growth - as a driver of the poverty reduction - was clearly understood in the prediction of Ahluwalia et al. (1979). Although there was a steady growth rate recorded in some SSA countries (see Figure 1.5), it mainly correlated with agricultural production and services sector (Nesiba, 2014). Ahluwalia et al. (1979) positioned that eliminating poverty was an illusion even when all economic frameworks were fully employed. In six of the SSA countries, the economy is oil-driven - including Nigeria, Angola, Gabon and Congo Republic (WorldBank, 2011; Zhan & York, 2009). Others including Benin, Burkina Faso and Mali realised their growth from being major exporters of cotton and agricultural products and Liberia exports metals (World Bank, 2011). Whereas the growth consistently proposed by Dollar and his team, sometimes difficult to achive in agricultural driven economy whenver "seasonality distress" affects agricultural products. Suppose the seasonal distress, in other words, agricultural vulnerability occurs, in the consequence triggers seasonality hunger for many countries such as reported in Bangladesh (Khadker & Mahmud, 2012; p.1).

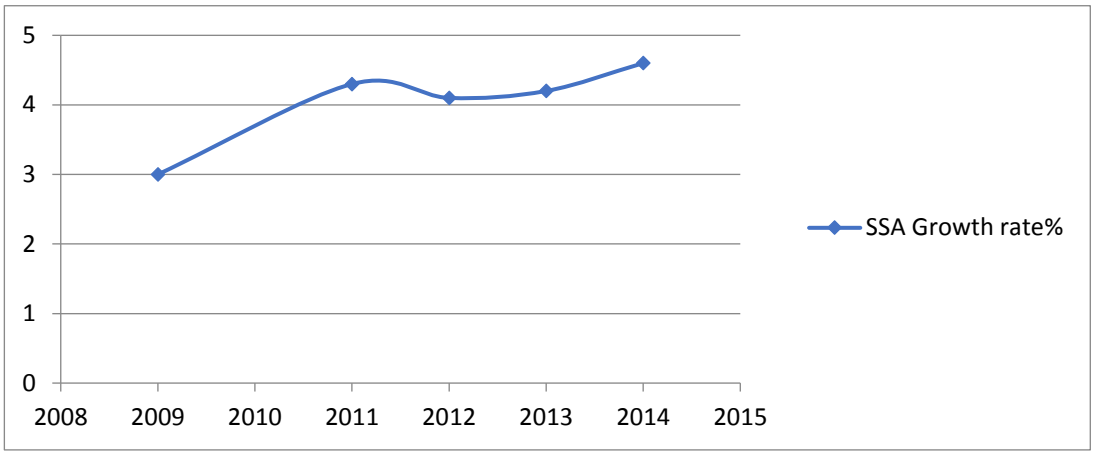

Figure 1.5: SSA Growth Rate (2008-2014)

Source: Authors Computation

On the contrary to growth assumption, the household faces the challenge of income inequality which confirmed the position of the Ahluwalia et al. (1979). The growth gains were not evenly distributed in the SSA indicating that timeless inequality was in disconnection with the proposition of the inverted U-shaped curve of Kuznets theory because of low savings arising from income inequality (Kuznets, 1955). A combination of steady growth and persistent income inequality seemed a cause for the rising of poverty in the SSA countries (Nesiba, 2014) (See and compare Figure 1.4 and 1.6). Thus, income inequality systematically impacted negatively on the household freedom to explore the economic environment thereby expanded the household poverty (Sen, 1999b).

For example, the official data demonstrated that during the years of growth stability at an average of over 4%, the poverty rate was high among the SSA countries. the World Bank data for 2010 showed that Zambia, Gambia, Nigeria and Benin had 77.9%, 73.9%, 69.2% and 38.4% respectively. The 2011 poverty rate of SSA selected countries with available data showed that Togo, Guinea, Chad and Rwanda maintained 73.4%, 64.7%, 52.5% and 48.7% respectively (World Bank, 2014). The aggregated behaviour of world poverty between 1990 and 2015 was explained in Figure 1.6.

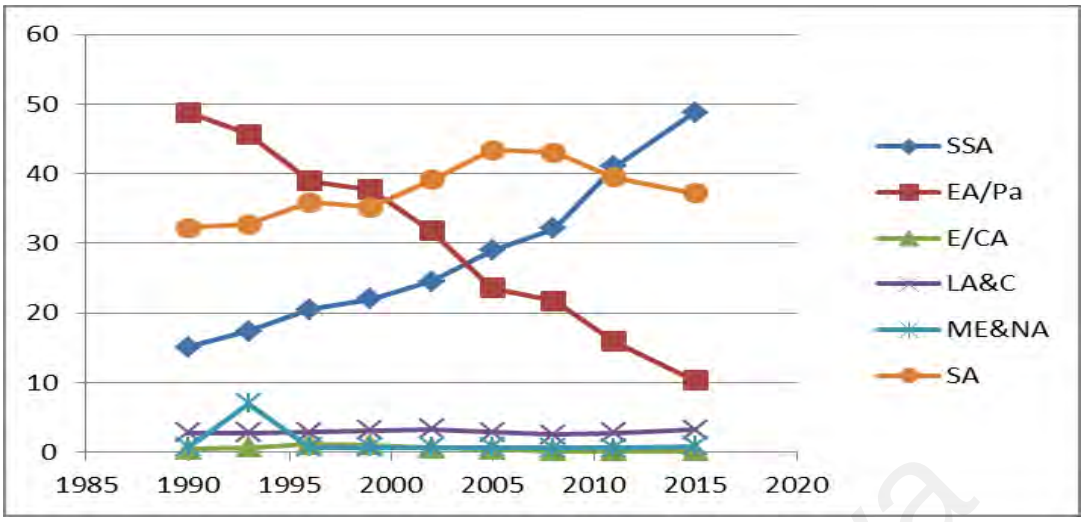

Figure 1.6 Global Poverty Perspective

Source: Computed from World Bank Dataset (2014)

The Figure 1.6 explained that the SSA countries' poverty had been increasing with time. In the case of East Asia and the Pacific (EA/PA), poverty was reducing considerably. South Asia, though on the high side, it was controlled compared with the SSA countries.

Although growth was found correlating with poverty reduction (Dollar & Kraay, 2000; Dollar, et al., 2013), recent scholarly work presented that growth assumption is an insufficient argument without investment in innovation (Nour, 2016). In other words, the rising of poverty correlates with innovation because the growth that correlates with poverty reduction is achieved through innovation. While innovation is an active indicator that promotes growth, innovation increases the chances of living a healthy life, and economic weapon, that controls rising of poverty. In turn, innovation is achieved through a system of knowledge and skill acquisition (Becker, 1964; OECD, 1997). So, innovation maintains a positive relationship with research and development (R&D) and as well as an issue across knowledge institutions (Nour, 2016). As such, it is imperative to assume that, before growth could be achieved that would trickle down to the poor people, a system of knowledge and knowledge transfer are required. Educational equality across households is significantly necessary to offer equal opportunities at different levels of labour market

to prevent a digital divide (Rasiah & Oyelaran-Oyeyinka, 2004). Earlier in this section, we argued that this system of knowledge, that is education, faced the challenge of unequal distribution. Where knowledge is unequally distributed, knowledge and the people well-being tend to have an inverse relationship with expected development arising from low-income and low-wages (Bonal, 2007; Wu, Zhang & Zhang 2008).

Taken together, the preceding arguments and different data illustrations hold three critical issues for the thesis. Firstly, the SSA countries are considerabely dispersed from expected development which stimulated the poor living conditions of the households and infrastructure decay. Whereas, growth is an assumption that it would improve the condition of the people in poverty and development. Though growth was achieved over time, but the growth was unequally distributed in most SSA countries. the inequality had considerable multiplier effect on the household poverty. Secondly, with educational attainment, there was education inequality beginning from secondary and tertiary enrolments. Notably, EFA almost achieved equal access to schooling, evidence showed that there were substantial number of school-age children that dropped out after the initial enrolment and more could not move to secondary education. Finally, the SSA countries have large deposit of natural resources to transform their economies into high-income countries. Various socio-political challenges disrupted the affected countries' development including corruption, war, social unrest in the educational system and political instability. Due to these challenges, inequalities of income and education pushed the households to live perpetually in poverty.

1.2 Problem Statement

Since 1957, the SSA countries had been setting up an economic and political structure for promoting well-being. The goal was to promote education and growth thereby creating

a reasonable living standard (World Health Organization, WHO, 2017). However, after four decades, the region remained poor and characterised by low education.

Over the years, two major approaches had been used to tackle the problems of the poor. Firstly, growth was proposed to be an effective instrument for poverty reduction. (Aigbokhan, 2008; Dollar & Kraay, 2000). Upon that, evidence showed that the SSA had maintained a steady growth of 4.6% overtime. Although the growth rate of SSA had been on the fast track, the proceeds of growth do not trickle down to the least poor, rather it triggered income inequality (UNDP, 2014; Nesiba, 2014). Second, the shortcomings of growth in developing countries led to the promotion of knowledge-based economy by some Asia countries, particularly South Korea, China and Singapore (Iles, 2001; Morrison, 2015). The knowledge economy was achieved through innovation, research and development (Nour, 2016). The idea was to promote equal access to education across households and import technology (Barro & Lee, 2010). As such, the proposition of growth driven economy correlates with skill acquisition, level of education attained and adequate investment in education (Krueger & Lindahl, 2001). The enhancement of both the social and private return to education is expected to promote economic growth which would reduce household poverty (Dollar & Kraay, 2000; Dollar, et al., 2013; Fatah, et al., 2009). Also, the relevance of education for inclusive growth was emphasized in the 2017 World Economic Forum Report (WEFR). Education and skills represent the first pillar of inclusive growth that meant to trickle down to the least poor (Samans, Blanke, Corrigan, & Hanouz, 2017). However, the poor distribution of education, or rather argue that the unequal education attainment in the SSA challenges the inclusive growth vision and expected productivity. As such, the inequality in education upturn the trickle down of growth hypothesis (Wu et al., 2008; Samans et al., 2017).

Over a decade, there was a projection for 2015 that poverty would end through the promotion of education for all (EFA) (Sachs, 2005). Using the SSA data on poverty as measured with the money-metric approach, a significant proportion of 415 million people of SSA are living below international poverty line of $1.25 per day (United-Nations, 2010). Furthermore, since the poor people live in the rural areas with farming as occupation, the rural workers were subjected to agricultural seasonality distress leading to "seasonal hunger" (Khandker & Mahmud, 2012; p.1). Hence, the low income arising from farmers challenges to seasonality distress alongside with low consumption exacerbated the SSA's policy bog. As poverty and agricultural seasonality increases for the farmers at the rural, two things could emerge - low income resulting to "endemic poverty" and education deprivation (Khandker & Mahmud, 2012; p.1).

Furthermore, there were arguments and counter-arguments on the poor development and household poverty. On the one hand, poverty was blamed on the low level of education acquired (Mubarak, 2014; Todaro & Smith, 2012). On the contrary, others casted the blame of poverty on inequality in education distribution (Andersson, Engvall, & Koko, 2006; Awan et al., 2011; Chidoko, Sakuhuni, Dhoro, & Gwaindepi, 2011; Letseka, 2014; Oyelere, 2010; Reinert, 2008; Spaull, 2013; Wang, 2011; Wang, 2013; Wu et al., 2008). Interestingly, the 2000 EFA goal at Darka, Senegal in providing access to all school-age children is almost achieved in the SSA. The universal primary education (UPE) goal of the United Nations (UN) for primary schooling runs to 99.5% in the SSA (WorldBank, 2015a). However, the UPE achievement in enrolment does not explain educational completion at all levels that could affect better household status and income. It only addressed the flow rather than the stock of educational outcome (Thomas, Wang, & Fan, 2001). Instead, the dropped-out of school, either shortly after the initial enrolment or could not proceed to secondary education, is a critical issue of concern in the SSA. At least 42%, dropped out from primary schooling, giving an average of 30 million school-

age children out-of-school in 2012. It increased to 31 million in 2013 where 53% were girls (UNESCO, 2014)

In fact, the growing of illiteracy which is assumed to be an indicator to low status, poor labour productivity and inability to import technology from abroad is an issue in SSA (Aghion, Boustan, Hoxby, & Vandenbussche, 2009; Barro & Lee, 2010). Despite the adoption of UPE policy in some SSA countries and significant improvements were visible in primary school enrolment, there were 182 million adult illiterates and 22 million youths that were out of school in 2012 (UNESCO, 2014)

Besides, although data explained the improvement made in enrolment at the primary level education, studies showed that the condition of primary education as questionable. Firstly, the initial primary education distribution contributed mostly to the educational inequality in the Sub-Sahara Africa (Hulme, 2014; Stewart & Samman, 2014; Wylde, Ssewanyana, Ogen, & Kiconlo, 2012). Broadly, the focus of the SSA governments on education distribution centres on the improvement of higher degrees with less attention to primary education development (Gruber & Kosack, 2014). As such, higher financing investment on the tertiary leaving poor investment in financing primary education contributed to the low-income group that were left behind, segregated and deprivation in educational distribution (De-Witte, Cabus, Thyssen, Groot, & Brink, 2013). The deprivation was reflected in the children dropping out before primary school completion. In consequence, the behaviour provided an extra advantage to the wealthy class in enlarging their wealth through education opportunity for their children. Such opportunity made the rich families to continuously be in position of the sharing of economic resources. On the other hand, the composition of the rural dwellers regarding the poor wealth acquisition and low education enlarged the headcount of those educationally deprived and poverty (Wu et al., 2008).

Then, it is of interest to note that previous studies focused on inequlity of education and its impact on poverty (Wu et al., 2008). Others focused on educational attainment, gender inequality in education, socio-economic status, income inequality in relation to poverty, segregation and return to education (Agasisti & Cordero-Ferrera, 2013; Bowman, 2007; Awan et al., 2011;Baliamoune-Lutz & McGillivray, 2015; Gruber & Kosack, 2014; Hu, Guo, & Wang, 2014; Letseka, 2014;Moav, 2002; Nakajima & Nakamura, 2009; Oyelere, 2010; Reinert, 2008; Spaull, 2013; Ukiwo, 2007; Wang, 2011, 2013; Wu et al., 2008). However, examination of the relationship between education inequality and poverty, with our limited understanding, got little attention . The only examination of the relationship was found in the study of Wu et al. (2008) which was carried out in the rural economy of China. Not only that there were few studies on the relationship, but the study of the relationship of education inequality and poverty also has little or no attention particularly in the SSA

Many studies pointed out that dropout is a crisis (Bonaldo & Pereira, 2016; Burrus and Roberts, 2012). Some of the studies delved into the causation of the dropout problem such as fluid reasoning skills, substance use and poor academic performance (Pagani, Brière & Janosz, 2017). Coupled with a substantial number of dropout in SSA as against the achievement of EFA, there was just a few in-depth analyses of children at risk of this social problem of dropout (Burrus & Roberts, 2012). From the methodological analysis, qualitative and descriptive methods had been used to analyse the volume of dropout in education distribution (Morse, Anderson, Christenson, & Lehr, 2004). Besides, the descriptive rate provided by UNESCO-EFA had been contested in the development literature (Burrus & Robert, 2012; Lu, Cui, Shi, Chang, Mo, Rozelle, & Johnson, 2016; UNESCO-EFA 2015b; World Bank 2016). For example, the 15 to 20% graduation rate in America was challenged (Pharris-Ciurej, Hirschman, & Willhoft, 2012). Hence, there was no clear-cut consensus between the official speed of dropout and the scientific rate

estimated for dropout. Also, these studies were out of the scope of SSA countries. Being classified as social education crisis, determining the spread had little attention in the previous studies (Burrus & Robert, 2012. Sum et al. 2009). We equally observed that most of the studies were carried out in a single country which might not be generalisable (Yi et al., 2012). Hence, it will be statistically necessary to investigate the magnitude and the status of its dropout spread in the SSA which increases the chance for recycling both poverty and education inequality across households.

1.3 Research Questions

Considering the problems highlighted above regarding the SSA countries, the thesis was designed to answer the following research questions.

1. What is the level of education inequality across Sub-Sahara Africa countries?
2. What is the relationship between education inequality and poverty in the Sub-Sahara Africa countries?
3. What is the status of dropout of the primary-school children in the education distribution of the Sub-Saharan African countries?

1.4 Research Objectives

After much in-depth into the previous works relating to the research questions of this thesis vis-a-vis the identified gaps, this thesis achieved the following specific research objectives.

1. To determine the level of education inequality in the Sub-Saran African countries
2. To examine the relationship between education inequality and poverty in the Sub-Sharan African Countries.
3. To determine the proportion of dropout among the eligible primary school children in the Sub-Saharan African countries.

1.5 Research Boundaries

The thesis covered the examination of the levels of education inequality and its relationship with poverty, both at regional and individual countries of the SSA. It analysed the proportion of variation in the educational levels for each sampled twenty-five (25) SSA countries. The study primarily used indicators of education inequality, poverty and consider Finally, the thesis considered poverty as absolute instead of relative where multidimensional indices were applicable.

1.6 Motivation of the Study

Across world regions, the development of SSA has continued to be a global debate. The region achieved little in the development process. Firstly, the region is blessed with economic resources (most countries of SSA have oil and gas sufficiently to transform their economies) and agricultural resources (Sala-i-Martin & Subramanian, 2003; Worldbank, 2011; AfDB, 2009; US-EIA, 2013). However, the natural resources expected to transform the region are at variance both at the individual level of living standard and the regional development (Sala-i-Martin & Subramanian, 2003). In consequence, there has ever being an increasing trend of poverty. Aside, data evidence showed that the region is educationally deprived.

Secondly, there were few direct studies done on education inequality and poverty relationship for the region. The scope of the studies on education inequality and poverty was outside SSA countries. The most recent study on education inequality and poverty relationship was in China rural economy running to a decade (Wu et al., 2008). Thirdly, data showed a substantial number of dropout which makes equality of education distribution seemingly difficult. Finally, the SSA countries were chosen as study area because data projected the SSA being concentrated with educational inequality and poverty (UNDP HDR, 2015a; World Bank, 2015c)

1.7 Organisation of the Thesis

The researcher divided the thesis into seven chapters. Chapter one focused on problematizing education inequality and poverty, which provided reasons for examination. the chapter explained the recent arguments and data presentation leading to three primary research questions that guided the rest chapters in the thesis.

The Chapter 2 of the thesis discussed two fundamental theories. The chapter also reviewed previous empirical works of literature on the objectives of the study. Chapter 3 explained the methodology used in solving the problems raised. Among others, the chapter discussed research design, justified reasons for method selected, and the methodology of each selected methods. The thesis was quantitatively designed. The chapters 4 - 6 were the analytical chapters of the thesis. Chapter 4 provided empirical results of education inequality Gini (EIG), wealth concentration across educational levels and the gender decomposition. Chapter 5 presented the empirical results on the nexus between education inequality and poverty. Chapter 6 presented the empirical results of the proportion of social education crisis of dropout and the extent of its spread. All the results of the analytical chapters were discussed. Finally, chapter 7 of the thesis presented the conclusion and policy implications of the thesis findings from chapters 4-6. The chapter concluded with the thesis contributions and the areas for future research.

1.8 Key Concepts/Definition of Terms

In this section, we presented the terms used in the thesis. In other words, the section presented the definitions and limitations of the various concepts used in this thesis work.

1.8.1 Education Inequality

Education is an essential public good, necessary for controlling poverty (Anomaly, 2018; Moşteanu, & Cretan, 2011; US-NSF, 2016; Daviet, 2016; Stiglitz, 1999). It equally correlates with growth (Krueger & Lindal, 2001). In contrast, not every household

children are privileged to start, and complete educational processes thereby creates differences in educational attainment. In this thesis, education inequality arises when school-age child lack freedom to access education through enrolment and complete all levels of education during the expected years of schooling. In other words, education inequality arises when there are differences in educational attainment across households and region and countries. It is a condition in which eligible household children are deprived of enjoying a complete formal educational system which distributes individual status and wages in the labour market (Becker, 1964). The situation enhances the recycling of education poverty within and between households (Wu et al., 2008).

1.8.2 Poverty

There are three classes of the society, the poor, the middle-income class and the rich. Hence, poverty falls on the low-income class wherein larger population is at disadvantaged. Furthermore, two poverty situations exist – the absolute and relative, although they are not mutually exclusive. Firstly, the absolute poverty is a poor experience in surviving daily needs (Bourgignon, 1999). People in this category find it difficult to provide food, shelter, clothing, electricity, education, health, sanitised, environment, and maintain peaceful co-existence with the people. Using the money-metric approach of the poverty line, the absolute poverty represents the category of households that fall below the poverty line of $1.25/day (Walker & Walker, 1999). Secondly, the relative poverty is a condition that a household could not be like others. This category can eat, cloth and house themselves because they have money to take care of those needs. However, relative povety arises when household ‘A’ buys an expensive car but household ‘B’ could not though not in want of a car (Bourgignon, 1999). In other words, household has a mobile car but could not afford exotic car used by the household B. Hence this thesis focused on the absolute instead of the relative poverty.

1.8.3 Educational Poverty

A formal education is measured by the quantity of education credentials. The credentials begin with pre-primary to degree levels. Educational poverty is "the precarious social situations in which seriously educationally deprived individuals face greater difficulties participating in different economic, social and cultural activities" (Botezat, 2016, p.3; Allmendinger, 1999). According to Cecchi (1998) as discussed in Botezat (2016, p.4), educational poverty group representing the individuals "who do not acquire a minimum educational threshold needed to survive". Educational poverty attracts double deprivation which include (1) lack of functional abilities and (2) lack of educational credentials to earn income in the labour market for survival (Botezat, 2016). Hence, the thesis alluded to educational poverty to mean a condition where household lacks the capability to complete all the levels of education available to it.

Furthermore, educational poverty can be absolute and or relative. The absolute educational poverty is a condition that the household lack "educational credentials" worthy of transforming living standard (Shavit & Park, 2016, p.1). The victim could be stark illiterate or have a minimum primary education which could not help to resolve life demands such that he occupies low status and low income. This condition has been referenced as positional good or relative educational attainment (Fujihara & Ishida, 2016; Hirsch, 1976; Rotman, Shavit, & Shalev, 2016). Whereas, the relative educational poverty is a condition in which a household could not attain the highest level of education though survived to the secondary education. The inability of the household to complete the seventh level of Barro and Lee (2013) educational distribution leads to educational opportunity failure in the labour market (Fujihara, & Ishida, 2016; OECD, 2012). This category of people falls in-between the fourth level and the seventh (Barro & Lee, 2010). In sum, the absolute educational poverty is lack of educational credentials and educational

competencies while relative educational poverty the lacking control of the threshold skills that could make individual to participate in social and economic activities (Bozeta, 2016).

1.8.4 Educational Attainment

Educational attainment, in this thesis, refers to the year of schooling or educational level that a household attained during the period of attending formal education. The levels comprise of no education, primary, secondary and tertiary educational levels (Barro &Lee, 2010). In the distribution, Barro and Lee split educational attainment into seven levels (Barro & Lee, 2010, 2013).

1.8.5 Income Inequality

The income inequality measures by income Gini coefficient which provides explanation on the deviation of the distribution of income among individuals or households within a country from a perfectly equal income distribution (UNDP-HDR, 2015a)

1.8.6 Dropout

Dropout arose when a school-aged child abandoned schooling for any reason rather than death before completion of his primary education at any age bracket. The dropout happens irrespective of time of the dropping out. However, students who left and returned before the expiration of academic session are not considered as a dropout.

1.8.7 Dropout Crisis

A ‘crisis’ associates with ‘spread’ across the vast population. Hence, dropout is labelled a social problem, a crisis that widely spread across educational levels (Balfanz, Fox, & Moore, 2010; Balfanz et al., 2014; Burrus & Roberts, 2012). The victims are the households’ children out-of-school. Hence, the thesis considered it as a social crisis. As such, it is a social problem that spread among the school-age children in a formal

schooling system, the classroom learning activities. It is mainly caused by poverty (Balfanz et al., 2010).

1.8.8 The Equilibrium Point Condition

The equilibrium points condition (EPC) is a technique to analyse the status of an economic variable of the extent of the spread, dominance or epidemic. The method was generated from the polynomial regression equation which arose from the *discriminant of the quadratic function*. Hence, in this thesis, EPC was used to determine the spread of dropout in the SSA.

1.8.9 Epidemiology

The term 'epidemiology' was used in this thesis to mean the spread of dropout in the sampled countries. the spread is understood to either stable or unstable, epidemic or endemic and controlled or uncontrolled.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Three testable objectives were stated in the previous chapter to which a considerable literature was reviewed in this chapter to explain the theoretical and empirical studies relating to each of the objectives. Although understanding the people standard of living has a wide array of theories underpinning it, particularly where growth was believed to be good for the poor (Dollar & Kraay, 2000), the recent studies of development shifted attention from growth to human development. In consequence, a wide array of studies had covered systematic approaches to relieve the poor from their economic bondage. As such, economists and sociologists proposed various theories and models to capture reasons why the poor are truly poor and the way out of the poverty region. These divergence and multidisciplinary theoretical views across disciplines are essential for this current study. So, this chapter focused on the review of the theoretical literature which provided theoretical understanding of education inequality and poverty. Also, the further interest of this review was to systematically and logically analyse previous empirical works with the focus to identify the potential gaps to cover and construct a novel contribution to economic literature, particularly, in the field of development studies. The review was organised in a way that each objective was achieved. To that end, the chapter was structured into seven sections and subsections.

2.2 The Countries Overview

This section presented the profiles of each sampled country in this thesis. We went through each country economic, social, security, human development, educational issues such as dropout and political issues overtime.

Countries Profile

Angola Profile

Angola, a country with a population of 29.5 million people, got its independence in November 1975 and currently was classified as low-middle income in 2018. The country has abundant natural resources such as petroleum, phosphates, diamonds, feldspar, bauxite, uranium, and iron ore. Others include gypsum salt, cement, granite and beryllium to make easy climbing the development ladder, in other words, to a strong and high economy. In addition, there are untapped mineral resources such as vanadium, zinc, wolfram, copper tungsten and silver. Others include quartz, mica, phosphate rock, nickel, manganese, lignite, uranium, iron ore, gold, lead, and clay. After Nigeria, Angola remains the 2nd largest oil producer and the 4th largest producer of diamond in the SSA countries. Hence, the Angola economy largely depends on oil. Geographically, Angola bordered Congo Republic, Botswana, Zambia and Namibia. The country's tourism industry across the country include the Bicauri National Park; Cameia National Park, Cangandala National Park, Iona National Park, Kisama National Park. Others include Longa-Mavinga National Park, Luenge National Park, Luiana National Park, Mucusso National Park, Mupa National Park and the Quicama National Park. There are large number of rural dwellers whose occupation is based on low farm-holdings.

Economically, its nominal GDP declined from $126.73 billion in 2014 to $95,337 billion in 2016. Despite the country abundant natural resources, the World Bank (2018) update, showed that the country fell from upper middle-income country to lower income country in 2018 World Bank classification. The falling back to low middle-income was due to the decline of its GNI per capita from $3,450 in 2016 to $3,330 in 2017. In its report, the latest human development report (UNDP, 2013), the United Nations

presented the country's education index as 47.4% and ranked the country with 149 out of 188 countries in 2013.

From the country political issue, the current President João Lourenço who won in the 2017 general election has majority in the legislative arm that is useful to rebuild the economy. Since his assumption in the office, it has tightened the monetary policy, moving the country economy towards market based and has potential influence on the foreign exchange rate allocations. Further steps were taken to reduce subsidies as well as reform the market economy by privatisation and liquidation of public corporations that were the economic burdens to the country. Most recently, to achieve the market reform, investment and the antitrust were approved for implementation beginning from 2018 fiscal year.

In attempt to revive economic problems, especially in the natural resources endowment, a memorandum came up with six constrained indicators. These included "(i) the incomplete transition to a market economy; (ii) macroeconomic management; (iii) governance and transparency in the management of the mineral wealth; (iv) the business environment; (v) agriculture; and (vi) public service delivery to the poor" (World Bank, 2007, P. xxxv). Earlier, this memorandum helped the economy to grow to upper middle-income country in 2016, although fell back in 2018 classification. Although World Bank has not updated the country' poverty status since 2008 as at the time of this writing, with available data, the country was able to reduce its poverty from 32.3% in 2000 to 30.1% in 2008.

However, according to World Bank (2018), the country had been facing the challenges of oil-dependency at the great cost to diversification of the economy; infrastructure decay; institutional incapability; poor governance, and being left behind in human

development within the realm of health, education and standard of living (Sources: Thomas, 2012, Bikalemesa, 2014; Carneiro, 2007; Jul-Larsen & Bertelsen, 2011; Gonçalves, 2010; World Bank, 2018,).

Burkina Faso Profile

Burkina Faso is a landlocked country with a population of over 18.6 million people in 2016, and according to World Bank classification, the country consistently occupies the low-income country status till 2017. The economy heavily relied on agriculture particularly cotton. To its advantage, there was a recent discovery of gold. However, the country is facing serious political problem with terrorist attacks.

Fiscally, the country's revenue was insufficient to settle wage bill and fiscal deficit that grew from 3.4% in 2016 to 8.4% in 2017. The economy is exposed to being vulnerable to prices of importation of oil, gold and cotton. According to world Bank on poverty, the international poverty headcount ratio was reduced from 83.1% in 1984 to 43.7% in 2014. The GNI was $610 which led Burkina Faso to occupy low-income group.

Moreover, on issue of human development, there existed in the rising of child mortality and fertility. The country had its education index of 25%, indicated that the country had been educationally deprived and internationally unequal in education. Although the country was able to reduce its out-of-school primary school children from 944,661 in 2012 to 746,623 in 2017 which accounted to 20.96% reduction, the sum of out-of-school was large for the small country of Burkina Faso. According to the United Nations ranking of human development, the country was ranked 181 out of 188 countries in 2013. This implied that the country was grossly deficient in health, education and standard of living of the people of Burkina Faso. Because of its deficiency in the education sector, through IDA, the World Bank approved $70 billion to address the

tertiary education of the country. Equally, to improve the performance of telecommunication industry, the World Bank approved $20 billion on April 25, 2018 to set up a better networking and telecommunication sector.

In the development of Burkina Faso, there are several challenges facing the country such as the issue of dependency on the oil importation and reoccurrence of terrorism. Other developmental challenges included the commodity export prices, rainfall challenge to its agricultural productions and the inability of its openness to international trade. Besides the economy, according to Wayack Pambè et al. (2014), there was a sharp gender difference especially in education and financial autonomy, the reduced participation in decision making and women regularly enjoyed domestic violence. The relative solution to overcome the challenges depends on the ability to stabilize its political system. (Sources: Wayack Pambè et al., 2014; World Bank, 2018, May 17; World Bank 2018, April 25; World bank, 2018, July 10).

Cameroon Profile

Cameroon is a country that shares boundary with Nigeria., Chad, Equatorial Guinea, Central African Republic, and Gabon. The country with a population of 24.1 million people has natural deposits such as uranium, cassiterite, cobalt, gold, lignite, and nickel. Others include manganese, iron ore, bauxite and diamond. The national belief, as contained in the "Strategy Document for Growth and Employment (DSCE)", was the exploration of these large deposits of natural resources with the aim to solve the problem of unemployment and the poor growth challenges.

Despite the natural resources, the economy depends largely on services sector as services contributed 46.4% to GDP in 2014 while industry and agriculture contributed 30.6% and 22,7% in that order. The 2017 annual growth was 3.25% which was a decline

from 4.5% in 2016. Despite the country GNI per capita which declined from $1400 in 2016 to $1300 in 2017, the country remained a low-middle income country as at 2017. On the issue of poverty, the country's international poverty headcount ratio was reduced from 46.1% to 23.8% in 2014 with 5.3 million headcounts remaining in poverty. Although the international headcount ratio was low, the national headcount ratio (37.5%) was higher in 2014.

About the country's labour market economy, labour participation was higher in 2013 with 71.2% but there was disparity between the gender where men (77%) participated more than women (65.4%). Likewise, the country total unemployment in 2013 was 4% but the share of the unemployment rate was higher for women (4.4%) than men (3.7%). Although there was existence of National Gender Policy of Cameroon, experts entertained doubt of efficient implementation of the policy to transform the economy (Mefire, Vissandjée, & Bibeau, 2017).

Politically, although the country politics was stabile since 1960, however, the government lacked efficient policy to address the issue of income inequality. There were fragile policies to encourage private investments and persistent corruption permeated the government business dealings. The country's gender inequality index showed 0.587 and ranked 132 out of 161 countries, indicating that there was high gender inequality between sexes in 2014.

The development challenges of the Cameroon have ever been on the issue of poor governance. This was reflected in the country's transparency index which was ranked 153rd out of 180 countries in 2017 indicating poor transparency in governance and administration. Also, the insurgence of Boko Haram has impacted on the social and economic development of the people (Sources: Mogoum, 2015, Thomas, 2012; World

Bank, 2018; Japan International Cooperation Agency, 2015; Mefire, Vissandjée, &, Bibeau, 2017).

Comoros Profile

Comoros is a small country with 0.8 million people in 2017 and located in the Indian Ocean, having boundary with Madagascar and Mozambique. The country contains four islands, namely, Mayotte, Mohéli, Ngazidja (or Grande Comore and Anjouan - as well as five ethnic groups.

Although Comoros has five different ethnic groups, the political system was well managed that allows for rotation among the four regions which promoted political stability of the country. In 2017, the country was classified as low-income country with the GNI per capita and with annual growth rate of $760 and 2.5% respectively. Comoros' economy is largely dependent on agricultural products such as bananas, vanilla, coconuts, cloves, cassava and ylangylang, Because of its agricultural based economy, agricultural products are the basic export products in its international trade.

With the Comoros' population of 0.8 million people, 60% of the population fall under the age of 25. Because of the large population under the 25 years, Comoros - whose economy depends on agriculture - has problems of importation of food items. Also, being agricultural occupation dominant country within an island, there has been a land shortage for habitation. Moreover, to enter into the country labour market requires university education.

According to World Bank poverty and equity data, the international poverty headcount ratio was 13.5% in 2004 but increased to 18.1% in 2013 with 0.1 million people were in poverty. Since the economy depends on agriculture, there is high rate of poverty in the rural areas of the country, particularly in the Moheli island due to little attention to

the rural dwellers regarding the multidimensional indices of poverty. Recently, oil was discovered in the country. Like other nations in oil wealth, the country new discovery of petroleum might increase the tension in the polity and socio-economic status of the country. Another issue about Comoros was that the country is small, but the income inequality was 44.9% which considered very high compare with countries of large population.

The development challenges of the country include malnutrition and hunger, high mortality rate and maternal mortality. Others include gender inequality which spread across all sectors such as employment, poor transportation system, heavy reliance on remittance, foreign grants and assistance. For example, the women have poor access to credit facilities, thereby they are fully participating in agricultural productions than men. Despite the full participation, women enjoy inequality in the marketing of the agricultural products. According to African Development Bank Report on gender inequality, the report regarding education showed that the gap was narrowed in secondary education but wider in technical and vocational education. In addition, the 2013 human development report (HDR) on education index showed that the country education index was 45% indicating that Comoros is educationally deprived. The country's human development index (HDI) ranking was 159th out of 188 countries indicating that the countries have low performance in health, education and standard of living (Sources: Verite Fair Labor, n.d; Ango, 2016; World Bank, 2018, May 17; African Development Bank, n.d).

Congo Republic Profile

Congo Republic, a country with a population of 5.3 million people, occupies economic status of upper-middle income with its GNI per capita of $1,360 in 2017. The annual growth rate began to be depressed from -2% in 2016 to over -4% in 2017. According to

the World Bank, Congo Republic, a member of Central Economic and Monetary Community (CEMAC), has its people live more in the urban than the rural. The country has a large forest with a vast of arable land unused. There is hydrocarbon reserves together with 1.6 billion oil field and 90 billion natural gas. Upon that, there is over dependence on the hydrocarbon natural resources and oil, whereas the revenue realised from the resources has little impact on the socioeconomic of the people. The curse of dependence arose because other sectors were abandoned, such as forestry and agriculture.

In 2017, there was a 9.6% fall of non-oil sector to which the private sector began to reduce their production capacity. However, it was assumed that the economy would keep the recovery pace due to foreign direct investment such as Dangote Cement industry.

The World Bank estimation on poverty showed that the international poverty headcount ratio was 51.6% in 2005 but reduced to 37% in 2011. Although the country poverty has reduced, 1.7 million people remained in poverty out of 5.3 million population. In human development estimations, the education index was at average level of 51.1% in 2013 while the HDI ranking regarding health, education and standard of living was 140th out of 188 countries (Sources: AfDB/OECD, 2006; Japan International Cooperation Agency (2017; World Bank, 2018, April 19;).

Congo, DR Profile

Congo DR is a country of 81.3 million people in 2017. The people of the Democratic Republic of Congo enjoined different kinds of conflict and suffered in the hands of dictatorship arising from ethnic disputes and tension on the issue of resources control. Besides, the country has arable lands and abundant natural resources. Despite the

unemployment rate for women was lower than men in 2014 (ratio 7:9), women in the country have been experiencing unequal participation in politics. There was low education for girls due to early marriages and dropouts from schooling. Their women faced problems of violence which causes complicated health problems. Among the women, there were persistent problem of raping which often led to unplanned pregnancy and increase HIV/AIDS infections. Moreover, the law of the country is so restrictive on the women particularly on discrimination. For example, "the family code requires women to obey their husband, obtain his permission to work and engage in any legal transactions. This is a powerful cultural and societal influence on women" (Home Office 2018, p.7). Often, the women faced issues of sexual harassment, economic discrimination and political participation.

In the economic aspect, the human development index and mean years of schooling accounted for 45.7% and 6.8 respectively in 2017.

Economically, the GDP growth rate was 6.9% in 2015 with 1.6% reduction to 2014. In 2016, the annual growth rate was further reduced from 6.9% in 2015 to 2.4% because of the several mining activities and constructions embarked upon in the cities. Notably, the economy is driven by Cobalt and Copper which accounted for 80% of the export. Unlike the counterpart Congo Republic, the country GNI per capita in 2017 was $450 which classified it as low-income country. Although there was considerable reduction of poverty from 71% in 2005 to 64% in 2012, Congo DR was ranked 176th out of 188 countries of the world in HDI. Politically, Congo DR has political instability that made significant impact on the exploration of the vast resources and its economic performance. Since 2001, there were conflicts regarding the ruling the country by just a Head of State, Joseph Kabila. As such, election in 2016 was thwarted because of

obsolete electorate register. The delay had led several bodies to mediate between government and the opposition party, for a quick conduct of the election.

The current challenges of the government are the issue of over 4.5 million people who were displaced within the country as well as taking responsibility of caring for over five hundred thousand refugees (Sources: Japan International Cooperation Agency, 2017; UNDP, 2018; Transformation Index BTI 2018; World Bank 2018, May 16; Home Office, 2018).

Cote D'Ivoire Profile

Cote D'Ivoire is a country with 24.3 million people in 2017, has its economy depended more on agriculture. The country is known as the largest producer of cocoa and coffee in the world. Also, the country is endowed with natural resources such as gold as well as a large field of oil and natural gas. Others include manganese, diamonds, silica sand, copper, cobalt, iron ore, bauxite, tantalum and nickel. Despite these natural endowment, the country faces challenges of poverty, inability to harness natural resources properly, political unrest due to inability to explain the resource governance and issue of identity. In 2017, the country's GNI per capita stood at $1,540, which made it a low middle-income country and its annual growth rate was 7.8% in the same year. Almost half of the population are living in the rural, at least 48% of the population in 2012.

Despite the international poverty headcount ratio was reduced to 28.25% in 2017, about 6.5 million people are living in poverty out of 24.3 million population. The headcount poverty was more if we consider the national poverty ratio of 46.3%, where 10.7 million people live below national poverty line in 2017. The country HDI raking was 171st out of 188 countries in 2013. The poor HDI was reflected in the education distribution with the estimated education index of 37.2% showing that the country was educationally deprived and internationally enjoyed inequality of education. Another revelation was in

2012 when the country out-of-school primary school children was 1,084,851 but it was reduced to 419,327 in 2017. Comparably, there was increase in the enrolment for girls, however, girl's education faces some notable inequality and problems. These include (1) few of those enrolled children completed their seven levels of education. (2) school environmental problem and (3) dropout was a common phenomenon due to gender-based violence by teachers and boys in the school.

According to World Bank, the economic challenges include the country's price volatility in mining and agricultural products, climatic conditions, security threats/risks and the inability to manage effectively the international and regional financial markets (Sources: Thomas, 2012; Zambe, 2014; Japan International Cooperation Agency, 2013; World Bank, 2018, May 17).

Ethiopia Profile

After Nigeria, Ethiopia with 105 million people in 2017, is the 2nd most populous country in the African continent. Like Burkina Faso, Ethiopia is a landlocked country and bordered Kenya, South Sudan, Sudan, Djibouti, Eritrea and Somalia.

It has an economic stability with a growth rate at average of 10.2% for a decade (2005/06 to 2015/16) making it a fastest growing economy in 2017. The government effort in construction, services, agriculture and a modest growth in manufacturing accounted for the stability. Despite the growth experienced, the GNI per capita of $783 classified the country as one of the poorest country occupying low-income group in the world. The country made remarkable efforts to reduce its international headcount poverty from 67.1% in 1995 with 38.5 million people in poverty to 27.7% in 2015 with a considerable reduction of people in poverty to 27.9 million people.

Ethiopia faces several challenges including gender inequality, poor quality of education and learning outcome, social unrest, political instability, problem in the manufacturing competitiveness leading to poor job creation. However, currently, the country is undergoing foreign direct investment attractiveness to the European Countries.

Further characteristics of the country include, the economy depends on agriculture and the growing population is creating land shortage for agricultural productions. Demographically, 80% of the population live in the rural areas. People are exposed to frequent droughts, earthquake and volcanic eruptions in some parts of the country which often promote migration and internally displaced people (IDP). Also, the country faces challenges of bordered wars such as Somalia disputes and internal ethnic crisis. The political instability which often impacted on tourism, foreign direct investment and exports are notable challenges in Ethiopia (Sources: Azo Mining, 2012; UIS-UNESCO, 2018; The World Factbook, n.d; World Bank, 2018, October 31).

Gambia Profile

Gambia with a population of 2.1 million in 2017 is rich in natural resources. The natural resources include Liquefied Petroleum Gas (LPG), ilmenite, Fish, zircon, silica Sand and Clay. Others include Zircon, Titanium, tin, laterite, rutile, gold and hydropower. There are seven National Parks: Wetland National Park, Abuko National Park, Niumi National Park, Kiang West National Park, River Gambia National Park, Tanji Bird National Park and Tanbi Wetland Complex. The substantial number of the population (57%) live in the urban and semi-urban cities of the country. The climatic condition is mostly tropical.

Gambia has its economy driven by agriculture where about 80% of the population have farming as occupation while agriculture contributed 30% to the national output (GDP). In the industry and services sector, according to Deen (2013), the two sectors

contributed 12% and 57% respectively to the GDP. In 2012, the GDP per capita stood at $544 while between 2007 and 2010, the average real growth was estimated at 5.5% arising from agriculture and services sectors (Deen, 2013). Besides the country dependence on agriculture, the economy is driven by its tourism with its developed parks and remittances. Likewise, the fall of government revenue accounted for the domestic debt which was placed at 4.7% of the GDP.

Although the poverty rate declined considerately as measured with $1.25/day scale, in 2015, the poverty level stood at 48.5% because about 70% of the rural population are poor. In the aspect of human development, in 2013, the Gambia HDI ranking was 172nd and the value if its education index was 34.6%. Also, the Gambia out-of-school children of primary school age, both sexes were 81, 095 in 2012 but reduced to 72, 584 in 2017 indicating a reduction of 10.5%, where male has substantial out-of-school in both years (UIS-UNESCO, 2018).

The major issues affecting the economy of Gambia were the weak governance, political instability and poor public administration. These issues had increased the country debt which affected the ability to revive the economy with inclusive growth. A substantial number of Gambia labour force are residing in Europe, which reduced the number of skilled labour in the country (Source: Bikalemesa, 2014; Azo Mining, 2012; Deen, 2013; UIS-UNESCO, 2018; The Gambia (2011); World Bank, 2018, April 19).

Gabon Profile

Gabon, a country with 2 million population, bordered Equatorial Guinea, Cameroon, Congo Republic and the Atlantic Ocean. Demographically, 63% of the population fall within the age of 24 years. Gabon is the 5th largest oil producer in the SSA where oil accounted of over 70% of its export, 40% in budget and 20% to GDP. Hence, the

economy depends largely on oil with less major diversification. Besides oil, Gabon has gold, natural gas petroleum, niobium, phosphate rock, manganese, iron ore, cement, uranium, and diamond.

Since 2009, Ali Bongo Ondimba has been the President of Gabon. Although only a family has been ruling since 1967, there has been political stability. The stability was due to the effort of the President to diversify the country's economy from oil and partnering, which positioned the country as an emerging economy.

Although there was a decline in the annual growth rate from 2.1% in 216 to 1.1% in 2017, the country GNI per capita was $6,510 in 2017. The country's economic classification remains at upper middle-income country with the above GNI per capita in the 2017 World Bank classification. As such, the President with his team are working to uplift the economy from upper middle-income to high income country.

The HDI ranking placed the country at 112th indicating that the country was performing better in education, health and standard of living than the other SSA countries. The education index of the country was above average given as 58.9%.

The international headcount poverty was 8% in 2005 but reduced to 3.4% in 2017 where the population in poverty was 0.1 million people in the 2017 World Bank poverty and equity data. However, the national poverty ratio (33.4%) was higher in 2017 than the international headcount poverty ratio of 3.4%.

The current challenge of Gabon is the lack of openness to foreign investment. Although there are existing foreign investments in the country, new entrance into the investment market looks difficult. For example, Gabon was ranked 167 out of 190 countries in the World Bank Assessment of Easy Doing Business, showing that policy reform on

investment is a necessary condition particularly in the extraction industry to give way for diversification of the economy (Sources: Kakar, 2017; Oxford Business Group, n.d)

Ghana Profile

Ghana, a country in the West African countries and with a population of 28.8 million people in 2017, has boundaries with Cote d'Ivoire, Togo, and Burkina Faso. Ghana is endowed with natural resources such as gold, bauxite and hydropower. Others include manganese, industrial diamonds, timber, rubber, limestone, silver and salt. In 2008, Kosmos Energy LLC discovered oil in a commercial quantity while exploration of the oil started in 2010.

The country services sector contributed 49.3% to GDP in 2012. In the same year, it was estimated that the forest provided income for 15% of the population. The agricultural sector, which supported the household livelihood, was focused by taking a credit of $50 million from the World Bank - IDA. The credit taken mainly was to expand the irrigation project by about eight thousand hectares and to provide employment for over 14,000 farmers in the northern region, upper West and East of Ghana. A further target of the loan was to increase production of cash crops to boost the agricultural growth.

Politically, in the SSA countries, Ghana was the first country that got its independence from the colonial masters. Dr. Kwame Nkrumah became the first President on 6th March 1957 and ruled till 1966. In the last two decades, Ghana took a giant stride to ensure sustainable democracy with a policy of multi-party system. Another notable report about the Ghana democracy was that Ghana was ranked as the 3rd country in Africa that won the achievement of freedom of the press and the freedom of speech. This aspect strengthen democracy and allowed Ghana to improve its social capital development. In the macroeconomic aspect, the country had been maintaining a high annual growth rate since 2010. The annual average growth rate from 2010 to 2017 was

7.33% showing a fast-growing economy. Specifically, the annual growth rate in 2016 was 3.72 but increased to 8.51 in 2017. There was an economic difficulty in 2016 but the country was able to reduce the fiscal deficit from 9.3% in 2016 to 6% in 2017. The achievement was made possible through the trimming down of the government expenditure. As against 2016, the oil production contributed to the rising of the annual growth rate. Likewise, the gold production was high as well as the cocoa production was stable in 2017. Controlling the importation, there was a better performance in the primary product (e.g. cocoa, gold and oil) which led to the macroeconomic improvements in exports of cocoa, oil and gold as well as improved the country's foreign reserves. The country stabilised the foreign exchange rate which allowed for international trade and competitiveness.

In human development and education aspects, although the country performed better in terms of macroeconomics compared with other SSA countries, the HDI ranking of the country was 138th out of 188 countries. The UNDP estimation on education index placed Ghana at 55.3% which was above average. However, the value of education index still showed that the country enjoined exclusion in education and internationally were left behind by 46.7%. Other aspect of education that contributed to the inequality is the number of primary children out-of-school. The country primary out-of-school was on the decline between 2013 and 2017 as estimated by UIS-UNESCO (2018). In 2013, the out-of-school was 716,870 but reduced to 622,861 in 2017, indicating a 13.11 percentage reduction. The female out-of-school was less than the male counterpart as we have 289,456 female out-of-school in 2017 as against 333,405 male counterparts, indicating 15.18% difference. However, with the African Information Highway estimations, the gender inequality index showed 50% inequality of women in the country' political and other indices of participation.

Furthermore, since 1990, government had been reducing the international headcount poverty rate and the population in poverty. In 1990, the international headcount poverty rate was 49.8% and the population in poverty was 7.7 million people. These values had reduced to 12% poverty rate in and the population in poverty was 3.2 million people in 2012. Nevertheless, the national poverty rate doubles the international poverty rate with 24.2% in 2012, indicating a concerted effort required in reducing poverty at national level.

In the past years, the challenges of Ghana included the unemployment that made the labour force vulnerable to the labour market and the problem of mortality rate was exacerbated by the spread of malaria. Others included lack of competent teachers in schools, the poor turnout of unemployable graduates and the poor policy to ensure quality of education, particularly at the capital city of Ghana (Sources: Alagidede, Baah-Boateng & Nketiah-Amponsah, 2013; Baxte, 2013; Kpelle, n.d; Graham, 2016, Mensa, 2006; World Bank, 2018, March 31; World Bank, 2018, April 19; Zindzy, 2018).

Guinea Profile

Guinea, according to World Bank data on population, is a country with a population of 12.7 million people in 2017. The wealth of Guinea lies on the bauxite, a natural resource, where the country is the 5th world largest producer and the world 12th largest producer of diamond. Other deposit mineral resources include salt, uranium, gold, cement, nickel, limestone, manganese and graphite. Being a partner to China, Guinea has stimulated its economy with foreign investment. Besides China partnership, it formalises trading partnership with Ukraine, India, Germany, Spain Russia, Denmark, Chile and Ireland. The wealth of the nation is also shown in its abundant rainfall, sunny weather and this naturalness to geography which are plausible for the renewable energy and hydroelectric productions. The economy of the Guinea was equally explained by

the water that allows for fishing. Likewise, agricultural lands for agricultural products are contributing to the country exports of vegetables, fruits and palm oil to the neighbouring countries.

About the country education, the data available on the World Bank regarding the lower secondary completion showed that in 2010, only 11.68% completed the lower secondary schools. Although the country reduced its out-of-school by 6.16% when compared 2010 with 2017, the out-of-school value stood at 406,478 in 2017. The country poverty was 55% in 2012 but would have been increased due to outbreak of Ebola. Despite natural advantage of the country, the urban unemployment in Guinea has increased from 8% in 2012 to 16% in 2015 in just 3 years. The country has witnessed political instability and macroeconomic shocks as well as labour union unrest. Finally, the country human development, measured by health, education and standard of living, was ranked 179th out of 188 countries in 2013, while its education index was 29.4% indicating education deprivation and internationally unequal in education distribution (Sources: Azo Mining, 2012, July 12; Guinea Country Commercial Guide, 2017, June 29; Jalloh, 2013; World Bank, 2018, May 17; UIS-UNESCO, 2018)

Kenya Profile

Kenya, a country with a population of over 41 million people has its politics dominated by domestic violence, high rate of corruption and abuse of power. Currently, there is inequality in political participation, particularly against women, where women have 87 of the 415 seats in the national assembly as well as 6 out of 16 of the country cabinet. Although the review of the constitution was long in process, the 2010 latest review has significantly impacted on economics, politics and structural aspects of the Kenya society. Also, with the long process of constitutional review due to the pressures of the

humanitarian bodies, the 2010 review brought in accountability and transformative mechanism into the public service and the local governments administration.

About the natural resources of Kenya, since 2012, there was a discovery of oil in about 750 million barrels in the South Lokichar basin. Though the country is achieving oil exploration at a small quantity for exportation, there is a delay in the petroleum law. Besides the oil in Turkana and the new discovered of Lokichar basin, there are other mineral resources including the Soda ash in Magadi, natural gas, coal, gemstones in coast province, Diatomite, Gold in Migori and Kakamega, sand and Limestone. With these discoveries, the Kenya faced the challenge of resources conflict in the ownership control and its management which provided the country the opportunity to gain financial support from USAID through invested fund into the conflict cities and villages, for conflict resolutions.

While the Kenyan economy almost crumble during the global recession of 2008, however, the economy recovered, with an increase of 5.8% growth rate in the 2016. This showed that the Kenyan economy was one of the fastest growing economy in the SSA countries. The achievement in the economy was because of the installation of stability in the macroeconomic indicators, improvement in the tourism industry, improvement in the remittances and the focus on the infrastructural development. Moreover, according to USAID, the economy remained the most diversified and the largest economy in the East Africa.

There are large population of promising youths with higher level of education eager to contribute to the development of Kenya. With partnership with USAID and the country's interest in diversification, USAID injected considerable amount of fund continuously into different aspects of the economy. In 2013, 2014 and 2015, USAID

invested the sum of $260.4 million, $384.2 million and $458.6 million respectively, into the Kenya economy both in agriculture and industry.

In the education sector, with the available data, at the lower secondary educational attainment, there was a positive change in the lower secondary completion rate given as 78.10% in 2014 to 81.07 in 2016. Plausible, the country narrowed gender inequality in the completion rate at lower secondary education. In 2014, the male had 77.66% while female was higher with 78.53% but relatively lower in 2016, that is, male 81.29% and female 80.85%. This placed the country education index at 51.46% but poor in human development with HDI ranking of 147 out of 187 countries. However, despite no current data on UNESCO and World Bank, the 2012 country's out-of-school primary school children was substantial with a value of 1,214,199 school age children (Brunton, 2018; Emerton, Karanja & Gichere, 2001; USAID, n.d; Nyamwaya, 2013; Muigua, 2016; World Bank, 2018; Interactions, n.d; UIS-UNESCO, 2018).

Mali Profile

Mali, who has boundaries with seven SSA countries including Niger, Burkina Faso and Cote D'Ivoire, contained over 18 million people, one of the countries with population that are youngest. The economy was driven by agriculture but failed to diversify its economy. Hence, it has different challenges such as commodity price fluctuations, food shortage, high rate of poverty, increasing population growth rate and political system instability. These shortcomings affected the public services delivery, increases spatial inequalities and deficient in social cohesion. For example, there was a military coup in 2012 which led to France intervention in 2013. Although Presidential election took place in 2013, but the local government elections were held in 2016 which would have created a gap in the social services delivery between 2013 and 2016.

Although there was a sharp decline in poverty from 55.6% in 2001 to 43.6% of poverty level in 2010, however, there were persistent of regional poverty while deprivation persists in the rural sector. For example, despite the intervention of the international bodies such as USAID, the rural poverty was 90% which was accounted for by the conflict and persistent drought in the rural sector. The Southern Sikasso region and northern region experienced no change in the poverty headcount while Kayes and Koulikoro regions have their poverty decreased between 2001 and 2009. Nevertheless, despite political tumor in the country that brought up by the Islamic jihadist, the political crisis had little variation in the economic performance between 2015 and 2016, that is, 5.8% in 2016 as against 6% in 2015. Also, the improvement in the country infrastructure and the private investment led to a sharp increase in the country investment. However, due to the increase in food prices, the inflation rose from -1.8% in 2016 to 1.6% in 2017. Likewise, there was a sharp decline in the growth of primary sector from 7.6% in 2016 to 4.8% in 2017.

Most of the Mali crisis were caused by the northern fraction who demanded for autonomy, the political crisis and the weakness of the Mali's constitution. The interest of the Islamic group to take over Mali was another issue inhibiting Mali development (Kelly, 2005).

In the aspect of Mali human development, Mali was having the HDI ranking as 176th out of 188 countries in 2013 while its education index placed Mali at low value of 30.52% in 2013. This could have been accounted for by the rate of out-of-school. The country's out-of-school data showed that between 2012 and 2016, the country increased its out-of-school regarding primary school children by 34.19% with the raw value, ranging from 864,236 in 2012 to 1,159,687 in 2016. Similarly, the primary completion rate decreased from 54.47% in 2012 to 50.98% in 2016. There was gender gap in 2016

that negatively skewed to male with a value of 54.07% compared with female, 47.87%. The condition was ascribed to the early marriages of the female, lack of professional teachers and the teachers' demand for wage increase leading to reoccurrence of strikes. The school enrolment was a strong challenge to the country education sector which made the inequality in education distribution to persist (Sources: Kelly, Carpenter, Diall, Easterling, Koné, McCornick, & McGahuey, 2005; Bastagli & Toulmin, 2014; Shuriye & Ibrahim, 2013; USAID, 2018; World Bank, 2018; United Nations Economic Commission, 2017).

Mozambique Profile

Like in Mali, the Mozambique has boundaries with six countries including Swaziland, Malawi, Zimbabwe, south Africa, Tanzania together with the Indian Ocean. The population of the country is approximated to over 18 million people in 2017. About 80% of the population live in the rural areas while the urban population is growing at the rate of 3.3% per annum. After the independence in 1975, the country faced many challenges such as 12 years prolong civil war and the socialist misappropriations.

Mozambique is rich in natural resources such as mineral sands, natural gas located in Rovuma Basin, and hydropower. These resources are untapped leaving large population in the Mozambique societies being dominated by agriculture and trade. Hence, trade and agriculture contributed over 20% to the country national output, GDP. Also, there are untransformed resources including the Savanna woodlands, indigenous forest and the coastal habitats. Because of its economic performance in GNI per capita given as $420 in 2017, Mozambique was classified as poorest country, that is, low-income country which might be the heavy reliance on foreign finances/aids and political instability, particularly the civil war that broke out in 1992. Interestingly, the country stabilises its economy for almost 15 years (2000-2015) which placed it as one of the best countries without oil in the SSA countries. However, the central bank of

Mozambique reported the growth rate from 7% to 4.5% accounted for by the drought in the agricultural sector, the reduction in the export prices and in the key export products as well as the reduction of government spending. The manufacturing sector has been improved through production of aluminium and agricultural-products. However, the country faces different challenges ranging from externalities to internal macroeconomic instability, lack of confidence in governance, exclusion and the lack of transparency in economic dealings.

In the education sector, the country's out of school in primary school children showed an increase of 4.4% when comparing the 2012 and 2017 out-of-school data. In the UIS-UNESCO (2018) data, the real value of the out-of-school was 697,823 in 2012 but increased to 728,531 in 2017. Similarly, the education index which explained the level of international inequality of education distribution was 37.21% while its human development index ranking was 178th out of 188 countries. According to World Bank data on poverty and equity, the headcount poverty was 17.1 million people, where the international poverty ratio was 62.9% poverty rate in 2017. The most affected group was the women in poverty and those living in the rural areas of Mozambique (Bucuane & Mulder, 2007; Hatton, Telford, & Krugmann, n.d; Mozambique's Economic Outlook, 2016; World Bank, 2018, April 19;

Namibia Profile

According to World Bank data, Namibia with 2.5 million population in 2017 gained independence in 1990 from the South Africa. The country has a substantial deposit of mineral resources such as lead, silver, uranium, tungsten, tin, zinc and copper as well as mining of diamond. It has arable lands to grow food products. As such, the country is largely deriving its revenue from mining, agriculture and commercial fishery activities. The mining of diamond forms the largest export product of the country. As a developing country, it formed partnership with the European Union to have the

opportunity of enjoying "preferential market access" under the Cotonou agreement (Overseas Development Institute, 2007, p.1). In 2017, the annual growth was 7% and the GNI per capita was $4,720.00 in 2016 but declined to $4,600.00 which classified its economy as upper middle-income country.

There was a sharp decline in the headcount poverty level of Namibia. The headcount poverty ratio drastically declined from 31.5% in 2003 to 13.4% in 2015. Although the Gini estimated results of the country showed a declining trend from 63.3% in 2003 to 59.1% in 2015, the income inequality remained averagely high.

Likewise, in the education distribution, the education index accounted for 52.02% which is averagely high, and the human development ranking was 127 out of 188 countries in 2013. Assessing the out-of-school issue, from UIS-UNESCO database, the country drastically reduced the out-of-school primary school children from 43,755 in 2012 to 8,724 in 2017. This accounted for 80% reduction during the period. However, the challenges of the country were largely in the mining sector where foreign investors dominated the market. The government did not create avenue for skill acquisition in the mining industry to attract internal investors in the mining sector (Jones, n.d; The national Planning Commission, 2001; Thomas, 2012; New Era, 2016).

Niger Profile

Niger is a landlocked country with 21.5 million population in 2017, had its gross national income (GNI) per capita to be $370 in 2016 but declined to $360 in 2017. It maintained the annual growth rate with the value of 4.9% in 2016 and 2017. According to the World Bank Poverty and Equity portal, the country's Gini index was 36.1% in 1992, increased to 44.4% in 2005 but declined to 34.3% in 2014. Also, the world bank data on poverty showed that there were 10.6 million poor people in 2007 but reduced to 8.5 million in 2014. The country poverty headcount ratio was 72% in 2007 but

reduced to 44.5% in 2014. Although the poverty headcount ratio was reduced drastically between 2007 and 2014, the country was the second least ranked in human development index in the HDI 2013 of UNDP development ranking. The HDI ranking was 187th out of 188 countries. Despite being a resource rich country and largely export minerals to earn its revenue, the country occupies low-income group. Furthermore, the poor educational status was revealed in its education index, where the country estimated value was as low as 19.79% in 2013, indicating that people of the country were severely educationally deprived and internationally unequal in education distribution. The country strongly has the challenge of primary out-of-school children. The out-of-school children at primary education level showed that Niger had 1,158,516 out-of-school children at primary school level in 2012 but increased to 1,223,142 in 2017 with 5.58 percentage increase.

The country has sufficient deposit of mineral resources to transform its economy such as uranium, coal, gold, iron ore, phosphates if extracted. Others include tin, molybdenum, petroleum, gypsum. and salt. Despite the natural resources, the Niger economy depends largely on agriculture which accounted for 40% of the national output. As such, there are 80% of the population that engage in farming as their occupation. The status of the poverty among these farmers is known as "multiple poverty trap" (World Bank Group, 2017, p. xi). The multiple poverty trap is the condition where the farmers, on the one hand, possess too few assets such as animal traction and land, and on the other hand, face acute income shortage, that is, farmers "are too much in debt to earn incomes that bring them above the survival threshold" (World Bank Group, 2017, p. xi). Also, the larger part of the national budget came from foreign aids.

Politically, the country stabilises the political system overtime. However, the country has a challenge of insecurity since the insurgence of the Boko Haram that cut across Cameroon, Nigeria and Niger, especially in the Diffa region of the Niger. The country is equally plagued with the jihadist attacks and child trafficking. Thus, the country faces both internal and external insecurities. The external insecurity was coming from Nigeria, Libya and Mali displaced people. Hence, the government currently having challenge of coping with this internally and externally displaced people. Evidence showed that the government invested $40 million to take care of this needy people and seeking help from the international development partners (Go et al., 2016; Thomas, 2012, October 12; World Bank, 2017, December 5; World Bank Group, 2017).

Nigeria Profile

Nigeria - located in the Gulf of Guinea - is having a population of over 190 million people in 2017 and the most populous country in the SSA. Nigeria got its independence in 1st of October 1960. The country endowment includes vast land with forest resources, rivers and lakes. It has a large field of oil and gas in the South-South part of the country and a member of Organization of the Petroleum Exporting Countries (OPEC) countries. It has iron ore for industrial productions at Ewekoro and other solid minerals such as lead, coal, zinc, limestone, and kaolin. Others include columbite, tin, barites and gypsum. Having a large population, it has greater advantage of production and consumption to make a healthy living (Sen, 1999) and be competitive with international economies. Because of the vast natural resources, it has the capacity of becoming a developed country if all the parameters influencing growth and development are optimised. Despite these substantial endowments, oil continued to dominate the economy with less attention to economic diversification.

Efforts made in human resources development showed that Nigeria established primary and secondary schools across the rural and urban in the 36 states, Abuja Federal Capital Territory and the 772 Local Governments. Besides the vocational institutions (Polytechnic) and Colleges of Education, it contained over 165 including Federal, States and private universities and institutes that are training manpower. With these number of the institutions available, the country has a vast population of educational elites. However, with the human development index data, the country was ranked 152th in 2013 indicating low performance in health, education and standard of living. Similarly, the 42.5% of the country education index indicated that Nigeria was internally has problem of inequality of education and internationally unequal in educational distribution by 57.5%.

For example, there were over 10.5 million out-of-school children in Nigeria where substantial proportion came from the Northern region (Adewale, 2017). According to the Minister of Education, Adamu Hussaini, children with health problems, the socially juvenile children and children displaced during insurgencies are those population in out-of-school.

Socially and politically, Nigeria has over 250 languages with multiple ethnic groups. However, the major groups are Yoruba, Hausa/Fulanis and Igbo where Hausas/Fulanis, live in the Northern part, have the largest population with large vast of land. The Northern part of the country ruled more than the southern part but heavily contained poverty and insecurity such as Boko Haram and Jihadist insurgencies. Besides, since independence, Nigeria had been overly ruled by military with little developmental plans and shoddy implementations.

Economically, Nigeria ranked 30th largest world economy where oil revenue plays an important role in the national budget. According to World Bank data, in 2017, the gross domestic product (GDP, constant at 2010 USD) stood at $80.08 trillion with GNI per capita declined from $2,450 in 2016 to $2, 080 in 2017. But the annual growth rate rose from -1.6% in 2016 to 0.8% in 2017. Prior to 2015, the growth rate had been on the average of 4% between 2007 and 2014 showing the level of stability during the period.

Although the country has a vast of recognisable sites for tourism attraction such as Zuma rock at Abuja, Yankari and Cross River National Parks, water falls at Erin Ijesha at Osun State, spring water in Ekiti State, little development takes place to enhance international competitive market in tourism. The Boko Haram persistent attacks has a strong challenge to these established tourist centres (Achumba, Ighomereho & Akpor-Robaro 2013; Katsina, 2012)

Nigeria development challenges include high unemployment for the teaming graduates that cut across all levels of education. A substantial number of the elites, the graduates from tertiary institutions, are unemployed due to poor investment in the real sector and diversification. The cause arose from poor institutions and corruption that plague the economy. According to World Bank (2017, December 12), other challenges include over dependency on oil, poor diversification of the economy, poor governance, poor financial management system, poverty, left behind in human development indices, poor institution, persistence of insecurity and poor infrastructure (Achumba, et al., 2013; Adewale, 2017; National Universities Commission (2018a, 2018b, 2018c; Sen, 1999; World Bank, 2017, December 12).

Rwanda Profile

Rwanda, a country that became Republic in 1962, has its population as 12.2 million people in 2017, is a landlocked, hilly but with good soil fertility. Rwanda has boundaries

with Congo DR, Uganda, Burundi and Tanzania. Rwanda increase the economic potentiality through World Bank and IMF. This population are of three ethnic groups, Hutu (85%), Tutsi (14%) and Twa (1%). Over 91% of the population live in the rural areas of Rwanda while 90% of them depends on the agricultural incomes. To this end, there is a land shortage of reaching the FAO of 0.75% ha land minimum requirement for a farmer in agricultural productions. The country's natural resources include gold, tin ore, and tungsten ore and methane. Others include columbite- tantalite, cement and tantalum.

In over two decades, after the 1994 genocide, the political system has been protected against degenerating into such ruthless crisis of 1994 where 11% of the population were killed. During the genocide, two certainties would have occurred to the human capital stock – it was either the skilled workers and elites were killed during the genocide or fled the country for safety and greener pastures. However, Paul Kagame was elected in 2003 to serve a seven-year term to which "unprecedented socioeconomic and political progress and consolidated peace, stability as well as social cohesion among Rwandans" (Country Profile – Rwanda, 2017, p.1). His performance in the transformation led to the re-election in 2010 and 2018. For example, there was a constitutional amendment in 2015 in favour of the President's third term with a consequence of being elected for another seven-year term in 2018. Besides, there is a high rate of women participation in politics, that is, 64% fill the national assembly seats. Also, there are two opposition parties who have enjoined wining the seats in the national assembly. China found the country good for economic partnering where all areas of the Rwanda economy, China has its landmark of its economic and social footsteps.

Economically, though with relative change, the Rwanda annual growth rate increased from 6% in 2016 to 6.1% in 2017. This reflected in the GNI per capita of the country

which was $710 in 2016 but increased to $720 in 2017. However, Rwanda economy was classified by World Bank as low-income economy. Furthermore, although the headcount poverty decreased from 75% in 2000 to 56% in 2013, the total population in poverty increased from 6.1 million people to 6.4 million in 2013. The country HDI ranking was 151st in 2013 indicating that Rwanda remains one of the poor countries in multidimensional indices. Due to the country' poverty in multidimensional indices, the country proposed vision 2020 development plan. Hence, the Rwanda vision 2020 was planned to elevate the country's status to a middle-income country, reduce poverty from the current level to a level below 30% and ensure the annual growth rate of 11.5%. In consequence, the Rwanda government came up with "Economic Development and Poverty Reduction Strategy (EDPRS)" to keep the track of social and infrastructure development as well as ensure economic competitiveness. While the EDPRS is in operation, the Rwanda government went ahead to widen the development horizon by drafting the "National Strategy for Transformation (NST)" that would cover 2018 to 2024. The NST targets social, governance and economic transformation in abeyance to the country's vision 2050.

In the education sector, because education is one of the HDI indicators, the poor ranking in the HDI was equally made clear in the estimated education index where the Rwanda education index was 47.8% in 2013. The 47.8% indicated that the Rwanda maintained an educationally deprived status and internationally unequal in education distribution.

Another area regarding the country education is about the primary out-of-school children. Although there was no UNESCO track of record to show the trend of out-of-school, the World Bank data of 2017 indicated that substantial primary school children were out-of-school. The total children at primary education level that were out-of-

school were 76,897 in 2017, where the male children were more than female, that is, male was 43,026 (55.95% of the total) while female was 33,871 (44.05% of the total).

The challenges to Rwanda economic development included dependency on foreign finances and poor skill acquired by its population due to over population in the agricultural sector. The poor skill has constrained the private investment which might slow the pace of growth and development as projected in the EDPRS and NST for vision 2020 and 2050 (Sources: African Development Bank, 2014; Country Profile – Rwanda; 2017; Kuo, 2016; Republic of Rwanda, 2011; Rwanda Environment Management Authority, n,d; World Bank, 2018, October 12)

Senegal Profile

Senegal shared boundaries with Mali, Guinea, and Mauritania. The country has rapid population growth from 3 million people in 1960 to 15.9 million people in 2017 with annual average growth rate of 2.6%. The tremendous population increase in Senegal was due to a considerable reduction in child mortality where malaria was under control and the notable increase in the women fertility rate. In addition, only 20% of the population live in the urban centres while other 80% live in semi urban and rural areas. However, the increase in the population did not witness the expected social services to the people.

The Senegalese economy depends on agriculture, particularly peanut exportation. Nevertheless, there was a recent discovery of oil and gas in the country to which the World Bank has agreed to lend the country the sum of $29 million as a technical assistance to build the oil and gas sector and for its exploration. This assistance was targeted to promote private investment and guide public interest on the country's natural resources sharing. About the agricultural sector serving as the main source of revenue,

between 1990, there was a shrinkage in the contribution of agriculture to GDP from 21% to 18% in 2000.

The country estimated value for unemployment was 10.2 percent in 2010, thus the female has higher ratio of the unemployment, given as 13.3% compare with men, 7.7%. According to the African Information Highway (2018), it is indicated that the Senegal gender inequality was at the rate of 50% in 2017 indicating that women faced substantially a large proportion of discrimination, poor participation in politics and poor health.

The country's estimated HDI ranking in 2013 which measures the health, education and standard of living, was 163rd out of 188 countries. The 163rd implies that the country was left behind in human development, demonstrating people's lack of freedom (Sen, 1999). Another area of concern is educational distribution. In the UNDP estimated education index, showed that the country had a rate of 36.8% in 2013, indicating a high proportion of education inequality in the Senegal educational distribution. The primary out-of-school children explained how the country was multiplying its education deprivation and inequality. In 2012, the estimated value of children out-of-school was 543,210 which was increased to 628,099, with an average speed of 15.63%. According to UIS-UNESCO (2018) database, out of this estimated value female enjoined lower abandonment from schooling than male. The female share of the abandonment was 237,502 in 2012 but increased to 257, 447 in 2017 while male was 305,708 in 2012 but increased to 370,633 in 2017.

Senegalese economy is faced with varieties of developmental challenges. The notable challenges to the economy of Senegal were in agricultural production arising from seasonal distress, the unemployment as well as regional and gender inequalities. Besides

the female lower in out-of-school, the rural employment showed that female was dispersed from equality as over 82% female population have agriculture as their primary occupation compared with 79.4% male counterpart. There was a challenge in teacher-student ratio, 40 students to a teacher in 2011. Also, late entry into school was another challenge in education distribution. There was a challenge in meeting the World Health Organisation (WHO) standard regarding health facilities. Another area of the challenge was low growth, where there was an average of 2.56% annual growth rate between 1987 and 2016. Because of these challenges, Senegalese Government drew a development plan called Plan Senegal Emergent (PSE). The PSE was aimed to address the issue of recycling the existing low-growth issue and the inefficient reduction of poverty. Thus, it was believed that an efficient implementation would help Senegalese government to improve the economic growth rate and reduce poverty.

Although the international headcount poverty had been decreasing from 68.4% in 1991 to 38% in 2011, the population in poverty remained substantial. The available data showed that 5.1 million people are poverty trapped in 2011. Also, there was a decrease in poverty between 2005 and 2011 from 38.4% to 38% in that order, but the change in poverty during the period was insignificantly low. Similarly, the GNI per capital did not have zero change in 2017 where the GNI per capita was $950 for the duo years. The value of the GNI per capita classified the country as a low-income country.

Finally, there are other developmental challenges affecting Senegal economy. Firstly, being agricultural dominant economy, poor production level was a constraint to the growth of Senegal private investment. Other challenges include low domestic savings rate, emergence of the rising of public debt, the liquidity constraints and the low foreign direct investment (Sources: African Development Bank, 2003; African Information Highway (2018); Boye, 1990; International Monetary Fund, 2013; Mansoor, Leichter,

Issoufou, Presbitero, & Jalles, 2017; USAID Country Profile, 2016; Thomas, Thomas, 2012, October 22; World Bank, 2017; World Bank, 2018, October 12).

Sierra Leone Profile

The sierra Leone has its population as 7.6 million people in 2017. The country is rich in gold, diamond, bauxite, rutile, chromite, ilmenite, titanium ore and bauxite. It has neighbouring countries including Liberia and Guinea but bordered the Atlantic Ocean. The economy of Sierra Leone depends on mining of diamond and gold. This mining exploration trapped the larger population to avoid engaging in commercial agriculture. Although the annual growth rate was running at 7.6% over a period of 12 years (2003-2014), there was a decline in the mining production of diamond and iron ore which led the annual growth rate decline from 6.1% in 2016 to 4.1% in 2017. Similarly, there was a decline of the country's fiscal activities due to the shortage in the revenue generation in 2017. The country increased its debt from 53.8% in 2016 to 54.5% in 2017 as the government keeps spending more than its revenue.

Politically, the country has been having persistent crisis within and intra-political parties. After the independence in April 27, 1961, there were coup against the incumbent government in 1967 which ousted Siaka Stevens few minutes after taken the oath of office. In a short distant time, the Lansana government was toppled by Andrew Juxom-Smith in 1968 who returned the country to the parliamentary system and returned the toppled Siaka Stevens to office as the country's Prime Minister. Subsequently, civil war broke out in the country that lasted more than a decade. During the war, there was a total breaking down of law. Thus, the Sierra Leonean society was characterized with raping, abduction, arson, mayhem and tormenting the common civilians by the soldiers. Moreover, properties either private or public were damaged or destroyed. Properties like roads, business centres, bridges, school buildings,

government offices, government and private hospitals, as well as clinics were affected during the war.

For example, in 1999, about 6000 people were killed which encouraged the Nigeria troops to retreat. During these periods, economic activities were paralysed, such that United Nations (UN) did not renew the sale of diamond agreement. The upheaval proceeded till 2007 when Ernest Bai Koroma was elected as the President and the opposition has the higher number of the parliamentary seats at the national assembly. Hence, the UN began to remove its sanctions on Sierra Leone. Thereafter, Ernest Bai Koroma was re-elected in September 2010 and November 2012 and the opposition party were having the higher number of seats in the parliament.

Thus, the GDP growth rate was depressed during the war despite natural endowment of the country. Between 2000 and 2010, there were major policy attempts to rebuild Serra Leone for sustainable growth, poverty reduction, peace restoration, restoration of basic services such as education and health. Some of the policies were "Interim Poverty Reduction Strategy paper (Phase I, 2005 – 2007), Poverty Reduction Strategy Paper (Phase II, 2007 – 2012), Agenda for Change and National Recovery Strategy (NRS, 2003-2004)". To reform the economy of the Sierra Leoneans, the Phase I policy targeted the promotion of human development, the promotion of good governance and security as well as to enhance the provision of food security for the poor people. Phase II targeted energy, efficiency transportation system, increase agriculture productivity and increase human development particularly in education and health.

Although the political crisis lasted for years, after good implementation of those policies and with the support provided by the IMF and World Bank, the economy of Sierra Leone began to shoot up. But the exchange rate of Leone depreciated in 2009 because

of the reduction in the remittances, the global financial crisis that covered 2008/2009, the drop of revenue from mineral exports such as gold and the economic combustion during the war.

Moreover, in March 2018, a general election was held and there was a close result between the incumbent President and the opposition party which resulted to court case. After the re-run of the election, the opposition party, Rtd. Brig. Julius Maada Bio, won by 51.81% while the ruling party had 48.19% but the winning party (formerly an opposition) had 68 seats as against 49 seats of the current opposition party (formerly the ruling party). The three independent candidates at the election were elected as members of the parliament.

There were development challenges to the economy of Sierra Leone. These include the looting of the diamond extraction due to the nature of the resource. Corruption and poor governance such as lack of transparency covered the business dealings of the government. The rural and urban poverty are challenging, and the country faces the challenge of infrastructure decay. The effect of the political upheavals still allows the country to have high rate of youth unemployment because skills were lost to the elongated war as well as education were sacrificed to the internally displacement of the people.

About the human development and education sector of the Sierra Leoneans, the HDI ranking placed the country at 183rd out of 188 countries. This implies that the country failed considerably to improve the health of the people, failed to improve the standard of living and being left behind in the country's educational activities. Specifically, the country's estimated education index in 2013 was 30.5%, indicating that the country was educationally deprived and maintained inequality in education distribution across

countries. However, the efficiency implementation of the Phase I and II policies which focused on the improvement in education and health, according to UIS-UNESCO, government was able to reduce the country out-of-school from 74,458 in 2012 to 10,119 in 2016, showing a percentage reduction of 86.41%. Equally, there was improvement in gender distribution regarding the primary school children out-of-school. UIS-UNESCO (2018) showed that female was higher in 2012 with 40,765 compared with male of 33,693. However, male out-of-school primary school children was higher (6,787) than female (3,332) in 2016 indicating that female had been inspired to accept the promises of education than the male counterpart.

In summary, the elongated period of war dislocated economic path of Sierra Leonean development. People were socially excluded from benefiting from equity participation in politics. Most children were not allowed to enjoy access to schooling which debarred them to witness education promises. The country lost the required skill and educational attainment necessary for tracking the country's development during the years of elongated war. Likewise, women brutalization and raping were replaced with expected living standard. These scenarios contributed to the deplorable condition of the economic activities and put the country on heavy reliance on foreign aids and assistance (Sources: Bangura, 2014; Centre of Sierra Leone Studies, n.d; Mizrahi, Yoman, & Babiker, 2011; Jalloh, 2013; Powlick, 2006; Thomas, 2012; Voors, Windt, Papaioannou, & Bulte, 2017; UIS-UNESCO, 2018; World Bank, 2018).

Togo Profile

Togo with 7.8 million population in 2017 got its independence in April 27th, 1960 from French colony. The country has boundaries with Ghana, Benin and Burkina Faso. The Togo economy largely depended on agriculture where agricultural sector provided employment for 60% of the labour force and 40% of the GDP. The agricultural

strategies such as using the new farming methods, farmer empowerment with agricultural seeds and the regular rainfall helped the farmers to increase their productivity. Both developed and undeveloped, the natural resources of Togo include cement, gold, limestone, clinker, iron ore, diamond. Others are phosphate, clinker, bauxite, marble, zinc, manganese, gypsum and rutile.

The country maintained an efficient monetary policy that allowed for the stability of market prices where the inflation of the country remained at an average of -0.7% in 2017. It has an advantage in the production of phosphate, a natural resource. Due to the country heavily indebted to international organisations, about 95% of its external debt were forgiven in 2010 as applicable to other countries like Nigeria. However, there was a pack of extended debt agreement with International Monetary Fund (IMF) in 2017. To avert the social and economic impact of the IMF debt, the Togo government introduced fiscal consolidation programme (FCP) to control the ratio of public debt to the GDP. The outcome of the introduction of FCP was realised in 2017 when the ratio of public debt was reduced from 81.6% in 2016 to 78.6% in 2017 because of the sharp reduction of fiscal deficit from 9.6% in 2016 to 0. 5% in 2017.

Regarding poverty, there is a challenge of poverty across households despite the effort of the government to reduce poverty. In 2005, 2011 and 2015, the international headcount poverty was 55.6%, 54.2% and 49.2% respectively. The poverty reduction was achieved through the Togo "Poverty Reduction Strategy Paper (PRSP)" which was based on four cardinals. These cardinals include (i) "Political, institutional and economic (ii) Construction of foundations for sustainable growth and shared well (iii). Human Development iv. Grass-roots development and Reducing regional disparities" (p.6).

The Togo human development index ranking in 2013 indicated that the country was ranked 166 out of 188 countries. The 166 of Togo ranking indicated that Togo was highly dispersed from development. Because education is a core indicator of HDI, the education index of Togo in 2013 showed that the country education was at the level of 51.4% which is plausible if compared with Sierra Leone. The implication is that the country households are averagely deprived of education distribution and internationally having unequal education. In addition, according to World Bank data, the out-of-school children in 2014 was 98,079 but increased to 161,030 which accounted for 54.18 percentage increase. Across the gender, female shared the highest part of the increase with 101,329 while male counterpart was 59,701 of primary school children out of school in 2017. This could have been accounted for because of the political upheaval in the country in 2017.

Moreover, the country's economy enjoyed stability with a 5% growth rate until a discontent arose from the political sector which subjected the economy to varieties of risks. This annual average growth rate of 5% was achieved through the foreign aid, improvement in infrastructure and business activities in the country.

The political system of Togo such as abuse of human right, had been a challenge to economic activities. Although the Togo was a parley of Jacques Chirac, the French President, the economy of Togo summersaulted which arose from the poor inward investment and a reduction in international aid. Consequently, there was a demand for reversal to 1992 constitution in August 2017, stating that two terms in the office is sufficient for a sustainable democracy and the second agitation was the rejection of the drafted bill. These agitations led the country to hold referendum on the two issues. Nevertheless, the political system of Togo has been stable despite those basic issues in politics. Other challenges include smuggling and visible trade diversion in the economic

aspect, while in the environment, climate change affected agricultural productions and there was an increase of flood (Sources: Kohnert, 2017; Index Mundi, 2018; Jalloh, 2013; Thomas, 2012; World Bank, 2018; Word Bank Group, 2016; Faye, 2010).

Uganda Profile

Uganda is a country located in the East Africa with a population of 42.9 million people in 2017. It has boundaries with Kenya, Rwanda, Somalia, Burundi, Tanzania and South Sudan. The Ugandan deposited natural resources include gold, cobalt, copper, iron ore, tungsten, limestone, phosphate, and columbite-tantalite. Others include steel, lead, vermiculite, niobium, tantalum, tin, gypsum, salt, soapstone, kaolin, cement, pozzolanic and beryl. Among the resources, the country is majorly mining cobalt, gold and columbite-tantalite where gold is an important export product although affected by the gold being smuggled from Congo DR. Others mineral resources are produced in smaller quantities. The recent discovery was the petroleum deposit found in Lake Albertine rift basin, Lake Albert and Lake Edward. These resources have the potentiality to transform the Uganda national economy and improve the welfare of the people.

In terms of the economy, the country derives its revenue more from agriculture as it contributes more to the poor people's earnings and commodity exports. The agricultural sector absorbs 75% of the labour force, 50% in commodity export and contributed 25% to the country GDP. Hence, the country GNI per capita in 2016 was $630 but reduced to $600 in 2017 which placed the country as low-income economy. In attempt to improve the economic activities of the country, the Uganda Vision 2040 was a 30-year economic planning to transform the Ugandan economy from peasantry to a modern society. The document explained that Uganda would reach the lower middle-income by 2017, middle income in 2032 and developed country in 2040 with a $9,500.00. Although Uganda growth rate was impressive with an average of 4.5% in the past five

years, the GDP growth rate had been declining from 7% in 1990 to 4.7% in 2016 and decreased to 4% in 2017. The declining of the economic activity was attributed to unfavourable weather, the spillover effect of South Sudan and the poor public project execution.

Furthermore, the country political system has been marred by truncation of true and fair election, as only a person has been ruling for over 32 years. The instability of the Uganda politics has serious effect on social and economic development of the country. On the issue of age structure in governance, in 2016, there were manipulations in the constitution in favour of the incumbent President to continue his ruling, which resulted to court case.

Understanding the country's performance in human development, Uganda was ranked 164th out of 188 countries indicating that the country was left behind in education, health and standard of living. This lagging in education was accounted for by the level of inequality in education distribution, where the estimated education index was 47.86%. Also, according to World Bank data, the out-of-school children at primary school level, there were 709,806 in 2011 but increased to 714,319 in 2013, indicating 0.64 percentage increase. The share of the male is higher than the female during the period where male's proportion was 415,685 and female was 298, 634 that were out-of-school at primary school level. The performance of the country is equally explained in the international headcount poverty rate which was 35.9% in 2012 but increased to 41.6% in 2016 (Sources: Azo Mining, 2012; Mugerwa, 2016; Uganda Wildlife Society, UWS, 2010; Uganda Vision 2040, n.d; Uganda Bureau of Statistics, 2002; World Bank, 2018).

Zambia Profile

The Republic of Zambia is a landlocked country, has boundaries with eight countries including Angola, Tanzania and Malawi and with a total of 1.8 million population. Like Ethiopia, the country had an economic stability for over a decade (2000-2012) and falls within the lower middle-income countries. According to Zambia Development Agency (ZDA), Zambia has sufficient resources deposit such as land, water and human resources to have a sustainable development. In the World Bank "Doing Business Report", Zambia was ranked 82 among 190 countries in 2018. The country recorded a GDP growth rate 0f 4.1% in 2017. Besides poverty that is high in the rural sector which allowed the people to migrate to the two largest cities in the country, Kitwe and Lusaka, over 57.5% of the population are living below poverty line in 2017 and 42% are extremely poor. The migration to the major cities accounted for the poor services and infrastructural facilities provided by the government in those major cities.

According to the World Bank data, the fiscal debt fragility is a strong challenge in the economy of Zambia where the publicly guaranteed and total public debt were estimated to be 61% of GDP in 2017. About the education in Zambia, there is a strong challenge regarding the out-of-school primary school children. Between 2012 and 2017, the country's out-of-school children at primary school level increased by 25% showing little attention to primary education of the country. Likewise, the primary school completion rate declined from 95.4% in 2010 to 76.65% in 2013. The female who had 99.94% in 2010 decreased to 77.89% in 2013 with a difference of 1.81% below the male primary completion. This education lapses are presenting the country extent of dispersion from equal distribution of education across the households (Sources: African Development Bank, 2018; USAID, 2010; World Bank, 2018).

Zimbabwe Profile

Zimbabwe, the country of 13 million population in 2012 has increased its population to 16.5 million people in 2017. Demographically, 52% of the population are female. It has its economy driven by natural resources (nickel, tin, gold, platinum, coal, copper and diamond) and agricultural productions of corn, maize and tobacco. In fact, one of the largest export commodities is the exportation of raw tobacco. Although the economy recovered from 0.6% in 2016 to 3.4% in 2017 due to improvement in agricultural production, there was liquidity challenge to the economy arising from the 2009 dollarisation (or multicurrency regime) with consequence on abandonment of the Zimbabwean currency. The pegging of cash withdrawals to $50.00 strongly affected the economic and business. As such, in the World Bank Doing Business ranking placed Zimbabwe at 159 out of 190 countries indicating that doing business with Zimbabwean is somewhat difficult. In consequence of the $50 pegged, there was a shortfall of foreign currencies leading to high cost of production and lack of market competitiveness. The Zimbabwe expansionary fiscal policy made the fiscal unsustainable. Equally, the country has challenge in industry capacity utilization, depleted infrastructure and the country economy becomes informalized.

Politically, until 2017, the country was ruled for 37 years without replacement of the President Mugabe, within and between parties. Socially, the unemployment rate of the country remained at over 75% and there were challenges in the health sector where cholera and HIV/AIDS had been reducing the life expectancy of the people to about 58.56% in 2017. Also, there were intermittent social unrest which is creating tension for the economy to grow. Hunger cut across 1.5 million people due to the decline of the commodity prices while the Zimbabwe poverty level stood at 72.3% in 2013. In education, despite that the value of education index of 50% in 2013, the country has the challenge of human development with HDI ranking of 156th in 2013 - as well as,

experienced a decline in the access to education among the school age children (Sources: Andreucci, 2017; Societe Generale, 2018; United Nations, 2014; World Bank, 2018).

2.3 Theoretical Framework

This third section of the thesis presented theories in relation to the education inequality and poverty, the main focus of the thesis. Hence, these theories included social exclusion and relative deprivation as well as human development-capability approach

2.3.1 Theory of Social Exclusion and Relative Deprivation

The major concern across development economists was the distribution of resources to improve human welfare across the households. As such, the far apart of the household from the required standard of living was discused in diverse ways as reflected in the development and sociology literature. As such, the interrelationship of the poor household and their welfare is best discussed with the theory of social exclusion and relative deprivation. Firstly, the study review literature on the general overview of the social exclusion. Secondly, attempt was made to review the relationship in the context of education.

The social exclusion theory posited that households, community or nation are deliberately deprived of common opportunities and resources available to all the members of the society or country. Those resources are essentials to promote social integration and preserve good living condition. Exclusion is an element of or a reason for social injustice (Muddiman, 2000; Townsend, 1979). No doubt, time takes an active role in the exclusion. The time is cumulative to history which eventually categorises exclusion into two groups – the individuals excluded and people exercising exclusion (Byrne, 2005). It is an action performed by a group, the oppressor, against the disadvantaged group, the oppressed. This oppression makes it systemic where the action emerges from the oppressors.

Social exclusion has an overlapping effect on society and economy. Firstly, the Social Exclusion Unit of the Prime Minister, London, posited that social exclusion has multiple linkages of problems that included subsistent income, poor skills, unemployment, persistent crime, inadequatee health care services, housing condition and unstable family (The-Social-Exclusion-Unit, 2004). As such, poor households are left behind in education, employment, wealth, consumption, public goods, and economic security (Silver, 1994; Sen, 2000; Stiglitz, 1999). The victims of social exclusion are often the asocial persons, handicapped, single parents, and economically disadvantaged households. From education dimension, household regarding the school-age children were often victims of such exclusion (The-Social-Exclusion-Unit, 2004; Sen, 2000).

Social exclusion has more devastating effect when compared to poverty (Duffy, 1995; Muddiman, 2000). It has both faces of poor wealth and the inability of a household to participate in the activities of politics, cultural life, economic and socio-political environment (Duffy, 1995). The emphasis is on multidimensional deprivation effect on social life activities. The dynamism of exclusion advances the battle of the 2oth century and after that to fight for the right to be socially secured (Tsiakalos, 1997). The insecurity includes the risk of accident, poor health consequences, unemployment, lack of right to persons full freedom to the development and the deprivation in education (Sen, 1999b; Tsiakalos, 1997). In contrast to the argument of Duffy (1995) and Muddiman (2000), Sen (2000) posited that exclusion is systematic where an exclusion in an activity leads to multiple deprivations in other activities. As such, freedom is lost, thereby, the outcome of exclusion reshapes individual lives. For example, an exclusion in gaining employment after graduation corelates with poor income, homelessness, undernourishment and destitute (Sen, 2000). While Duffy (1995) and Muddiman (2000) have seen social exclusion as a central issue in welfare, Sen (2000, p.5) opined that social exclusion is a part of "capability deprivation," an instrument to "capability failure". The capability

failure implies that a failure arises from the loss of freedom due to capability exclusion. The failure becomes a trajectory for poverty and destitution.

Furthermore, the precarious situation of exclusion in the society is due to the actual interest of those socially excluded that are misrepresented such that the social solidarity is empty. As such, education inequalities and education opportunities (Barry, 2002), correlate with social exclusion. Again, Klasen (1998) argued that social exclusion is a societal problem worthy of sustainable policy to curtail it. Otherwise, the socially excluded group would be vulnerable to life-threatening issues that could be instrumental to other chronic societal problems such as inability "to be well-health, well-educated, well-housed or well-nourished". In the opinion of Klasen (1998), he classified social exclusion into four categories. These included “economic, birth or background, social and societal/political” social exclusions (Klasen, 1998; p.4,5).

In similar vein, Townsend expanded the theory of social exclusion into relative deprivation theory. It was argued that a subsection of the population is poor due to exclusion from benefiting from the available human and economic resources around them (Townsend, 1979). In consequence, the population excluded are trapped in poor diet, poor clothing, fuel scarcity and light, poor housing and housing facilities, poor home environment and lack of home amenities. Their resources are below those demanded of the average person or household within the society (Mack, 2009; Townsend, 1979).

Moreover, Tsiakalos was more specific than Klasen. He added deprivation in education, health and politics to strenthen the debate. Tsiakalos argued that social exclusion is a process that people are hindered “from the absorption of social and public goods, such as that of education, health care, participation in politics and so on, the lack of which usually leads to economic distress” (Tsiakalos, 1997; p.4). The view implies that household that are deprived in education tends to be poor in the future because of failure of education

promises. Since people are not conceptualised in the abstract form (Tsiakalos, 1997), parents' social exclusion from economic and politics implies that their children would directly be susceptible to be educationally unequal at school activities. The parents exclusion provides a platform for such households to have no opportunity to gain initial enrolment. Like Fryer (2016), it is with the understanding that the socially excluded children from making use of social and public good of education are prone to be socially excluded in economic resources sharing when they grow up to adulthood (Tsiakalos, 1997).

Another important argument was whether education should be a public good or private. While Tsiakalos supported the famous argument that education is a public good, others see it as private (Daviet, 2016; Moşteanu, & Cretan, 2011; Shaw, 2010; US-NSF, 2016). It is a public good because it possesses non-rivalry and non-exclusive properties (Anormally, 2018; Cemmell, 2002). On the other hand, the discussion on education as a private good arises from the payments made by an individual on the services rendered by the institution. However, making education a private good would not only make the poor household excluded from the consumption of the commodity, but private school strenthen deprivation and prepare the disadvantaged households to be recycling education poverty across generations (Shaw, 2010). Although most developing countries could not afford to make education free, sticking to education as a public good will accelerate social inclusion at all levels of education thereby discourages inequality. To that end, the value of consuming education as a public good remains the same for all households that make a demand of it. Similarly, as a public good, no one irrespective of social status, class, language, ethnicity, or any undefined reason should exclude others of consuming the commodity (that is, education) (Cemmell, 2002).

Country's future development depends on the extent of accumulated human stock (Thomas et al., 2001). As such, application of social exclusion and relative deprivation to children education is worthy of review. Although children household lack knowledge of their future, Klasen (1999) positioned that children have rights and capabilities to their own lives. In 1989, the children rights and capabilities were discussed at the convention entitled "Law Reform and Implementation of the Convention on the Rights of the Child" (Klasen, 1999; UNICEF, 1989). Despite each nationality position on the child constitutional rights to education, as defined in the Civil Rights of Children (CRC), the world focus was on the right that children should have access and the "primary education must be free and compulsory. The duty to provide access to secondary education is recognized, in general programmatic terms, but no mention is made of pre-primary education" (UNICEF, 2007, p.43). Thus, the most important of this consensus was explained as a preparatory ground for children to be "responsible life in a free society, in the spirit of understanding, peace, tolerance, equality of sexes, and friendship among all peoples, ethnic, national and religious groups and persons of indigenous origin." (UNICEF, 2007, p.43). As such, for the children to be functional individual during adulthood, particularly their future status in economic, political and social participation hangs on their current capability to complete their educational careers (Sen, 1999). Klasen (1999) opined that the failure to respect the educational rights of the child is a social exclusion for the vulnerable children (Ainscow & Miles, 2009). With experience, evidence showed that inequality of education permeateed most developing countries. The rights of the children had been violated, with future consequences in social, politics and economics (Klasen, 1999). On the other hand, the exclusion can be averted with a deliberate attempt to focus on education inclusion. Ainscow and Miles (2009) opined that inclusive education is a process and provided educational inclusive framework (see Figure 2.1), which included four areas of the education inclusiveness. These included (1)

concepts, which should focus on the curriculum, principles guiding educational polices, agencies and the monitoring. (2) Policy, in which its target should be that education inclusion should have a living document for education and senior experts in education should keep on the watch. Educational leaders should always provide consistent polices at all levels of education and all educational level leaders should challenge the exclusion at their various levels of education. (3) Structures and systems which should focus provision of high quality to the learners who are vulnerable, a team work should exist between the institutions and services for educational inclusive policy, equality in resources distribution (human and physical) and specialty should be a watch word in educational inclusive policy. Finally, practice, where the focus of the inclusion should be on school's strategies, school support, trainee teachers and current teacher's development.

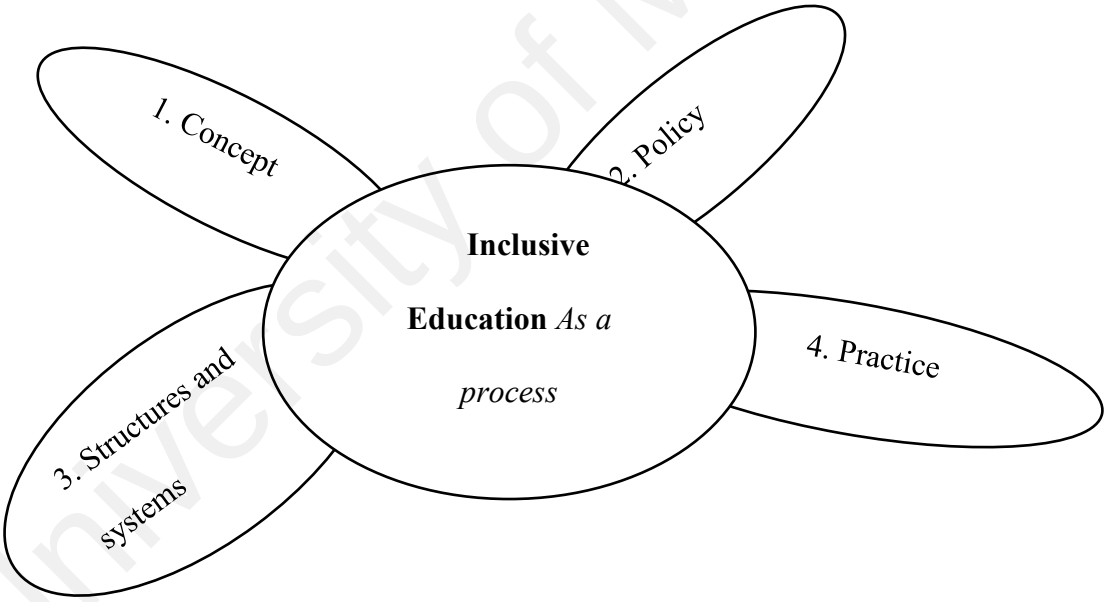

Figure 2.1: Educational Inclusiveness Framework
Source: Ainscow and Miles (2009).

In total, the promises of education which were highlighted in the human capital and the return to education studies would be achievable through inclusion in education instead of exclusion.

2.3.2 Human Development Theory-Capability Approach

The extent of exclusion in education at tender age of education distribution proposes that human welfare will be low when the victims of the exclusion grow to adulthood. Hence, the focus of the second theory of this thesis was the human development theory - capability approach. The human development theory is a theory widely adapted across disciplines. However, the theory had been compressed into "socioeconomic development, cultural modernization and democratic regime performance" which are interrelated in principle (Welzel et al., 2001, p.5). Out of the three sophisticated concepts of human development, the thesis focused on the socioeconomic development of the human development theory. The human development - capability approach was discussed from three perspectives, namely, socioeconomic perspective, educational development perspective and educational constraints perspective.

2.3.2.1 HDT-CA - Socioeconomic Development Perspective

Historically, the classical theories relating to human development were important to this thesis, although no rigorous review was carried out on the non-essentials. These included the culture poverty theory, structural theory and, where more emphasis was laid on the human development theory. Firstly, in the middle of 1960s, Lewis came up with the proposition that the poor were responsible of their poverty, which connoted the popular culture theory of poverty. The culture theory of poverty centred on the inability of the poor to exploit their economic environment which was claimed to be self-imposing poverty (Lewis, 1966). Their ineptitude to exploit this economic environment subjected the poor population to remain in poverty and the condition would persist, particularly across generations. However, this theory was vehemently opposed by the structuralist (Jordan, 2004). The fundamental argument against the primitive culture theory was that, instead of blaming the poor, man is systematically deprived by his environments which included the deprivation in economic resources, gender discrimination, intolerant of

political institutions. Others included capitalist's institutions and gross income inequality (Ellwood & Summers, 1986; Hines Jr, Hoynes, & Krueger, 2001;). These indicators played significant role in excluding the vulnerable group to participate in the resources sharing. In fact, deprivation was the crucial argument for rejecting the culture theory of poverty. After the rejection of the theory of culture of poverty, there was a focus on the structural theory which rather casted the blame of poverty on the institutions and environment where the poor people live (Ellwood & Summers, 1986; Hines Jr et al., 2001; Jordan, 2004).

Despite the structuralism argument and efforts made, poverty experience in most developing countries did not significantly change in the 1970s, 1980s and 1990s. This brought about rethinking an innovative approach to human development. Hence, the new school of thought changed the direction from growth (Dollar & Kraay, 2000; Dollar, et al., 2013; Fatah et al., 2012) and structural debates (Jordan, 2004) to human capability (Nussbaum, 2000b). On this ground, human development theory-capability approach (HDT-CA) was developed, in which, attention was focused on the specific concerns of the poor (Sen, 1999a, 2000).

Human development theory, capability approach (HDT-CA), has its origin with the economist Mahbub UI Haq and later developed in Amartya Sen's work on human capabilities. Sen based his argument on the rhetoric question: can people able to be and do desirable things in life? (UNDP, 2015) In other words, human welfare should be measured beyond utility or state of satisfaction. It should be measured by the abilities to do basic things or attain the desired condition of being. The capabilities, once acquired, add freedom to individual in possession (Nussbaum, 2000a, 2000b; Sen, 1999a, 1999b; Stanton, 2007). Thus, Sen (1999b) further argued rhetorically that can people work, get the needed education, have voting right unaltered and participate fully in remarkable community life and development? If there is a definite response to the rhetorical

questions, then man can get well fed, have a suitable housing and remain healthy throughout a lifetime. However, these depend on people's ability to make the desired choice to gain freedom or autonomy (Klasen, 1999; UNDP, 2015; Sen, 1999b; Welzel et al., 2001).

Furthermore, the HDT-CA was a set of ideas, and traditional thoughts focused on the specifics of the poor. What does it take to live a healthy life? HDT-CA theory assumed that every member of the society has equal opportunity to enjoy basics of real life. The overall use of the basics of life would make human flourishing otherwise experience poverty and inequality. Instead of imposing the blame on the poor, Sen accused humans' failure to expand their thought in creating the roadmap and organise the world for everyone irrespective of who they are; where they came from and the status they occupied. Sen and his followers positioned that real life should not be meant only for the minority of the society. As against the growth theory rigorously pursued in the 1970s to late 1980s (Dollar & Kraay, 2000), Sen presented his view that the central idea of human development should be by the government and its agencies to pursue life-enriching activities for the entire people rather than all efforts devoted to growth (UNDP-HDR, 2015a).

The HDI framework developed from the central proposition of HDT-CA was for government to allow its activities to revolve around health, education and standard of living. Sen referred to these as actual indicators for healthy living which can promote labour productivity and improve minimum income/expenditure required for daily living (Todaro & Smith, 2012). This specific concern of man would inspire or enable him to participate in either political or community development, possess the ability to explore the environment and to exercise freedom (not in a frivolous activity or deviant behaviour inimical to social norms).

In a nutshell, the idea of the socioeconomic development in human development – capability approach was shaped by individual autonomy that made household capable to participate fully in the market operations and it provided the cognitive resources and physical capabilities to enhance access to information, skill acquisition and household income (Welzel et al., 2001). Thus, as Welzel et al. (2001) and Sen (1999) argued, autonomy resources - in other words, the human freedom - contributed to human choice during every resources allocation.

On the contrary, as constructive as HDT-CA well positioned by the advocates (Nussbaum, 2000a; Sen, 1999a, 1999b 2000; Stanton, 2007), the theory was criticised by Tarabini and Jacovkis, (2012). Referring to the capability of a household, it is a complementary reasoning to opportunity theory which is a deliberate attempt to polish culture theory of poverty that blamed the poor of their ineptitude. The capability approach moved a little away from the personality of the poor to their assets. Logically, in capability theory, education and health were the cardinal focus of moving out of poverty. Deficiency in these components of capability led to poor income of the said household (Tarabini & Jacovkis, 2012). Hence, a level of causation occurred between education, health and income (Todaro & Smith, 2012). The concern of Tarabini and Jacovkis (2012) was that pursuing equal opportunities in an egalitarian society with this causation analysis shifted the thought to capabilities equality. As such, the individual carries the bulk of the responsibility than blaming structural factors. This position holds two basic issues to consider. Firstly, Tarabini and Jacovkis (2012) opined that capability - directly or indirectly – accused the poor of their ineptitude rather than the structural factors that included institutions. Secondly, health and education introduced into capability approach are the central theorems of human capital theory (Todaro & Smith, 2012).

2.3.2.2 HD – Educational Development Perspective

Nevertheless, human development is a major issue of educational development because leaving behind in human development indicators often told on educational distribution. As such, inequality in education was associated with poor performance in schooling examinations, beginning from primary education that led to dropout (Oreopoulos, 2007). This arose because the early years of schooling were major contributors to the child mental thinking and intelligence (Stetsenko, & Arievitch, 2002).). Relating the HDT-CA to education, Klasen (1999) opined that the right of a child is associated with his capability, especially when disability is concerned. To him, the capability related to mental ability in association with the child ability to excel in learning activities. Also, Stetsenko and Arievitch (2002) positioned that intelligent can be learnt and taught so that the child's mind in learning would be improved. In practice and research, Stetsenko and Arievitch (2002), further argued that the mechanism that link teaching, learning and cognitive development in human development process has a poor linkage in knowledge transmission during the childhood experiences. In the famous work of Piaget (1964), the human mind is developed through individual's active home and classroom engagements. In this aspect of cognitive development, the children capability and progress in learning would be that the child is capable to develop mental capacities to which Stetsenko and Arievitch (2002) itemized as ability of the child to conceptualise problems and ability to reason logically and in turn, enhances the child discoveries and experiences.

In Sen (1999), his proposition of human development was ability to gain freedom. To achieve the proposed freedom during adulthood, the childhood period is most important especially primary school learning. In Lee (2001), human development, especially at the childhood age, is explained by the variability of the human itself. He positioned that "humans differ from one another in numerous ways. Variations in sex, shape, size and skin colour have formed the basis of social hierarchies in many different times and places"

(Lee, 2001, p.1). This happened due to what he called “chronological age” (p.1). To minimize the quantity of education inequality, Lee (2001) opined that tension existed between human variation and the discounting of the human variation. In other words, unjust attribution of levelling all children in the school is often the problem of teachers which could impact on the child learning, thinking and performance. The second tension is the over-emphasizing the ability or inability of the child imagination in the classroom. The child may be over rated in performance when he is below the rank. The cumulative effect often showed at the adulthood. The intelligence required at adulthood to solve critical and daily problems may narrow the chance of the Sen proposed freedom. As such, the child cognitive domain at early childhood is a function of the adulthood economic and social freedom. Lacking the proper cognitive development from childhood, no doubt, has increased the dropout from primary education which arose from poor performance and other related reasons such as lack of season of birth, motivation, poverty and location (Angrist & Krueger 1991; Malik, 2002; Oreopoulos, 2007)

Different philosophies had been proposed in the psychology literature to address the childhood cognitive development. The cognitive development in learning activity is better understood from the Piaget (1964) framework which explains the changes expected in child learning stages (see Figure 2.1), and the Erikson (1963) psychosocial development. To develop the mind for improved intelligence and schooling performance that would support education completion (the seven levels of education according to Barro & Lee 2013), at the early years of schooling when learning begins, the stakeholders in education (parents, teacher and education policymakers), are expected to consistently investigate the four stages of Piaget as well as Erikson child psychosocial development. For example, Erikson (1963) argued that, in the first stage of child development, child needs to develop trust (trust versus mistrust) at early stage especially in the classroom environmental tasks. The child lack of trust would lead to inability to participate in the

classroom activities due to the loss of autonomy (Welzel et al., 2001; Sen, 1999b)). In other words, the child mistrust of the classroom environment would inspire the child to avert shame and ridicule if participates and makes mistakes in his ideas.

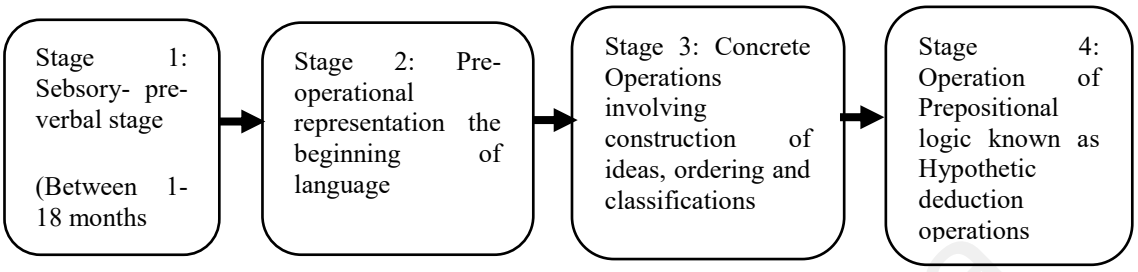

Figure 2.2: Child Cognitive Development
Source: Piaget (1964)

Also, human development demands that the stakeholders should pay attention to the mechanism or processes of teaching, learning and cognitive development to train the child cognitive domain during the primary schooling (Stetsenko & Arievitch, 2002). Because the early years of schooling contributes large proportion to child development, no doubt, during the upper levels of schooling, the outcome of cognitive developed at primary school level would yield "higher order thinking and metacognition." (Stetsenko and Arievitch, 2002). Although factors like poverty might contributed to the child inability to complete educational levels, the knowledge terrain acquired from the early childhood development to the higher order thinking at the secondary education would spill over to tertiary education (Armstrong, Ogg, Sundman-Wheat, & Walsh, (2014).

2.3.2.3 Human Development – Schooling Constraints Perspective

The other aspect of the human development in this thesis was the consideration of the constraints associated with childhood learning. In the attempt to understand the schooling processes starting from the childhood as well as how education is distributed across households, learning comes with varieties of risks which could interject into linear input-output of learning relationships. As such, educational experts identified several risk factors making schooling, sometimes, not worthwhile. Among these experts was Finn

(1993), who argued that student engagement correlates with performance where engagement is a habitual or behavioural. When a student is disengaged in classroom activity, Rumberger (1987) opined that such disengagement correlates with dropout. Cumulatively, Druian & Butler (1987) itemized nine schooling risks as:

> *"(1) living in high-growth states; living in unstable school districts; (2) being a member of a low-income family; (3) having low academic skills (though not necessarily low intelligence); (4) having parents who are not high school graduates; (5) speaking English as a second language; (6) being single-parent children; (7) having negative self-perceptions; (8) being bored or alienated; having low self-esteem and (9) pursuing alternatives: males tend to seek paid work as an alternative; females may leave to have children or get married"* (Druian & Butler, 1987, p. 3 Note: the numbering is ours)

Besides the engagement behaviour, Finn (1993) made a further clarification about the status risk factor. He opined that status risk could be (1) general or have a common risk to members of the population (2) individual risk behaviour by the student himself/herself and (3) a cluster of risk factors, that is, individual having multiple occurrences of risk factors. In sum, the dropout occurring at primary levels due to behavioural and status risk factors (Finn, 1993), has been making the children to be vulnerable to unequal education during the adulthood. The rate of graduation list, although looks better in developed countries, is making the quantity of enrolment and education completion be at disequilibrium in the developing countries.

2.4 Measuring Education Inequality

There are different ways to measure inequality and methods varies across disciplne. A good example of inequality is income distribution across the households. Among the methods used were the Lorenz curve and Gini coefficient (Lorenz, 1970; Gini 1936). Others included Pearson-Cramer (PC) index (Cramer, 1946); Atkinson index (Atkinson, 1970), Theil index (Theil, 1967); Overlap index (Weitzman, 1970), Dissimilarity index; Lorenz curve; Reardon index (Asadullah & Yalonetzky, 2012), concentration index and Herfindahl-Hirschman index. The analysis of the inequality was extended to education

distribution by Thomas et. al., 2001). Besides, educational attainment, years of schooling, literacy, school enrolment and finance were used to measure the quantity of inequality in educational distribution (Maas & Criel, 1982; Thomas et al 2001). Traditionally, the World Bank institution has its methodology of computing inequality with income distribution across the households. The method accounts for calculating Gini coefficient with a continuous Lorenz curve across the income levels (Thomas et al., 2001; Yang, Huang & Liu, 2014). However, the methodology could not transferable directly into educational inequality measurement. Due to the categorisation of the household education into seven levels (Barro and Lee, 2010, 2013), level of schooling was considered discrete rather than continuous and truncation of the Lorenz curve at the horizontal axis (Thomas et al., 2001). Hence, Thomas et al. (2001) developed an education inequality Gini (EIG) as:

$$E_L = (\frac{1}{\mu})\sum_{i=2}^{n}\sum_{j=1}^{i-1} p_i |y_i - y_j| p_j \qquad 2.1$$

Where the E_L represents the education inequality using educational attainment, the μ represents the mean years of schooling, y_i and y_j represent the years of schooling that individual attained, p_i and p_j are the education rate across the population and n represents the number of levels of education. In this case, the seven (7) levels proposed by Barro and Lee (2010) were adopted. Calculating the MYS and standard deviation of schooling (SDS[1]) for education inequality, Thomas et al. (2001) specified them as:

[1] The SDS was also used by past scholars to measure education inequality. It measures the dispersion of the distribution from the mean.

$$MYS = \sum_{i=1}^{n} p_i y_i \ \ and \ \ SDS = \sqrt{\sum_{i=1}^{n} p_i (y_i - MYS)^2} \qquad 2.2$$

Alternatively, if the sample size is small[2], multiplying $\frac{N}{N-1}$ *by* E_L (the equation 2.1), education inequality Gini would be computed.

Until now, the methodology described above had been adopted by scholars (Agrawal, 2014) and different approaches were used to estimate educational inequalities. For example, Asadullah and Yalonetzky (2012) applied Reardon index, Pearson-Crammer index and overlap index in the study of educational opportunity. The Pearson Cramer inequality represents the ratio of the test statistics over its maximum. As specified in Asadullah and Yalonetzky (2012), it is:

$$PC = \frac{X^2}{X^2_{\max}} \qquad 2.3$$

It is further expanded as

$$PC = \sum_{t=1}^{T} \sum_{\alpha=1}^{A} \left(\frac{N^t}{\sum_{k=1}^{T} N^k}\right) \frac{\left(p_\alpha^t - \frac{\sum_{t=1}^{T} N_\alpha^t}{\sum_{t=1}^{T} N^t}\right)^2}{\min\{T-1, A-1\} \frac{\sum_{t=1}^{T} N_\alpha^t}{\sum_{t=1}^{T} N^t}} \qquad 2.4^{3}$$

[2] Gini is sensitive to small sample data (Thomas et al. 2001). N is the total number of the concerned population

[3] $\frac{\sum_{t=1}^{T} N_\alpha^t}{\sum_{t=1}^{T} N^t} = \sum_{t-1}^{T} p_\alpha^t \frac{N^t}{\sum_{t=1}^{T} N^t} = p_\alpha^*$. Hence, it is the attained outcome level α Also $\frac{N^t}{\sum_{k=1}^{T} N^k}$ represents the ratio of the population associated with type t to be denoted as w^t (Asadullah & Yalonetzky, 2012),

The PCI method measures the weighted average probability (WAP) that compares the probabilities across different type in the distribution. However, it focuses on "dissimilarity across the conditional distributions of outcomes" which Asadullah and Yalonetzky (2012; p.1154) critically opposed. The opposition was due to the inability of the model to measure inequality between-groups.

2.4.1 The Reardon Segregation Index

The Reardon segregation index (RSI) accounts for the shortcomings of the PC. There are two approaches in RSI. Hence, Asadullah and Yalonetzky (2012) described how it is to be computed.

The First Approach[4] is stated in equation 2.5

$$RSI = 1 - \frac{1}{\omega}\sum_{\alpha=1}^{A-1} w^t \left[\frac{1}{A-1} \sum 4F^t(\alpha)[1 - F^t(\alpha)\right] \qquad 2.5$$

The second approach is stated in equation 2.6

$$RSI* = 1 - \frac{1}{T\omega^*}\sum_{t=1}^{T}\omega^t \qquad 2.6$$

In which ω^* depends on $F^*(\alpha) = \frac{1}{T}\sum_{t=1}^{T} F^t(\alpha)$ 2.7

The output of the RSI is to infer that there are two points minimum and maximum. The minimum value is achieved when $F^t(\alpha) = 0 \vee 1$. This implies that there is minimum

[4] The first method can simply be put as $RSI = 1 - \frac{1}{\omega}\sum w^t \omega^t$. The $F^t(\alpha) = \sum_{s=1}^{\alpha} p_s^t$ explains the cumulative probability (CP) of getting an outcome with the condition that it belongs to type t. Also, the $F(\alpha) = \sum_t^T w^t F^t(\alpha)$ describes the cumulative population probability (CPP).

inequality when individuals in the distribution have an identical outcome. Hence, the between-type inequality (BTI) reduced. On the other hand, the maximum value is achieved when $F^t(\alpha) = \frac{1}{2} \forall \alpha \in [1, A-1]$. The implication is that maximum inequality is achieved with the condition that the individuals in the distribution are evenly divided between the outcomes of best and worst (Asadullah & Yalonetzky, 2012).

In the same work of Asadullah and Yalonetzky (2012), the objective was to see the movement of inequality of opportunity. They expanded the study to develop an index named as AFO index to account for the movement arising in inequality of opportunity. The AFO formula is an adjustment to the Fields and OK (1996) (AFO) mobility index. The AFO is stated in equation 2.8 as:

$$AFO \equiv \frac{1}{N} \sum_{n=1}^{N} \frac{\left| y_n^{CY} - y_n^{BY} \right|}{\left| y_n^{CY} + y_n^{BY} \right|}$$

$$= \frac{1}{N} \sum_{n=1}^{N} \frac{\left| y_n^{CY} - y_n^{BY} \right|}{\left| y_n^{CY} + y_n^{BY} \right|} I(y_n^{CY} > y_n^{BY}) + \frac{1}{N} \sum_{n=1}^{N} \frac{\left| y_n^{CY} - y_n^{BY} \right|}{\left| y_n^{CY} + y_n^{BY} \right|} I(y_n^{CY} < y_n^{BY}) \qquad 2.8$$

The N, y, I, CY and BY in equation 2.8 where N represents the number of states (or countries in comparison); y represents the inequality index (as may be computed by any method e.g. RSI, PC, Gini etc.); I represents an indicator function which takes the value of 0 and 1(when the expression of the parenticies in the formula is true, it takes the value of 1 otherwise 0); CY represent the current year and BY represents the base year respectively. This measurement explains the decomposition movement either upward or downward changes in mobility (Asadullah & Yalonetzky, 2012).

From these studies, although Agrawal (2014) decomposed education inequality, the concentration of inequality across educational levels of the household was not examined. Likewise, the AFO mobility index to decompose the mobility changes is limited to the

examination of time series data and in comparison, in two periods. The AFO could only be applied to cross-sectional data with two periods and same population.

2.4.2 Measuring Educational Attainment

This thesis measures the inequality in education with educational attainment. Hence, there is a global debate about measuring educational attainment. The level of education attained by household could be absolute or relative (Bukodi & Goldthorpe, 2016). The absolute measurement of educational attainment was determined by the volume of resources that households hold in the educational processes (Fujihara & Ishida, 2016). In that case, it focused on individual household rather than the majority. In contrast, educational attainment is a social commodity which is scarce (Hirsch, 1976). In this respect, reference was made to it as a positional good which represents the relative measurement of educational attainment (Fujihara & Ishida, 2016; Rotman et al., 2016; Shavit & Park, 2016; Triventi, Panichella, Ballarino, Barone, & Bernardi, 2016). As such, the relative measurement captures the educational distribution and returns to education. The relative explains the "value of education" often necessary to transform household from the status of poverty (Fujihara & Ishida, 2016, p.6).

2.4.3 Understanding Idiosyncratic Measurement of Poverty

Poverty is a complex concept and to understand the complexities requires more clarifications. Sometimes, the variables used to measure poverty were often introduced only to examine the surface (Haughton & Khandker, 2009). However, poverty characteristics was not uniform across countries. Some countries' poverty was influenced by institutions, while others are education and socioeconomic variables. For example, in capability theory, education is one of the three core variables that were proposed to measure poverty (Sen, 1999b; Todaro & Smith, 2012). As such, substituting education into a regression equation might be misleading (Haughton & Khandker, 2009). An in-

depth analysis is expected to examine the causation and the correlation between the variables. This is because most explanatory variables often used in poverty analysis were exact or proximate. Examining the specifics of those causes might be necessary in understanding poverty for a given individual household and society.

Education as a proximate variable, for example, could be examined as 'does household 'A' sampled poor because of his low education? Alternatively, is the household 'A' low education a product of his poor condition? Since most of the measurements of poverty were proximate causes, they did not explain the root of why a household was poor (Haughton & Khandker, 2009). Neglecting this area is harmful in statistical application and policy implications. Instead of proximate examinations of poverty, for example, could be – 'was the schooling expenditure too high for the household with low education?' 'How close is the school to the household apartment at the year of enrolment?' Suppose the school was far away, 'how risky was the attempt to send a child (with little experience) to such a distant school?' Regarding sponsorship, 'did the parents declined responsibility?' 'Did the household parents alive at the point of initial enrolment?' 'Did the parent's belief show that a female child should attempt schooling?' These are idiosyncratic issues to understand educational levels of the household, especially when the household has low level of education (Haughton & Khandker, 2009).

Furthermore, health and education are core variables that have a positive relationship with productivity while measuring poverty (Todaro & Smith, 2012). Suppose health is added to education variable in a regression equation to explain poverty. Then it is pertinent to consider how the poor would shift from exact to specific in health-related issues. The in-depth cause could be: 'does the poor household health caused by poor water, untidy environment that accumulate germs, and dirty room to contain mosquito and flies?' 'How often does he takes care of his toilet and bathroom?' 'Does he use a mosquito net?' 'Are

the poor vulnerable to these specific factors?' (Haughton & Khandker, 2009). These are fundamental issues in understanding a household in poverty regarding his health (Edoumiekumo, Karimo, & Tombofa, 2013). This is because this type of examination addressed the specific issues of the poor than the international money-metric approach of measuring poverty with $1.25/day (Ahmed, Hill, Smith, & Frankenberger, 2009). This approach of going beyond the proximate is known as multidimensional poverty measurement (Adeoti, 2014). Hence, knowing the poor beyond theoretical approach and a money-metric measure of $1/day ($1.25 and $2 a day), is desirable to construct and efficiently design appropriate interventions for the poor (Ahmed et al., 2009).

2.5 Empirical Studies

This thesis has three fundamental research questions. To answer each of the research questions, the empirical studies were organised into three subsections. From the review into each of the three research questions, research gaps were pooled together.

2.5.1 Studies on Education Inequality

To understand the levels of education inequality in the SSA as stated in Objective 1, this subsection reviewed literature on the empirical works regarding measurement of education inequality. The studies reviewed, revealed mixed results. To start with, Blanden, Gregg and Machin (2003) opined that pursuing equal access to education is an attempt to improve the "children from less well-off backgrounds in order to break generational cycles of deprivation and encourage economic growth" (Blanden, et al., 2003, p. 1). Using educational attainment and family income to determine the changes in education inequality in the UK and US with longitudinal data, it was found out that differences in educational system explained better than the intergenerational mobility in economic and social. This result indicated that the breaking of educational poverty, in other words deprivation, depends on the reduction of education inequality. Considering education inequality and human capital inequality, Lim and Tang (2008) used education

and the human capital inequalities Ginis. The result showed that the two Ginis were positively related when the education inequality Ginis are low. This occurred because when the education distribution near equality among the population, human capital stock would be high. The case does not look similar when the distribution in education is low, the corresponding human stock will be negative (Lim & Tang, 2008). The result indicated that the role of education being unequal will keep lowering the human capital accumulation if the distribution is high. In other words, a high inequality of education would impact negatively on the human accumulation, recycle education poverty and lower economic growth (Blanden, 2003).

Along the same thought was the study of Checchi (2001) who applied a Gini index to examine education and income inequality with educational attainment factor. The empirical results indicated that the higher the quantity of access to education, the lower the income inequality. However, this outcome was based on two propositions. "First, the initial level of educational attainment must be sufficiently low; second, the average educational attainment must be raised sufficiently rapidly" (Checchi, 2001, p.35). According to Checchi, there will be few educated people to earn fat wages when the average level of education is considerably low. Nevertheless, income increases with increase in both access and attainment because of labour factor supply that would cause incentives to increase, due to the higher rate of access and attainment. Also, Gregorio & Lee, (2002) further buttressed the argument of Checchi (2001) that a simultaneous increase in the level of educational attainment and equal distribution of education would produce equal distribution of income.

Furthermore, Barro and Lee (1993b) examined the losers and winners of economic growth and their findings showed that, at the lower quintile of income distribution, the group had -1.3% of the proceeds of growth while those at the upper quintile was 4.8%.

The result presented indicated that those at the lower quintile of educational attainment levels benefited more from the economic growth than the lower quintile in the distribution. This agreed with Nesiba (2014) that the developing countries share their income unequally. In other words, reducing poverty among the low level of education would be difficult because of the educational cost involved in learning, that would not be easily affordable. No doubt that Ahluwalia et al. (1979) argued that eliminating poverty would be elusive even when all economic frameworks are fully employed due to unequal distribution from the proceeds of growth.

Regarding the distribution of education across sexes and impacts on growth, using cross country analysis, Klasen (2002) opined that inequality of education reduced the economic growth because there was a reduction of human capital stock. It was further stressed that the inequality impacted on investment and growth of population. In Michaelowa (2000), the argument of the study was that human capital accumulation and endogenous growth correlated with schooling. Although cross country inference was not made, the study showed that at microeconomic studies, private investment in education contributed to the economic wellbeing of the individual.

Another clarification from Barro and Lee (1996) was that, firstly, the classification of the educational attainment into seven levels. The levels enable us to understand clearly the extent of inequality in different educational attainments. Secondly, they argued that with the seven levels, although wealth distribution was not suggested, an array of studies could be carried out using the educational attainment to predict role of gender in economic growth, democracy, freedom in politics as well as "adult schooling on fertility, child mortality, and education of children" (Barro & Lee, 1996, p.222).

Following the suggestion of Barro and Lee (1996), Hargreaves and Glynn, (2002) examined the relationship of HIV and educational attainment using educational levels

data. The results showed that education attained correlated with HIV infections. When compared with socioeconomic and demographic factors, it was found out that educational attainment and socio-economic indicators were correlated. This could imply that, not only that education attained could influence income, productivity and improve wellbeing but it helps to avert dangerous lifestyle practices such as unprotected sexuality that could result to HIV infection.

Another dimension of measuring inequality in education distribution was the measure of educational outcomes instead of educational attainment. The educational outcome goes beyond the proximate to specifics, especially when the students were in the classroom. Here, the specific represents the ability of the child in reading and writing (English), counting (mathematics) and skill in sciences. With PISA scores, Bruckauf1 & Chzhen (2016) examined educational inequality in educational outcomes in the OECD countries, using "replicate weights and plausible values" methods (Bruckauf1 & Chzhen, 2016, p. 17) with 'repest' in STATA software. The findings showed that relative inequality of educational outcomes existed in the bottom end. The bottom end inequalities showed a situation where the inequality arose from the falling of educational standards.

Also, Schnepf (2008) examined educational inequalities among the immigrant's children in Canada, Australia, New Zealand, Germany, Switzerland, UK, Sweden and USA. Using PISA scores in mathematics and reading ability, the result shows that the immigrant children's learning ability are highly dispersed from perfect equality. The dispersion of the immigrant's children from perfect equality was a cause, arising from countries effect of the immigrant's parents of the children as well as the language. Similarly, the study carried out by Ferreira and Gignoux (2013), used PISA scores in mathematics, reading and sciences. Using the simple variance, that is, the standard deviation from the mean, there was a disparity in educational achievement in 157 countries examined. However,

the measure of educational inequality in the study was different from the use of years of schooling and the education inequality Gini.

2.5.2 Studies on Education Inequality and Poverty Relationship

This subsection focused on empirical works on the relationship of education inequality, the objective 2 of the thesis. There were large number of studies on poverty causes. Equally, previous studies focused on the impact of low education, in other words differences in education, on poverty. Largely, those studies examined education inequality subject to varieties economic variables. This thesis presented them in this section. However, it is necessary to point out that a direct research on the relationship between education inequality and poverty was scarce in the previous studies. The main work found in this area was the work of Wu et al. (2008). So, the primary goal of the thesis was to expand the knowledge of Wu et al. (2008) on education inequality and poverty relationships.

Essentially, the basic argument of Wu et al. (2008) was that most existing studies on education, human capital and income distribution focused on effects of education distribution on income distribution (Wu et al., 2008, p.309). They argued that the existing studies established causality between education and economic growth as well as education and income distribution. Also, the low-development trap was found to cause double track causality between education and growth. While these had been done in the previous studies, Wu et al. (2008) further developed a framework that captured education, growth and poverty. The framework explained the growth path of poverty where the households had a similar economic background but with different levels of education. The framework and analysis were based on rural households in China. The empirical results indicated that household with different educational levels but with similar economic opportunity falls faster to poverty than the household with similar economic

advantage. This finding implied that unequal education among the households positively correlated with poverty despite similar economic background.

From the theory of social exclusion, there was greater importance of education credentials required to gain freedom and live a healthy life. Otherwise, household would be excluded from sharing economic resources due to low or differences in education. To that end, while we considered the suitability of the methodological framework, however, the target of the Wu et al. (2008) focused on growth path of poverty instead of predicting the relationship. Although inequality of education arose as a cause of poverty, the household existing poverty in relation to education inequality demanded for examination. Another area of the study was that the description of the sample data used in the paper was unclear to understand how representative the data were in the study area. Expanding education inequality and poverty relationship beyond single country could enhance more of generalisation.

To understand poverty, the thesis liked to present the determinants of poverty. Firstly, the study of Haughton and Khandker (2009) examined poverty and they went beyond proximate issues to investigating those poor living below poverty line such that the poor were grouped into three - subjacent poor, medial poor and ultra-poor. The subjacent poor group comprised those that live on more than 75 cents of US$ currency but less than $1. The poor medial group comprised those that live on more than 50 cents but less than 75 cents while the ultra-poor group were those poor that lived less than 50 cents a day. The money-metric poverty analysis was employed in this classification. Thus, household demographic features and income of the family per month were significant variables that predicted poverty.

In Sri Lanka, despite massive expenditure on poverty alleviation and social welfare, the fair of the rising tide of poverty gave a concern (Vijayakumar & Olgar, 2012). The argument was that the worldwide shock of food and fuel between 2008 and 2010

deepened world poverty in the country. The shock was associated with the fall of GDP and disasters and that the unstable growth rate usually had devastating effect on the poor. Using the ordinary least square (OLS) method, the study found road, access to market, gender inequality in wages and low education correlated with poverty in Sri Lanka

Nigeria poverty had been a severe one compared with the vast natural resources of the country. The situation was described as "suffering in the midst of plenty" (Edoumiekumo et al., 2013; p.14), Although Nigeria economic growth was impressive over the years, the poverty incidence was apparently significant. In Edoumiekumo et al., 2013, poverty increased from 42% in 1992 to 67% in 1996. Likewise, poverty increased from 74.2% in 2000 and 92.5% in 2010. The consequence paved the way for people nurturing anti-government groups. The study focused on examining the concentration, location, depth, severity, causes of poverty and the vulnerable groups. Using logistic regression model and the Foster, Greer and Thorbecke (1984) (FGT) index[5], the study found that household income poverty was not of a serious factor, but the families were susceptible to poverty at the rate of 59.73%. Other factors that correlated with poverty were the household size, per capita expenditure on health, education and food. Additionally, those households that were susceptible to fall back to poverty were found in gender inequality differences in household occupation, years of schooling, household size, per capita expenditure on education, health, food and the number of rooms occupied by the household. Similar studies found age, informal sector employment and size of household (Awan & Iqbal, 2010) while sex composition of household, minority group and the nature work undertook correlated with poverty (Misra, 2007).

[5] FGT Index $P\alpha = \frac{1}{N}\Sigma(\frac{Z - Y_i)^q}{Z}$

Estimating poverty with money-metric approach was argued to be weak because of its computational problems (Grivani, Shadimeri, & Falahi, 2014). Although we could not shy away from using the income approach, the weak computational problem usually arose from the lack of interest of the households to provide actual information about their income than their expenditure. In expenditure approach, household expenditures are measured in two ways; namely food energy intake per calorie and measuring poverty line based on the basic needs. Hence, Grivani et al. (2014) used cross-sectional data with Tobit model[6], found that gender inequality, dependency ratio, and remoteness (rural) were major causes of poverty in Iran.

Interestingly, the work of Adeoti (2014), examined the issue of change (Δ) in poverty for two periods[7]. Putting aside the use of conventional OLS and Tobit methods, he made use of logit model to estimate rural poverty. Using secondary data of national living standard survey (NLSS) for 2004 and 2010, the study argued that all the households examined were deprived of good living (Sen, 1999b). The Northwest responded to the highest rate of poverty in all the indicators used. The Northeast had the highest intensity of poverty in 2004 but reduced in 2010. Health, asset, and education dimensions contributed a substantial proportion to the Nigerian poverty. In the same vein, Ennin, Nyarko,

[6] The Tobit model $y_i = \begin{bmatrix} y_i^* = \beta X_i + \xi_i & \text{if } y_i^* > 0 \\ 0 = & \text{if } y_i^* \le 0 \end{bmatrix}$, the Tobin (1958) model.

$where\ \xi_i \sim IIDN(0, \sigma)$

[7] Finding the change (Δ) that occurred. The change (Δ) can be in percentage or absolute for the two periods. The annual mathematical change (Δ) that he used was presented as $\Delta M_0(X,Y;z,k,w) = \left[\frac{M_0(Y;z,k,w) - M_0(X;z,k,w)}{t_y - t_x} \right]$ and the percentage change as $\delta M_0(X,Y;z,k,w) = \left[\frac{M_0(Y;z,k,w) - M_0(X;z,k,w)}{(t_y - t_x) M_0(X;z,k,w)} \right]$.

Agyeman, Mettle, and Nortey (2011) used similar methodology to find that family size, illiterate heads, household heads in agriculture as a primary occupation and the location of the household correlated with poverty. Whereas, Garza-Rodriguez (2015) found out ambulance work, manufacturing repair work and domestic work with low-wage as major causes of poverty in Mexico.

Using cross country's analysis of 48 SSA countries with OLS regression, Adeyemi, Ijaiya, & Raheem, 2009) found that 7/10 of the variables examined were major causes of poverty in the 48 Sub-Sahara Africa countries examined. The causes included population, inflation, safe water, per capita income, gender discrimination, ethnicity and HIV/AIDS. However, education effect was omitted among the ten variables. Other studies that used OLS regression found education, extension services, farm income, gender inequality, age and age squared as well as access to credit as the causes of poverty (Aigbokhan, 2008; Bogale, Hagedorn, & Korf, 2005; Chidoko et al., 2011; Rupasingha & Goetz, 2007). For example, Bogale et al. (2005) posited that poverty expanded by deprivation which occurred when the household lacked the required household assets or expected resource endowment. As such, the household would be at risk of poverty. Thus, they found from the logit model used, that, assets such as animal, human capital, and land distribution were the causes of poverty.

Furthermore, Sekhampu (2013) argued in favour of understanding poverty from definitional perspective because a robust definition of the causes of poverty helps in policy formulation. As such, three reasons were provided for the elimination of poverty in the society. These included high productivity (because of the improved health, education, mental soundness for innovation and skills); choice of family size; and a healthy society. A self-administered questionnaire instrument was used to obtain data on household demographic characteristics, income and expenditures. Out of the 300-

questionnaires administered, 283 forms were returned representing 5.66% refusal rate which was considered acceptable. The first part of his objective adapted the Slabbert (2004) and Ravallion (1998)[8] models. Hence, the study found age, household size and status of household head in the labour market that correlated with poverty. However, the weakness of the study was the use of household income to measure poverty rather instead of expenditure because household is always eager to provide accurate data on their expenditures instead of revealing their income (Grivani et al., 2014).

Equally, Sadeghi, Toodehroosta and Amini (2001) studied Iran rural poverty while Brück (2001) and Kabubo-Mariara, Mwabu, and Kimuyu (2006) studied Mozambique and Kenya poverties. Sadeghi et al. (2001) posited that age, experience, level of education and household income were the factors that correlated with poverty in Iran. In Kenya, education, household assets and family composition (size) were the causes of poverty (Kabubo-Mariara et al., 2006). Finally, war, low demand for education and eroded assets significantly caused poverty in Mozambique (Brück, 2001)

Having understood causes of poverty, the thesis reviewed studies that has relationship with education inequality. From the qualitative analysis, the conditions such as persistent unemployment is an enabling factor for parents to withdraw their wards from schooling in Latin America (Bonal, 2007). Besides, the school financing issue is contravening the hypothesis of equal education, Though the population is increasing, the imposition of the

[8] The Jalan and Ravallion (1998)model $H(y,z)=\frac{M}{N}$ and the logit function specified was $\frac{L_nP_i}{1-P_i}=\Sigma_{j=1}^{k}\beta_j X_{ij}$ .The The $\frac{L_nP_i}{1-P_i}$ is the natural log of the odds of households below poverty line which shows $\frac{\partial \log(oddratio)}{\partial X_j}=-\beta_j$

high cost of schooling becomes an impediment for a large number of household children to proceed to secondary and tertiary education (Bonal, 2007). As such, Bonal did not support the view that inelastic demand for education is achieved through an increase in educational fees. The argument was rooted to support the efficient supply of education that would not interfere with the inelastic demand for education. Instead, the income levels of each household, reduction in the rationale for investing in education, needed information towards investment in education and wage differential put the argument abated (Bonal, 2007; Colclough, 1996).

Also, while examining stock of knowledge for less developed countries (LDCs), Bowman (2007), expands the Schumpeterian growth model to incorporate the skill intensive. The author compared the advanced model with the LDC. It was found out that initial wealth inequality at the pick-up stage accounts for the slow pace of growth. This is due to the high spread of education inequality in those countries which is against the proposition of Kuznets inverted U-Shaped Curve (Kuznets, 1955). Though Dollar and Kraay (2000) argued that the growth care about people living condition, the Bowman growth model did not investigate the relationship between levels of education inequality and wellbeing or people's poverty condition.

Another qualitative study was Kalindi (2015) who examined education of the Sub-Saharan Africa and the findings showed that education inequality was higher among the gender due to low enrolment, diseases, school distance from home, child-labour activity, teacher skill, teacher-student ratio, hunger and free education increases education inequality in the SSA countries (Kalindi, 2015). Reasonably, the position need be verified with quantitative analysis. Besides, the study did not directly consider the relationship between education inequality and poverty.

Another related study was the education spending seen as a strong indicator of education inequality. Gruber and Kosack (2014) tried to look at education spending on primary and tertiary institutions. Using the Feasible Generalized Least Square (FGLS) method of estimation, the findings indicted that government in most developing countries are tilting education spending to the tertiary levels of education, with little spending to grow primary education. The effect of the behaviour was on the education of the rich class would been larged compared to the poor class. In consequence, it is logical to argue that the chance of the poor to acquire needed knowledge to occupy high-status becomes slim such that income inequality increases. In so doing, the household capability and freedom are encroached upon resulting in education inequality due to differences in primary and tertiary education spending (Sen, 1999b).

According to Letseka (2014), there was an unclear direction of education in the South Africa. Hence, Letseka (2014) explored a qualitative method to explain the precarious situation of education in the country. From his analysis, he showed that separation of school children between the white and the indigene of South Africa, missing of cohesion and school risks characterised educational system of South Africa. This created a wide gap in the South African educational distribution. A similar study in Ireland further explained the determinant of education inequality (Borooah & Knox, 2015). Being a Catholic state, education differential was examined using the Theil Entropy index (Theil, 1967). The findings showed that there was schooling segregation among the religious groups. This religious group of educational system with high quality, thus separated the less privileged pupils in Ireland to have equal education. Though Theil's Index is a good measure of inequality, it is a measure of income inequality. On the one hand, Thomas et al. (2001) argued that using the income inequality Gini deals with a continuous variable. Income is a continuous variable while educational attainment is a discrete variable as designed by Barro and Lee (2010, 2013). On the other hand, the educational attainment

treated as a categorical variable in Thomas et al. (2001) omitted the differences in the educational achievement (Jorda & Alonso, 2017). Instead, the educational attainment was treated as a continuous variable, a better alternative to the previous methodology of Thomas et al. (2001). Jorda and Alonso argued that the continuous method allowed for the imposition of assumptions on how a year of schooling would be distributed at each educational levels.

Furthermore, there was a proposition that a good education acquired is a precondition for poverty reduction (Capra, 2009). As such, Awan et al. (2011) used logistic regression model to find out the proposition that education is a precondition for poverty reduction (Awan et al., 2011). The result indicated that additional education obtained at each level education was inversely related to poverty (Awan et al., 2011). Statistically, the logistic regression was appropriate to examine cross-sectional data, in the event of hierarchical variables, the hierarchical model would be appropriate to capture all idiosyncratic elements of the household behaviour (Hair et al., 2014).

In addition, the result of the logistic regression, an education production function was introduced which was to determine the performance of the resilience students in association with their socioeconomic indicators (Agasisti & Longobardi, 2014). The result showed that socioeconomic status and type of school influences the poor performance of the resilient students. This created education gap between the advantaged and resilient students (Agasisti & Longobardi, 2014). The result of Agasisti and Longobardi (2014) agreed with Pan (2016), where low saving factor impacted adversely on both the disadvantaged and advantaged students. The capability of the household head in relation to income correlated with the type of school that a child would attend otherwise; the child would be deprived of quality education (Sen, 1999a).

While considering the admission criteria, a qualitative study of China regarding education inequality was carried out (Wang, 2011). The study reviewed the admission taking place at the higher education system of China. The findings showed that economic deprivation perpetuates educational distribution at the top-level education through differentiated admission criteria among the Universities. The low-income group found it difficult to gain admission into high ranked university irrespective of the intelligent quotient (IQ). Also, a wide gap existed between rural and urban education resulting in education inequality over time (Wang, 2011). Understanding this outcome, however, would require further quantitative analysis.

Using quantitative analysis, Nakajima and Nakamura (2009) constructed a theoretical framework that explained the effect of the price of education. Suppose tuition fee accounts for the primary source of revenue for institutions, the primary education would be that the education gap between the wealthy and poor class would be minimal. However, knowledge gap widens at higher levels of education because the wealthy household has income and saving capacities to pay the price of tuition fee and other prices (Nakajima & Nakamura, 2009; Pan, 2016). However, similar study by Lincove (2009) examined the determinants of gender disparity of schooling in Nigeria, Using OLS technique, the findings showed that the cost of schooling at primary school level created education inequality among the sexes. This could happen because the economically advantaged household has chosen high-quality education provided by the private institutions leaving the larger disavantaged household children at the mercy of poor quality education dispensed at the public schools.

To have a brief knowledge about gender inequality and poverty to assist in the discussion of gender disparity in education distribution, we reviewed the work of Colclough, Rose & Tembon (2000). The argument of the paper was that, there had been access to schooling

in most developing countries. However, the access was taken over by inequalities. As such, the paper rested on understanding the reasons whether the two situations came from the same source or whether there are other factors interacting with the relationship, as a reinforcement. In consequence of their findings, Colclough, Rose & Tembon (2000) opined that households with poverty have more challenges than the richer households because the cost of schooling was higher for poor households than the rich homes. Also, there was poor allocation of funds from the government to provide quality education to accommodate school-age children. Both issues cumulated to poverty impact on education distribution. But the gender differences were associated with cultural practices instead of poverty itself. But in Jacob (1996), female was fair in access to education but exhibited disparity in the college experiences and lagged in the schooling outcomes. In so doing, this aspect of the gender weakness could trigger out-of-schooling for female than for male.

Summarily, we deduce that studies have not delved into the analysis of predicting the relationship between poverty and education inequality. Most of the studies were qualitative suggesting that more of quantitative analysis might be necessary to verify their claims. Likewise, some of the studies' methodology were not clearly presented particularly, the sample size used.

2.5.2.1 Studies on Household Composition

The study of education inequality and poverty was associated with micro studies of the household. Knowing the composition would help to understand the relationship between education inequality and poverty. The composition of the household is a considerable factor to observe household welfare. According to the human development-capability approach, people's well-being includes education, health and standard of living (Nussbaum, 2000b; Sen, 1999a, 1999b). Hence, Roemling and Qaim (2013) used OLS

and Theil's index. Their findings demonstrated that urban location, size of children, and per capita consumption expenditures of household increase intra-household nutritional inequality at the cities (Roemling & Qaim, 2013). As such, the differential in nutrient due to the poverty of the household could transmit into deprivation in education among the household.

Also, the poor live in the rural area, and that primary occupation of the poor in the rural area is rural extraction (López-Feldman, 2014). The rural poor solely relied on the environment as their source of income. Hence, the López-Feldman (2014) study showed that the household composition (village level features) did influence households' extraction decisions in the rural of Mexico. Because of the seasonality distress associated with the rural sector (Khandker & Mahmud, 2012), the extraction decision could affect income and education distribution such as children enrolment at primary school. There was possibility of withdrawing children from school if parents' income was affected by the low-income coming from the rural extraction. As such, the nature of the household work in the rural area defined the household poverty level that led to further deprivation in educational distribution.

Another interesting study of household composition was found in Mangiavacchi and Piccoli (2011). They used a sharing rule known as the continuous line to argue that the child welfare among the households was distributed more unequally if intra-household inequality was considered and that the concentration of the poor children was higher among the households (Mangiavacchi & Piccoli, 2011). Since attention was focused on the share of children in the household income, that is, measurement of child poverty (Ansell, Barker & Smith; Payne & Bidle, 1999; Zhang, 2003), the household education distribution was essential to the household economic wellbeing. Hence, the children

portion of the household income at intra-household level was an indicator to explain the level of education inequality and its relationship with poverty.

In further understanding the household composition, using OLS method, Dassanayake, Luckert, and Mohapatra (2015) showed that the composition of household regarding gender, does not demonstrate that female-headed households do have lower income than male-headed households. However, there were income inequality that existed among the female-headed households (Dassanayake et al., 2015). Also, female heading a household were likely to give their children needed education than the male-headed household. Nevertheless, the differential in income across the female-headed household could trigger poor education distribution across such female-headed households.

In contrary to Dassanayake et al. (2015) who argued that female-headed household was better than male-headed households, Amato, Patterson, and Beattie (2015) alternatively argued that children living with single parents were not an issue with test scores or the student ability. Instead, the maternal education had an association with test scores (Amato et al., 2015). The aggregated performance of school children largely depended on the mother whom might be due to closeness and maternal affection of the mother to the children, particularly when the father shark fatherly responsibility. In summary, the studies indicated that household composition usually defined the distribution of household income that could impact on education distribution.

2.5.2.2 Studies on Household Spatial Distribution

In Leary (2016) argument, the large number of global poor live in the rural areas, and they are poorly educated. Hence, the location where the household lives define the capability (Wang 2011). About the inequality of income, Annim, Mariwah, and Sebu (2012) used generalised Entropy – Theil's index and regression to examine the location where people live. The results showed that the within-district inequality to national

inequality was higher than inequality between-districts. There was a consumption inequality, indicating a significant effect on household poverty, but at varying degrees (Annim et al., 2012). The income inequality across the urban households does not matter compared to rural households. Where consumption impact differently, education deprivations becomes endemic among the school-age children.

Since the larger population live in the rural sector, farming is usually the primary occupation. The agricultural product is often being affected by various problems such as the seasonality distress. Hence seasonality distress causes seasonality hunger (Khandker & Mahmud, 2012). Due to the agricultural seasonality problem in the rural area, rural poverty increased across rural households. This was because when other factors reinforce themselves with poverty and seasonality, poverty and seasonality become endemic. In that case, the rural income would be affected considerably, and education deprivation deepens due to low savings (Kuznets, 1955; Pan, 2016)

For example, Pan (2016) examined households saving capability in both urban and rural sectors Using the quantile regression. The findings showed that rural saving increased at lower percentiles whereas the urban saving experienced a more significant shift at higher percentiles (Pan, 2016). The result agreed with the Kuznets (1955) proposition on savings arising from the household income. Where saving was primarily low, then, the household would lack the ability to invest in children education, thereby causing educational inequality.

Furthermore, using a Gini coefficient, education, rural and the urban economies were compared (Zhang & Kanbur, 2005). There was an indication that differences existed in the education of the rural and the urban. The result showed that gender illiteracy was higher in the rural than the urban (Zhang & Kanbur, 2005). The higher illiteracy in the rural areas accelerated the headcount of the rural poverty (Pan, 2016).The findings of Pan

(2016) and (Zhang & Kanbur, 2005) supported the the findings of Wu et al (2008) where those in the rural China with similar economic advantage but with varying educational attainments fell faster into poverty. Such situation leads to multiple problems such as mortality rate among the school-aged children (Chin, Montana, & Basagaña, 2011). The study of Chin et al. (2011) used survival regression and argued that there was a spatial concentration of child mortality in the far west and middle west of Nepal (Chin et al., 2011).

Market behaviour is another global debate regarding location od the household (Gulati & Ray, 2016). In the spatial distribution model developed by Gulati and Ray (2016), it was shown that the wealthy class was most attractive to the supplier or people in business than the poor. Hence, the poor neighbour usually buys fewer goods and services due to higher charges of the supplier favouring the rich within the neighbourhood. This market behaviour rejects the poor from actively participating in the market (Gulati & Ray, 2016). The study was in line with Pan (2016) that household saving ability matters in the distribution of economic and educational resources. In a large household where parents have little saving from the family the low-income would lead to unequal distribution of education within the household. So, the profit-oriented goal of the market within the neighbourhood was a proposition that created a wide gap between the poor and the rich. This argument was supported by Farrell and Firebaugh (2016). Using similar method of Zhang and Kanbur (2005), Farrell and Firebaugh (2016) used Gini coefficient to examine the spatial differentials that existed among the white immigrants. The result showed that there was a spatial inequality in the America rural areas among the white immigrants. A Large group of the suburban of America experienced substantial inequality (Farrell & Firebaugh, 2016).

Summarily, the household is an integral part of a society that enhances the stability of nation's economic and social development (Byrd, 2012). Again, the rural economy attracts more of the low income and low education (Farrell & Firebaugh, 2016; Zhang & Kanbur, 2005). In consequence, they often experience deprivation in economic resources sharing, having a spillover effect on education distribution. This spillover effect, in the more extensive discussion, made some scholars believe that the poor people cannot move out of poverty region because they were often rejected by the market (Gulati & Ray, 2016). It has resulted in recirculation of both headcount poverty and education poverty across individual households and at national levels. Also, there was the mixed consensus of the influence of location of the household about household welfare. Location, where people live, does not matter if it is rural. This was because the study of Gulati and Ray (2016) findings showed that some group of urban and the suburban people equally suffered deprivation.

2.5.3 Studies on School Dropout

In this subsection, the focus was to review literature that provided solution to research question 3 where the objective was to determine the speed of dropout spread and its stability. Conceptually, dropout is a social problem associated with character malfunction. The character malfunction makes dropout a social problem, in other word a social crisis. Dropout, as a social crisis, increased the chance for social misdemeanors that led more youths to prison (Burrus & Roberts, 2012). Dropout speedily exposes the loosing of education track of a child and the inadequacy of the government to distribute the public good (education) equally. On the part of parents, it explained the *prima facie* of the economic status of the parent, demonstrating the inability to provide education for their children. As a social crisis, it is socially spread through the individual, peers and the parents who are vulnerable to poverty (Burrus & Roberts, 2012; Lu et al., 2016). For example, children born into poverty have contacted poverty from the day of birth, hence,

there is a higher likelihood of being excluded in education distribution beginning with the school enrolment and or experience educational deprivation through dropout during the years of schooling.

Qualitatively, dropout was associated with children health such as “fluid reasoning skills” and substance use (Pagani et al., 2017; p.1) a common phenomenon at all levels of education and all societies. In urban centres of America, 50% of the enrolled children were reported graduated from secondary education. As such, wage differential became an issue where wage inequality was substantial between the high school graduates and the dropouts from schooling. Specifically, the dropout victims that abandon secondary education were losing a sum of $375,000.00 to children that graduated from high school. The loss was higher when considering the university dropout students and the graduates (Burrus & Roberts, 2012). The effect of the dropout from school included being vulnerable to unemployment, low income, poor health and circulation of poverty (Burrus & Roberts, 2012). Similar findings showed that the dropped-out victims usually engaged in multiple illicit behaviours contrary to societal norms. For example, Sum, Khatiwada, McLaughlin and Palma (2009) findings showed that the dropout syndrome in America increased the prison inmate by 22% daily jailing of the dropouts from high school. They argued that the dropout from school did not arise by chance. Time misapplied rolled over to history of the dropout. So, findings indicated that demographics, student performance, poor self-assessment and self-defeat drawn from bias parents, teachers and close adults (Burrus & Roberts, 2012) made the victims of dropout to abandon schooling.

Furthermore, the study of Burrus and Roberts (2012) used the qualitative method to examine the cause of dropout and the institutions of the dropout. Moreover, Sum et al. (2009) used descriptive approach to explain the consequences of dropout in America.

From their descriptive analysis, they identified joblessness, youth parenting and increase in incarceration rate as effects of dropout.

In contrast, De-Witte et al. (2013) considered the argument of dropout caused by unemployment as paradoxical and controversial. As against Burrus and Roberts (2012), being an economically advantaged country, dropout was high among America school children due to the efficiency of economic activities (De-Witte et al., 2013). Labour market employment provision was attractive to the teenagers such that the employment opportunities dragged them out of the classroom. In Lewin and Sabates (2012), the existence of dropout in developing economies differ from the developed countries. Although students were dropping out in the developed countries due to economic advantages (De-Witte et al., 2013), the dropping out in the developing countries was associated with harmful elements. With the EFA achievement, access was given to children and these children were attending classes, but large number were struggling with personal and family problems such as reoccurrence of illness, poor feeding and poverty (Lewin & Sabates, 2012). As a result, they came to school, marked attendance and participated but failed to grab daily classroom lessons (Lewin & Sabates, 2012). In fact, they marked attendance and attended classes, yet, the disadvantaged students in health, economic and family problems caused them to be educationally deprived.

In identifying the location of the dropped-out students, descriptive statistics was used to establish two cut-points to identify those that have high dropout and low graduation rates (Balfanz & Legters, 2004). The probability of graduation and non-graduation was 50% chance for each the situations. The second cut-point was on ratio 60 to 40. The premise for choosing the methodology was that there was no existing measurement model of the dropout to provide a consistent estimation. From the Balfanz and Legters (2004) descriptive analysis, the large numbers of the dropout were found among the minority of

African, Americans and Latino students. The results also showed that the promoting power is weak. This was attributed to the poverty level of the household, and this dropout population were found at the suburban population (Balfanz & Legters, 2004). As such, it is imperative to argue that the spatial location and household poverty matters in educational distribution. Nevertheless, the study was limited to the descriptive method.

Another position was that manpower development was at risk due to persistent dropout from school (Chang, Min, Shi, Kenny, & Loyalka, 2016). The economic impact of the persistent dropout often led the economy into low human capital and middle-income trap (MIT) (Chang et al., 2016; Gill & Kharas, 2015). In Chang et al. (2016), using descriptive, t-test and OLS to determine the rate of dropout of school children in China, findings showed that dropping out rate was very high, and it correlated with the expectations in education. The dropping out was found during the junior secondary school compared to senior secondary education level (Chang et al., 2016).

Summarily, the study of inequality of education when it is approached from the dropout syndrome defines the starting point of poverty in personal life. It is social education crisis that usually creates disparity in wages and in turn increase poverty level due to unequal education (Bonaldo & Pereira, 2016).

The review of the dropout in this section showed the contributions of scholars in identifying the fundamental causes, effects and consequences of dropping out of school children. Hence, descriptive, OLS, t-test and qualitative approaches were used to explain the dropout crisis. In effect, this thesis stood to challenge the methodological approaches as insufficient to confirm the speed and stability of the dropping out. Because of the nature of dropout spread (DuPont, Caldeira, DuPont, Vincent, Shea, & Arria, 2013), mathematical approach with econometric modelling might be more efficient to examine the proportion of dropout and the status of its spread.

2.6 The Research Gap

This section focuses on summarizing the gaps discovered in the literature reviewed. These gaps were covered in this thesis.

2.6.1 Research Gap - Objective 1

Although existing studies explained that education inequality cut across the SSA countries with the use of educational attainment secondary data, examining cross countries education inequality with cross sectional survey data, to our best knowledge, had not been covered in the development and educational literature. It was the author interest to estimate the levels of education for each country to understand the enormity of inequality that cut across household.

Furthermore, previous studies concentrated on the relationship of growth, human capital and income inequality in relations to education distribution (Becker, 1964, Digdowiseiso, 2009; Schultz, 1960). The studies have argued that using education per capital would increase income. Particularly, Digdowiseiso (2009) argued that education variables have strong impact on economic growth. Other findings such as Lucas (1989) presented the argument that the speed of human capital explained the speed of growth required in the country. However, the extent of how household wealth is distributed across the educational levels designed by Barro and Lee (2010) remains unclear in the previous studies, particularly in the SSA countries as a case study.

Finally, examination of education inequality has been done scholarly using Gini, standard deviation and representation index (Maas & Criel, 1982; Thomas et al., 2001) in the context of education distribution. But this thesis extended the examination of the inequality using concentration index. With the concentration index, the author extended the analysis to decompose the inequality according to gender and analyse wealth distribution across the educational levels as designed by Barro and Lee (2010).

In a nutshell, in objective 1, we covered the estimation of the enormity of education inequality in the 25 Sub-Saharan African countries using household data. The thesis went ahead to cover how wealth was distributed across the seven educational levels. (Barro & Lee, 1993a, 1996, 2010) and decompose the inequality according to gender, following Jann (2016).

2.6.2 Research Gap - Objective 2

After understanding the quantity of education inequality, the objective 2 focused on the examination of the impact of poverty on education inequality. There were different dimensions examined in the literature (Digdowiseiso, 2009; Wu, et al., 2008). On the one hand, several relationships were examined in relation with education where findings showed that low education or differences in educational attainments caused poverty (Becker, 1964, Digdowiseiso, 2009; Schultz, 1960). However, these studies did not directly examine the relationship between education inequality and poverty. A direct study of education inequality and poverty was found in Wu et al., (2008), which focused on the understanding of the growth path of unequal education and poverty. Their findings showed that households with differences in education but with similar economic advantage fell faster into poverty than those with similar economic advantage.

In all, previous findings showed that education was strong indicator to reduce poverty, improve income and sustain growth (Becker, 1964, Bonal, 2007; Digdowiseiso, 2009; Schultz, 1960). However, substantial number of the household children could be educationally deprived due to level of poverty, which scholarly demanding for examination., To our best knowledge, investigating the relationship between poverty and education inequality was missing in both education and development studies. in consequence, the thesis investigated the influence of poverty on education inequality in the SSA countries.

2.6.3 Research Gap - Objective 3

Dropout was investigated in the previous studies where we found a disagreement in the rate of dropout between the technocrats and academic community (Burrus and Roberts, 2012; Sum et al., 2009). The technocrats produced a result with descriptive statistics while the academia used qualitative, descriptive and OLS. The official dropout rate (value) was smaller than the academia. In the context of this, the author liked to investigate dropout problem using a different methodology besides the conventional methods previously used. The new approach in the estimation of dropout extended the analysis beyond understanding the rate of dropout to the stability of dropout.

2.7 The Conceptual Framework

After a thorough review of the theories and empirical literature, this thesis came up with the conceptual framework providing the direction of the study. This wass presented in Figure 2.3.

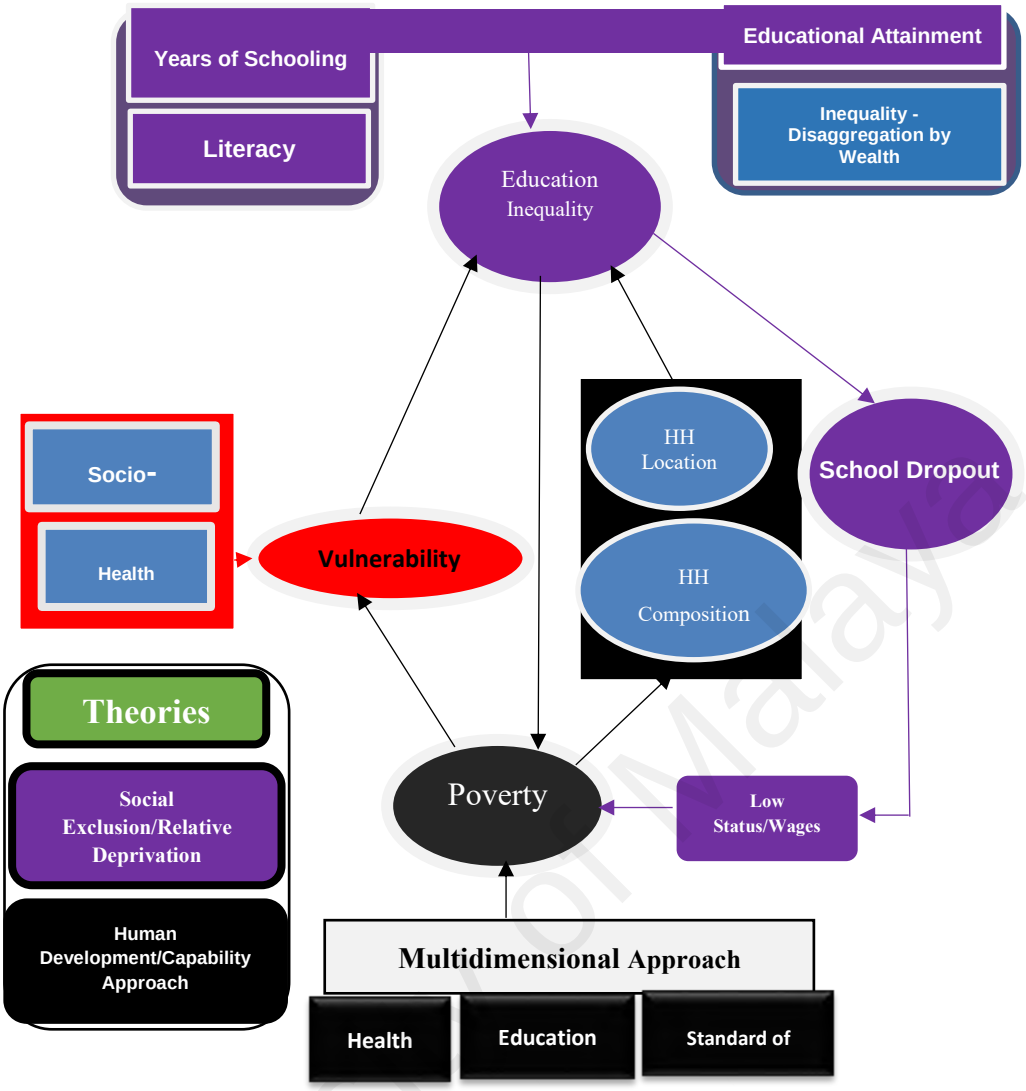

Figure 2.3: Conceptual Framework

Source: Author

The conceptual framework in Figure 2.3 provided the direction of achieving the three objectives of the thesis. The Figure 2.3 explained that the thesis estimated the quantity of education inequality for the SSA countries, examined the relationships between education inequality and poverty alongside household composition and spatial distribution and finally considered the examination of dropout as an instrumental indicator for low status/wages leading to household poverty.

CHAPTER 3: METHODOLOGY

3.1 Introduction

In the previous chapter, we reviewed literature regarding the three objectives in relation to the overall objective of education inequality and poverty in the Sub-Saharan African Countries. The thesis had interest in analysing the level of education inequality across the households; examined the impact of poverty on the inequality of education and finally determined the rate and stability of dropout in the SSA countries. To achieve these objectives, this chapter presented the philosophical opinion and critical analysis of the researcher that justified the methods used in achieving the three stated objectives, because a skillful methodological framework laid an excellent foundation for robust data analysis and findings (Trochim, 2006). As a result, the focus of the chapter was primarily to make a detail presentation of the methodological framework and justification for suitability of the methods. Thus, the thesis answered the following research questions as stated in chapter 1:

1. What is the level of education inequality across Sub-Sahara Africa countries?
2. What is the relationship between education inequality and poverty in the Sub-Sahara Africa countries?
3. What is the status of dropout of the primary-school children in the education distribution of the Sub-Saharan African countries?

Conventionally, quantitative and qualitative methods are acceptable subject to the frame of the research objectives (Soiferman, 2010). To avoid spuriousness of the results, suitable statistical instruments were employed to account for straightforward conclusions and helpful to draw policy implications. As a result, the chapter was divided into eight (8) sections and subsections.

3.2 Research Design

The research design was perceived as a worldview by Creswell (2014). The philosophy behind worldview was the overall ideology about the phenomenon and the nature of research that a researcher embarked upon in a research project. The overall view provided the direction of the research that created a system of belief for the readers (Guba, 1990). Currently, to have a worldview of this thesis, there were three standard approaches to a research design - namely, qualitative, quantitative and mixed methods.

3.2.1 Quantitative Research Technique

The positivist promoted the quantitative research design with the intensive use of numerical data, hence, it is a confirmatory research design. As noted of its numeracy, it provided proximate chances to confirm accuracy of the existing theories (Creswell, 2014; Piaw, 2012). The philosophy behind the quantitative research emerged from the notion that there is relative objectivity in the knowledge of the population under study (Soiferman, 201; Creswell, 2014). It assists to assume the changes that take place within the society rather than looking at the individual changes (Piaw, 2012; Soiferman, 2010). So, the researcher would have theoretical background to select sample, use the scientific method of sampling, formulate a hypothesis, generalised and draw inferences about the target population (Hanson, Creswell, Clark, Petska, & Creswell, 2005; Piaw, 2012; Soiferman, 2010). In a nutshell, quantitative research possesses the characteristics of confirmatory research design.

3.2.2 Qualitative Research Technique

The qualitative research is a philosophical approach to research project that minimally uses numerical data. The approach helps to perceive individual or group of individuals what they understand about a problem. As an interpretivist, positivists' philosophy of quantitative research was opposed (Johnson & Onwuegbuzie, 2004). They posited that

qualitative method helps to ascertain true "constructivism, idealism, relativism, humanism, hermeneutics, and, sometimes, postmodernism" (Johnson & Onwuegbuzie, 2004, p.14). There are certain societal problems which numeric data cannot explain (Piaw, 2012). The paucity of data inadequacy for a qualitative research generates small or no knowledge of the population characteristics. To get the accuracy of the desired outcome of a research project, the interpretivist focuses on the use of qualitative research method. Instead of using numerical data to analyse a phenomenon, investigating the problem such as views, love, happiness, "emotions, empathy, motivation" (Piaw, 2012, p.10) falls within the realm of qualitative research design. Since there are no data for emotions, the qualitative research increases the understanding and facts about the population under study because the researcher draws inferences from each of the respondent's belief (Onwuegbuzie & Leech, 2007). Also, it is easier for interpretivist to use small sample size and mainly focus group instead of extensive data required in quantitative research. It is based on grounded theory mechanism which is the scientific lens of qualitative research (Onwuegbuzie & Leech, 2006; Piaw, 2012; Soiferman, 2010). Majorly, the rapport of the research exists between the researcher and respondents (individual or the focused group) within the study area**.** Again, rather accepting the study of the cause-effect relationship of the positivists, the interpretivists posit that cause and effect in a study are inseparable. The subject (respondents refer to as "knower") was the origin of the truth, which the researcher would be obtaining direct information (Johnson & Onwuegbuzie, 2004) that would produce a current and consistent result. As such, the interpretivists used the comprehensive report of the research rather than the passive method of the positivists (Johnson & Onwuegbuzie, 2004). While quantitative research design aimed to confirm the theory, the qualitative approach is detecting specific theory. Notably, consultation to literature, consultation with focused group and consultation with

the experts are the scientific methods of exploratory or qualitative research design (Saunders, Lewis, & Thornhill, 2007).

3.2.3 Mixed Mode Method: Recent Research Development

In the worldview philosophy of Creswell (2014), the mixed method is a complete way to understand the problem. It combines the positivists and interpretivist approaches of inquiry - quantitative and qualitative. The core assumption of the mixed mode method is that separating the two approaches is a position that diffuses logic of rationality (Harrison, 2011; Onwuegbuzie & Teddlie, 2003; Soiferman, 2010). The mixed method was Creswell (2014) philosophy of pragmatic worldview. The worldview pragmatically study the phenomenon to have a complete knowledge of the problem (Harrison, 2011; Small, 2011). It is helpful to arrive at unbiased result, bring about innovation and draw proper inference for theory and policy formulation. (Harrison, 2011; Trochim, 2006). Argumentatively, quantitative data depends on qualitative data (Trochim, 2006; Soiferman, 2010). The epistemological differences in both schools of thought should not diffuse the interpretivist to design positivist approach of examining a research problem and vice versa (Johnson & Onwuegbuzie, 2004). On this basis, some positivist researchers have consistently narrowed their thought on the combination of the two methods currently referred to as Mixed-Mode Method (MMM) (Small, 2011). Nevertheless, combining the two approaches is an enormous task (Small, 2011). It requires that the researcher handle the research questions and or objectives more carefully; otherwise, it would result in confusion of rationality and justifiability for using the combined approaches.

3.2.4 Choice of Research Design, Technique and Justification

From the preceding arguments on quantitative and qualitative research design, the synthesis of the approaches increases the understanding of how to select and why a research design would be selected. The quantitative approach suggests the cause-effect

analysis with the use of extensive data, using the deductive research criterion, and generalises the result back to the population to confirm the theory. The qualitative approach suggests the use of small data, focused group, exploration, the inductive criterion to detect the theory. The mixed mode method (MMM) school of thought suggests that no one (positivists and interpretivists) should claim superiority over another as the two approaches would be useful to obtain both cause-effect results as well as make the research work consistent and current (Johnson & Onwuegbuzie, 2004; Small, 2011). In this thesis, the research objectives are tailored to the quantitative approach. The quantitative research design is justified because we have prior knowledge of the population (SSA) characteristics (Bhattacherjee, 2012). Also, sufficient survey data were available. In other words, the current study followed Harrison (2011); Creswell, (2014) and Small (2011) on the selecting positivists approach of quantitative research design.

3.3 Research Flow Chart

The quantitative research design is presented as a flowchart in Figure 3.1 regarding the research procedure undertaken in this thesis.

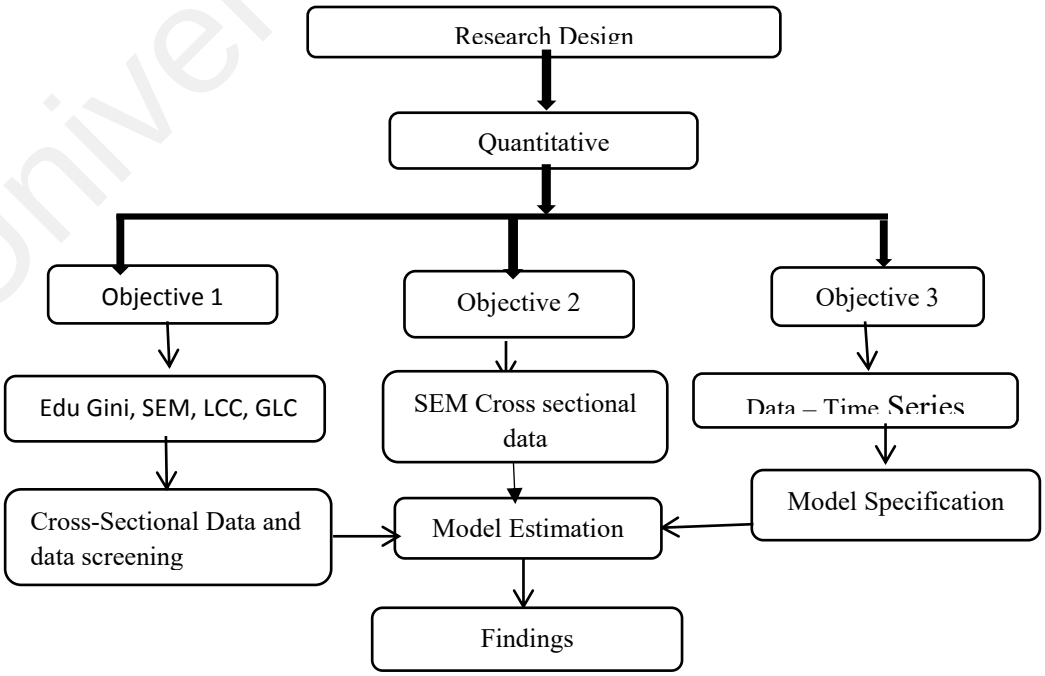

Figure 3.1: Research Flowchart

3.4 General Methodology

In this thesis, the general methodology for the three objectives was explained in this section. This included data, sample selection and sampling method.

3.4.1 Research Data

Obtaining the research data is as crucial and critical as when a man plans to select a lady among beautiful girls in his neighbourhood for marriage. This is because misleading data about the women in the neighbourhood and or trying to have a mistaken view of the lady to be chosen would lead to poor selection of a woman in marriage. A bad wife could be due to the spurious findings got from the lady's characteristics. In this thesis, first, we referred to research data as a bundle of facts gathered from a known event with the objective of statistical analysis that would, after all, assumptions were drawn, parameters are estimated and produce desired results for policy formulation. Second, distinguishing the research data, these facts organised as data could be primary or secondary. The primary data are usually collected by the researcher while the secondary data were data collected, organised and kept for periods of time. Third, from the category of secondary data, some data are time series while others are cross-sectional data. This thesis uses the secondary data that include cross-sectional and time series.

3.4.2 Cross-Sectional and Time Series Data

The cross-sectional data refers to data collected through observation of the phenomenon such as data gathered from an individual, household, business enterprises, countries and regions without consideration for time variant and location (Biorn, 2013). It deals with micro units of the society. Hence, some cross-sectional data can be macro data like the one duly collected across households over a period (Biorn, 2013). The time series data happened to be cumulated data from the successive period, making an annual, monthly,

weekly and daily/seconds. They often reflect in the macro data collated by the World Bank or other institutions handling such data type.

3.4.3 Choice of Data and Justification

Taking together from the previous argument on various research data holds four basic things holds for this research thesis. Firstly, data should be selected carefully from the different data type. Secondly, the nature of the research problem and questions help us to choose among the different data type. Thirdly, from the mode of the research design, cross-sectional data was selected to fit into the estimation technique of research questions 1 and 2 of this thesis. The aspects directly affect the poverty households' behaviour which would help to understand the levels of education inequality in the SSA and its relationship with poverty. Fourthly, this thesis embarked on the study of cross countries analysis, and it was - presumably for the study - to adopt regional data of households for estimating the relationships between the dependent variable and independent variables. Likewise, each country data was used to determine the country effect in relation to the parameters. As regard research question 3, we collected time series data on SSA as a region. Furthermore, time series data were collected based on the individual country (nine countries whose data were available) to estimate the proportion of dropout and determine the status of epidemiology. The time series data was selected because the World Bank organisation has the data annually for the region and it fitted into the expected mode of research question 3. Summarily, we chose quantitative method research design with secondary cross-sectional survey and time series data to achieve the three stated objectives.

3.4.4 Sources of Data, Justification and Coding Methodology

The cross-sectional study data were obtained from Demographic Health Survey (DHS) for 25 Sub-Saharan African countries, a programme of the United States Agency for International Development (USAID). (See Appendix B for the list of SSA countries). The

focus of USAID institution triggered the use of DHS data. The institution targets the elimination of extreme global poverty, promoting equal education and advancing a healthy society. Further, USAID institution ensures that the DHS programme developed standard methodologies, procedures, prepare a full manual, and recorded videos to achieve the reliable and valid of the research instrument (Questionnaire) (Cueto, Pérez, Farfán, Santos, & Fong, 2015). Furthermore, the DHS instrument contained the variables required in our study. For example, besides the instrument, instruction and consent page, the instrument is divided into two major parts: household schedule and household characteristics. From these two categories, they contained health variables, education variables, poverty variables of the study. The instrument used was applied across the countries between the period of 2010 and 2014 (Measure DHS Phase III Project) while 2014 was reviewed, however, the review does not affect our variable description.

The recipient country did the DHS coding of the data; nevertheless, the DHS requirements for coding data were maintained across the countries (Section 5 Footnotes, subsection 9, DHS toolkit 2008-2013). Some of the data collected were in nominal while others are continuous. The coding for the two-data type follows the same pattern. On the one hand, continuous data sometimes treated as categorical data requires no ordered condition. On the contrary, the researchers coded nominal data with numbers; though, it cannot be ranked (Gniazdowski & Grabowski, 2015). The DHS coding system adequately considered this situation.

3.4.5 Population and Sample

The SSA countries form the population of this thesis. The region comprises of 49 countries, wherein, for a start, we considered individual household of the region as a member of the population. However, the DHS data do not cover all the countries neither can the researcher reach the non-completed data countries to obtain the required data. As

such, the study made a sample of the population. Twenty-five (25) countries were chosen based on data availability. The sampled countries cut across West Africa, Central Africa, East Africa and South Africa. The list of the countries, classification of income and IDA of each of the country was presented in Table 3.1 to 3.3. Hence, the Countries classification according to IDA was presented in Table 3.1.

Table 3.1: Classification IDA Borrowing Countries

Classification	Country
IDA countries	Burkina Faso, Cameroon, Comoros, Congo DR, Congo Republic, Cote D'Ivoire, Ethiopia, Ghana, Gambia, and Guinea, Kenya, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Togo, Uganda, Zambia and Zimbabwe.
Non-IDA Countries	Angola, Gabon, Namibia

Note: Country Classification by Borrowers from International Development Association

Source: World Bank

The income countries classification by World Bank was presented in Table 3.2.

Table 3.2: Income countries' Classification (GNI per capita)

Classification	Country
Low Incomes	Burkina Faso, Congo DR, Comoros, Gambia, Guinea Ethiopia, Mozambique, Niger, Senegal, Sierra Leone, Togo and Uganda, Mali, Rwanda and Zimbabwe
Lower Middle Income	Angola, Cameroon, Congo Republic, Cote D'Ivoire, Ghana Kenya, Nigeria and Zambia
Upper middle Income	Gabon and Namibia,
High Income	Nil

Note: World Bank Classification by income. The "low-income economies are defined as those with a GNI per capita, using the World Bank Atlas methodology, of $995 or less in 2017; lower middle-income economies are those with a GNI per capita between $996 and $3,895; upper middle-income economies are those countries with a GNI per capita between $3,896 and $12,055; high-income economies are those with a GNI per capita of $12,056 or more" (World Bank, 2018).

Source: World Bank (2018).

According to OPEC, the countries classification according to oil and non-oil and gas was presented in Table 3.3.

Table 3.3: Oil and Non- Oil producing countries' Classification

Classification	Country
Oil	Angola, Cameroon, Congo Republic, Cote D'Ivoire, Gabon and Nigeria.
Non-Oil Countries	Burkina Faso, Comoros, Congo DR Ethiopia, Ghana, Gambia, Guinea, Kenya, Mali, Mozambique, Namibia, Niger, Rwanda, Senegal, Sierra Leone, Togo, Uganda, Zambia and Zimbabwe.

Note: The oil countries are members of OPEC. However, some countries have small quantity of oil but not a member of the OPEC. Such countries were not considered as oil producing countries.

Source: Classification according to Zhang and York (2009).

3.4.6 Determination of Sample Size from the DHS Survey

The general method of analysing a data begins with getting the required sample size for the study. To select accurate sample for the study, scientific method was used to determine the sample size. Hence, the sample size for each country was determined by using the Krejcie and Morgan (1970). The Krejcie and Morgan (1970) sample determination Table contained two columns, N and s where N represents the total population of the study and s represents the sample required for the study[9] of a given population.

From the DHS data downloaded for the twenty-five (25) SSA countries, the DHS total sample respondents formed the population where the partial collection was taken (Knaub Jr, 2015). The total respondents for the 25 countries are 937,117. The justification for our sample of 9,432 respondents was on two premises. First, the total respondents for each

[9] See Appendixes E and F

country were not equal. There was a need that all the countries selected were of equal representation. Second, there is a benchmark for a required sample to be used in a given population as derived by Krejcie and Morgan (1970) and The Research Advisors (2006) (See Appendices E and F). In consequence, the sample of 9,432 was drawn based on the sample size determination Table in the columns N and s of the said Tables for each country of the SSA (Krejcie & Morgan, 1970; Piaw, 2012).

3.4.7 Justification of the Sample Size Versus Structural Equation Modelling

The rationale for using the 9,432-sample size which was relatively large was based on the following premises. First, the study was cross-country analysis that covered 25 countries of Sub-Sahara Africa. Each country was considered as a cluster with the use of scientific Table of Krejcie and Morgan 1970. Second, the SmartPLS software accommodated large sample. Hence, the methodological argument was that "although PLS is well known for its capability of handling small sample sizes, it does not mean that your goal should be to fulfil the minimum sample size requirement merely. Prior research suggested that a sample size of 100 to 200 is usually a good starting point in carrying out path modelling" (Hoyle, 1995; p.5; Wong, 2013). It was stressed that the sample size increases depending on the goal of the research objectives (Wong, 2013). Again, the recent argument of Lowry and Gaskin (2014) indicated that running a small sample in PLS is good but "it will still affect results negatively" (p.133). Also, "the only way to minimise chance sampling errors is to select a sufficiently large sample" (Mugo, 2002, p.6). The widespread use of small sample size in PLS estimation is due to limited data available to the researchers in psychology and business (Nachtigall, Krochine, Funke, & Steyer, 2003). As such, Yung and Bentler (1994) suggested 2000 as a minimum sample size to get a satisfied result where data are available.

However, large sample data is only useful with the ability to fulfil Type I and Type II errors (Piaw, 2012). A significant data is useful because it reduces type I error. On the contrary, using an extensive data causes type II error to increase, that is, a unit increase in the sample size would create an opportunity for an error to occur further. To avert type II error, we used the standard format of Krejcie and Morgan (Piaw, 2012). Hence, the study sample was determined by Krejcie and Morgan (1970) sample determination Table.

Furthermore, the justification for using the total 9,432 was found in (Brewer,1963; Knaub jr, 2013) In a research project, data are obtained from either primary or secondary data. In recent times, research is made easy such that different organisations collect primary data (survey). The data gathered are not time series but cross-sectional which were obtained from many respondents at various times and with the same instrument. The data were collected for the immediate use of the institution and kept for further use by researchers. This type of survey data is to make research easy for the researchers. For example, a large sample was taken from the household using electricity which is often a large sample data in the United States Energy Information Administration (EIA) (Knaub jr, 2013). Because the data from all households would be too large for a study, a measure of a size would be required from the survey secondary data which was already a sample from a given population. Hence, the sampling method was called 'cutoff', 'quasi-cutoff' and 'partial collection' (Brewer,1963; Knaub Jr 2013, p.1). To achieve partial collection, the sample size would be explained by the exclusion[10] [11] conditions, in which not all respondents would meet (Chadyuk, 2015). In case the original sample was in strata or cluster, then the sample of each stratum or cluster should be carefully considered during

[10] Exclusion Criteria refers to responses of subjects that require their removal as subjects as members of the sample Roberg (2010)

[11] An Inclusion Criteria refers to characteristics of subjects that are essential for being selected as members of the sample.

the partial collection exercise (Knaub Jr, 2015; Chadyuk, 2015). Hence, Knaub Jr (2015) argued that such sample should follow randomisation such that all members of the partial collection or quasi-cutoff are adequately represented in the latest sample. As such, Hassan (2015) suggested the use of Krejcie and Morgan (1970)[12] as a scientific method of taking the partial collection for the sample size required.

3.4.8 Sampling Techniques

The philosophy of sampling emerged from the researcher constraints of using the whole population. In this thesis, the inability of the author to reach the entire population together the associated costs resulted to scientifically used sample out of sample (SOS) (Knaub Jr, 2015). The sample was selected based on the research objectives and the type of estimation required in the study, which draws scientific attention (Latham, 2008). The scientific techniques for sampling are probabilistic and non-probabilistic sampling. The probabilistic sampling needs be adopted when the researcher aimed at having a level of confidence in the sample representation, the level at which the outcome could be generalised back to the population (Henry, 1990; Latham, 2008). Besides, the probabilistic sampling gives a chance to establish probable errors and biases. The non-probability sampling, on the other hand, is useful when the researcher wishes to achieve certain objective and knowledge of the population characteristics. (Babbie, 1990; Henry, 1990; Latham, 2008). It is also known as non-random sampling (Latham, 2008). The non-probabilistic sampling method of selection includes purposeful/judgmental, quota, convenience and snowball (focus group) (Piaw, 2012). While considering all these methods, we chose to use both probabilistic and non-probabilistic sampling methods. The rationality behind chosen the two methods was based on two premises. Firstly, data were

[12] The Research Advisors for Required Sample Size was recommended by Hassan 2015. Both the Krejcie and Morgan 1970 and the Research Advisors sample determination tables are the same. For social sciences, we use 95% confidence to establish the sample size (See Noordzij, Dekker, Zoccali, & Jager, 2011). Alternatively, the online software is recommended.

incomplete in many countries of the Sub-Sahara Africa. As such, we used purposeful sampling technique (non-probabilistic) to choose the countries that their data were completed to represent the SSA population. Secondly, for each country, the population of the respondents is larger than the sample size table of Krejcie and Morgan (1970). So, we considered each country as a cluster[13], although determined by the non-probabilistic method of sample selection. After that, we proceeded to apply the probabilistic sampling technique to select the required sample for each cluster/country. The sample was drawn from each country's population sample.

Finally, after sample size was determined for each country using sample size Table of Krejcie and Morgan (1970), simple random sampling method was adopted to select the sample from the pool of DHS data. To achieve effective randomisation, we used Statistical Package for Social Scientist (SPSS, version 22) to generate a sample for each country. Each country data was collated to form sample cross-sectional data for the twenty-five (25) SSA.

3.5 Variable Description

The variables of the study were carefully selected based on the theories, empirical findings, and data availability. In this section, the thesis was committed to present the rationale for their inclusion in the study. Firstly, the variables of the study are categorised into two: dependent variable (DV) and independent variables (IVs). For objective 2, both the DV and IVs are latent variables. They DV and IV were latent because they were variables that depended on other variables, called manifest variables. As such, we could

[13] Cluster represents a group that has similar characteristics but different from another group. Hence, each country of SSA maintains homogeneity that differs from each other country.

not use the conventional methodology of regression to carry out the estimation of the relationships.

3.5.1 Education Inequality

Various techniques had been used to measure education inequality. Among others, Gini coefficient, standard deviation, and education inequality Gini (Maas & Criel, 1982; Thomas et al., 2001; Yang et al., 2014) methodology were used. In this thesis, the education inequality is the response variable denoted by EDINQ and a latent variable for objective two. It represents the dependent variable in which we determined the variation of the relationship. The education inequality variable is a hierarchical variable as it depends on other explanatory variables (Alinovi, Mane, & Romano, 2008). The EDINQ is captured by educational attainment, literacy, school performance, dropout, enrolment and years of schooling to explain education inequality (Burrus & Roberts, 2012; Maas & Criel, 1982; Thomas et al., 2001). Due to data availability, we used educational attainment, literacy and years of schooling as the manifest variables to capture cumulatively inequality that occurs in education distribution as reflected in Thomas et al. (2001). As such, we followed the above authors in the chosen of the variables. The educational attainment was considered as relative due to the importance of the value of education for a household to move out of poverty (Fujihara & Ishida, 2016).

3.5.2 Poverty

Poverty wss another major aspect of the study which stood as the independent and latent variable. The study examined the relationship between education inequality and poverty. The variable, poverty, was a hierarchical variable denoted by PVLT. From the human development theory, we employed standard of living, health and education as the manifest variables to explain poverty (Sen, 1999b; Todaro & Smith, 2012; UNDP-HDR, 2015b). The standard of living was explained by either consumption or income (O'Donnell, Van

Doorslaer, Wagstaff, & Lindelow, 2008; Deaton and Grosh, 2000). Hence, consumption was preferable on two grounds. Firstly, conceptually, the essence of household saving is to finance consumption. Likewise, evidence showed that people eager to give information about their consumption than income. Secondly, in practical terms, income survey often excludes household production (O'Donnell et al., 2008). In so doing, consumption was chosen to measure living standard.

Conventionally, the standard of living was explained by electricity, household food consumption, television, radio, refrigerator, bicycle, motorcycle, car and other salient variables representing the household consumption or expenditure. (UNDP-HDR, 2015b). So, we used electricity, television, radio, refrigerator, bicycle, motorcycle and car to explain the standard of living. According to human development model, the health manifest variable was explained by child mortality while years of schooling explained education. Hence, the study assumed that poverty did not affect the rising of education inequality in the SSA.

3.5.3 Vulnerability

School-age children usually faced some schooling risks. The thesis assumed that the probability to abandon schooling was measured by vulnerability in this thesis. The vulnerability, denoted by VULT, has its manifest variables got from socioeconomic and health risks such as poisoning from water (Asadullah & Chaudhury, 2011). The age of first given birth, wealth index, exposure to mosquito, dependency, and living children with pregnancy as manifest indicators. The justification for the variables included the falling out of classroom activities by children might be from the early pregnancy of a school-age girl. It might equally be that a school-age boy became a father at the tender age between 15 and 25 due to lustful and uncontrol sexual practices. The wealth index was chosen because each household wealth status could be a risk or opportunity for the

child to complete or dropout from schooling. In other words, the more a child lives with poverty, the higher the likelihood that the child would dropout from schooling. Health wise, the extent a household is exposed to mosquito representing a health risk could lead to persistent illness. Finally, the number of dependence on the household-head low-income was a schooling risk. Thus, nderstanding this aspect would help in policy formulation on schooling ropout (Fernandez, 2015).

3.5.4 Household Spatial Distribution

In chapter 2, the author discussed the spatial distribution effect on the relationship of poverty and education inequality. Hence, the study used spatial distribution variable to examine its effect on education inequality. Ecological threat or opportunity sometimes make a household to be poor or be in prosperity. Though the SSA countries are abundantly sufficient in natural resources, yet the region was educationally deprived and impoverished. Evidence showed that the poor live in the rural areas (Leary, 2016). Hence, for regional analysis, we chose the household location as one of the independent variables denoted by HLCN. Further, spatial distribution was a latent variable in the thesis which is explained urban and rural. Hence, urban and rural were the manifest variables. However, the DHS data coded the spatial distribution into one single variable named in this thesis as spatial distribution (SPD).

3.5.5 Household Composition

The risk of falling into education inequality was for a child to be at risk of falling out of school. In that sense, household composition, which Hunt (2008, p. 17) referred to as "household contexts" provided a pathway to be educationally deprived. It was evident that the nature of household or household characteristics usually describeed the condition of the poor people for being poor and educationally deprived. Hence, we introduced the variable as control variable. The household compositions, denoted by HHCP, where its

manifest variables were family size, the age of household head, sex of household and relationship with the household (Hunt, 2008).

In summary, both the dependent and independent variables' data for objectives 1 and 2 were downloaded from DHS database. The variables had the characteristics of latent and manifest which were represented by variable name and acronyms (See Appendix A for the list of variables' names and their acronyms).

3.6 Education Inequality: Model Specification

The objective 1 of the thesis[14] examined the level of education inequality in the SSA countries. As such, we followed Thomas et al. (2001) and Agrawal (2014) that used educational attainment as measurement variable and their methods. Specifically, the education inequality Gini model followed Agrawal (2014) as specified in the model 3.4.

$$EIG = \frac{1}{2\mu}\sum_{i=1}^{n}\sum_{j=1}^{n} p_i \left| y_i - y_j \right| p_j \qquad 3.4$$

Where EIG represents education Gini, and μ is defined in equation 3.5 as:

$$\mu = \sum_{i=1}^{n} p_i y_i = MYS \qquad 3.5$$

The subscript y_i and y_j denotes years of schooling for educational levels attained by individuals, In the DHS data, the education attainment has six levels as against the Barro and Lee (2010) with seven levels. Hence, we assumed that all admitted into tertiary education completed their educational programme The EIG measures the ratio to the mean years of schooling (MYS) of half of the deviations from average schooling between

[14] See Research Objectives 2.8

all possible pairs of household (Thomas et al., 2001; Agrawal, 2014). Hence, the levels of education attained is described as 0 = No education; 1 = incomplete primary (1/2(6) Years); 2 = complete primary (6); 3 incomplete secondary (6(1/2(6); 4 = complete secondary (12) and 5 = tertiary education (16). The p_i and p_j are the proportions of the population. EIG assumes values between 0 and 1. Measuring inequality with education Gini implied that the value, 0 means perfect education equality and the value,1 means perfect education inequality. In between 0 and 1, the values explained the extent of how the household was educationally excluded in education distribution.

3.6.1 Wealth Concentration Methodology

In this subsection, we presented the methodology of wealth concentration across educational levels. The author used the household wealth index collected from DHS to understand where wealth is concentrated in education distribution. . Firstly, to determine the concentration of wealth across educational levels, the study followed Jann (2016) method and used Lorenz concentration curve (LCC) to illustrate how wealth was distributed across the households. Concentration index is a methodology that provides a curve that shows whether ranked economic indicator (e.g. wealth) produces inequality if measured with educational attainment (O'Donnell et al., 2008).

In Jann (2016) method, the infinite concentration is determined with equation 3.6.

$$L_{XY}(p) = \frac{\int \frac{Q_Y^p}{-\infty} \int_{-\infty}^{\infty} xfXY(x,y)dxdy}{\int_{-\infty}^{\infty} xdF_X(x)} \qquad 3.6$$

Where X represents educational attainment; Y is the household wealth index. The wealth index has five levels - poorest = 1; poorer =2; average = 3; rich = 4 and richest = 5. Since

our population sample is finite, then the Lorenz concentration curve (LCC) is simplified in equation 3.7 as:

$$L_{XY}^{j}(p) = \frac{\sum_{i=1}^{N} X_i I\{Y_i \leq Q_Y^{p,j}\} J_i}{\sum_{i=1}^{N} X_i J_i} \qquad 3.7$$

Therefore, the result is interpreted as follows. First, if the estimated LCC lies above the egalitarian line (45^0), the household wealth is concentrated on those group with ***No*** and ***Low*** levels of education. Second, if the estimated LCC lies on the equality line (45^0), it implies that there is zero concentration, which would be neither of the low nor higher levels in education distribution. In other words, there is equal share of the wealth between the low and high educational attainment in the distribution. Finally, if the LCC lies below the equality or egalitarian line (45^0), then wealth is concentrated in the group with the higher levels of education. (Jann, 2016; O'Donnell et al., 2008).

3.6.2 Gender Decomposition

To further understand the distribution across the gender, we examined gender as a subgroup population, Hence, the author followed Jann (2016) methodology. Generalised Lorenz Curve (GLC) was employed using the infinite population (N) to develop the finite. This method - GLC - illustrates inequality across sexes.

For the infinite population, the equation 3.8 explains the overall inequality across the sexes.

$$GLC_x(\rho) = \frac{1}{N} \sum X_i I\{X_i \leq Q_x^{\rho}\} \qquad 3.8$$

Since our population is finite, the subgroup population is gender where male = 1 and female = 2. The finite formula is presented in equation 3.9 as:

$$GLC_x^j(\rho) = \frac{1}{\sum_{i=1}^{N} J_i} \sum_{i=1}^{N} X_i I\{X_i \leq Q_x^{\rho^j}\} J_i \quad 3.9$$

Where $Q_x^{\rho^j}$ represents the quintile of education attainment (X) in the gender distribution j.Also, $\sum_{i=1}^{N} J_i$ accounts for the size of the subpopulation (i.e. male and female) in the distribution. The l and J are the proportion of the population examined (Jann, 2016). The GLC subpopulation result proposes whether the male is better-off in the education distribution or the female sex.

In summary the objective 1 was achieved through the use of education inequality Gini with an extension to decomposition by wealth and gender. The results of the objective 1 are presented in chapter four.

3.6.3 Methodology on Education Inequality and Poverty (Objective 2)

The objective 2 of the thesis was to examine the relationship between education inequality and poverty in the 25 sampled Sub-Saharan African countries. The education inequality was the dependent variable while poverty represents the independent variable. The null hypothesis is

i. Poverty does not influence the variation of education inequality.

In estimating the parameters of the hypothesis, a partial least square structural equation modelling (PLS-SEM) was employed.

3.7 Justification for Partial Least-Structural Equation Modelling

The rationale for selecting partial least square in structural equation modelling (PLS-SEM) methodology is justified as follows.

i. Measurement. The variables of the study are hierarchical variables that depend on other variables. It is also known as latent.

ii. Variate. The study has variate feature, that is, variate is a linear relationship between several variables (Hair et al., 2014).

iii. Measurement scale. The data collected from DHS program are coded nominal and continuous.

iv. Nature of the study. The study focuses on prediction rather than confirmatory.

3.7.1 The Study Assumptions

The following assumption are concluded from the theories, empirical literature and the study environment, the SSA countries.

Poverty, which was explained by health, education and standard of living, has significant influence in the variation of education inequality, explained by educational attainment, literacy and years of schooling, across households.

3.7.2 Estimation Techniques

As earlier pointed out, there are many methods to establish relationships. Method to be adopted depends on the nature of the variable and data of the study. In SEM methodology, two approaches are commonly used. They are confirmatory factor analysis (CFA) and partial least square (PLS). The CFA method aims at confirming theory where model fit is ensured with covariates of the constructs (Hair et al., 2014). The primary assumption of the CFA is that there should be a normal distribution of the data. The normal distribution uses parametric method in SEM analysis. In that regard, in confirmatory analysis, AmosSPSS, R, STATA, LISTREL are software useful for the estimation of the complex system (Kelloway, 1998).

On the other hand, the PLS-SEM method deals with prediction. In predicting an economic phenomenon, the study must be non-parametric (Hair et al., 2014; Wong, 2013). Besides, the PLS-SEM has the advantage to manage large, hierarchical and complex system than the confirmatory method. This is achievable with repeated usage of manifest variables (Akter et al., 2011a; Guinot, Latreille, & Tanenhaus, 2001; Noonan & Wold, 1982; Tenenhaus, Vinzi, Chatelin, & Lauro, 2005). There is dedicated software that was used to estimate the parameters of a complex relationships. The popular among them are SmartPLS, WARP-PLS and Advance Analysis of Composites (ADANCO). They are famous because of their easy usage and accessibility. For example, WarpPLS version is easy to use because it takes care of missing values and standardise the data before estimation, provides results on discriminant validity without manual computation, produces results on multicollinearity and probability values instead of Statistical significance of 1.96 level of significance (Kock, 2014). However, SmartPLS is useful when handling large data which provides assurance of non-spurious results that are obtained from the conceptualised complex system. It handles complex system with multiple relationships while WarpPLS takes care of nonlinear relationship (Kock, 2010). Recently, STATA team introduced SEM analysis into STATA software. Since our study was based on prediction, the author used SmartPLS (version 2.0) and WarpPLS (version 6.0) to determine the relationships. However, as at the time of the thesis data estimation, SmartPLS software version 3.0 was just released. The cost of acquiring the software and the time of learning the new software were the economic and technical constraints for using the latest version of SmartPLS.

3.7.3 Estimation Procedure

In handling the cumulative data of the twenty-five SSA countries, the author used SmartPLS. With SmartPLS, there are underlying assumptions that must be met before

data estimation. The assumptions were stated in the work of Hair et al. (2014). They included:

i. The study should target prediction.
ii. The structural model is a complex system.
iii. The data are not normally distributed suggesting non-parametric analysis.
iv. If the relationship of the construct is formative, then the formative constructs are a member of the structural equation.
v. There should be the absence of outliers.
vi. There should be no missing data. In case there is, the acceptable tolerance should be less than or equal to 5%

In case of the individual countries, we used WarpPLS (version 6) to account for the individual country's estimations due to smaller data. The WarpPLS has the same assumptions but built-in to the software.

3.7.4 Data Screening

Going by these assumptions PLS, the estimation procedure began with data screening of data obtained from Demographic Health Survey (DHS) program.

Though the data collected from DHS program is a standard and processed data, the data were regarded as raw data which further underwent statistical data screening. Initially, the DHS survey data were collected for 29 SSA countries. We checked through for variables data in all the countries. The author found out that the variables of the study were not covered by four countries which reduced the countries to twenty-five (25). The four countries were removed on the premise that any variable whose missing observation exceeds 15% should be removed from the dataset (Hair et al., 2014) (See the list of countries in Appendix B).

3.7.5 Data Coding and Outliers

The DHS personnel had coded the data to be nominal and continuous. However, the study observed from the data that some coding and the definition of the coding were not consistent with SmartPLS assumptions. As earlier discussed, the PLS-SEM of SmartPLS assumes that there should be an absence of outliers. The outliers in a data set represent extreme values in the distribution. The avoidance of the outlier, in statistical data analysis, could make a study difficult to achieve the stated objectives because of extreme values below 25 percentile and values above 75 percentiles (Gupta, Gao, & Aggarwal, 2014). The existence of outlier was determined with the use of SPSS software.

With the use of SPSS software, the result showed that variables like electricity, the age of household, relationship with household, car, radio, refrigerator, motorcycle, television and bicycle had the presence of outliers. The cause of the variables' outliers, as observed, emerged from the coding system. From the DHS program, there was a permission to recode where possible to fit the expected data. In consequence, the affected variables with outliers were re-coded. For example, variable with 97, 98 99 coded as *'don't know'* (DK) were considered as missing. This helps to remove the effect of outliers in the data analysis. As for the WarpPLS, the software is programmed to solve the problem of outliers.

3.7.6 Missing Data Problem and Justification for Cleaning

As mentioned in the assumptions of the PLS-SEM, the SmartPLS software does not accept the variables with missing data. Missing data are lost responses which is strong enough to distort the outcome of the estimation (Cox, McIntosh, Reason, & Terenzini, 2014; Gelman, n.d.). Missing data, with a sizeable observed sample - like DHS data -it is unavoidable. For example, in the DHS survey data with the use of a questionnaire, the respondents might omit one or more items unanswered. If phone interview method was adopted, the respondent might hang off the phone. During the data entry, the researcher

or research assistant might omit, unintentionally, some cell cases of the responses. The fact remains that there will be an element of bias when missing data occurs in a dataset (Cox et al., 2014). The extent and direction of the bias make the missing data detection difficult to overlook. As such, the magnitude could be in a data set that is completely missing at random (CMAR), missing at random (MAR) or missing not at random (MNAR) (Gelman & Hill, 2006). In consequence, the thesis does not overlook the complexity and bias of missing data that occurred in the complete dataset obtained from the DHS program.

3.7.7 Missing Data Process

There were different schools of thought of handling missing data (Acuna & Rodriguez, 2004, Cox et al., 2014; Gelman, n.d.). The methods range from multiple imputations, to mean replacement, median replacement, listwise deletion, pairwise deletion and expectation maximisation (EM) (Cox et al., 2014; Gelman, n.d.). Conventionally, the percentage of missing data in a dataset should not exceed 5% (Hair et al., 2014). Also, when it exceeds 15%, such construct should be removed from the dataset or the researcher should look for the concerned respondents to complete the data (Hair et al., 2014; Piaw, 2016b). Whereas, there was an argument that a dataset with 20% missing values is acceptable. (Acuna & Rodriguez, 2004). However, instead of agreeing with the two schools of thought, the author preferred to ensure that missing values were replaced because SmartPLS algorthm does not accept any iota of missing value.

Firstly, the missing data processing started with the determination of the degree of missing data in our dataset, using the regression imputation method of SPSS software, version 22. Figure 3.2 displayed the outcome of SPSS analysis. The result showed 1.04% missing values which was less than 5%.

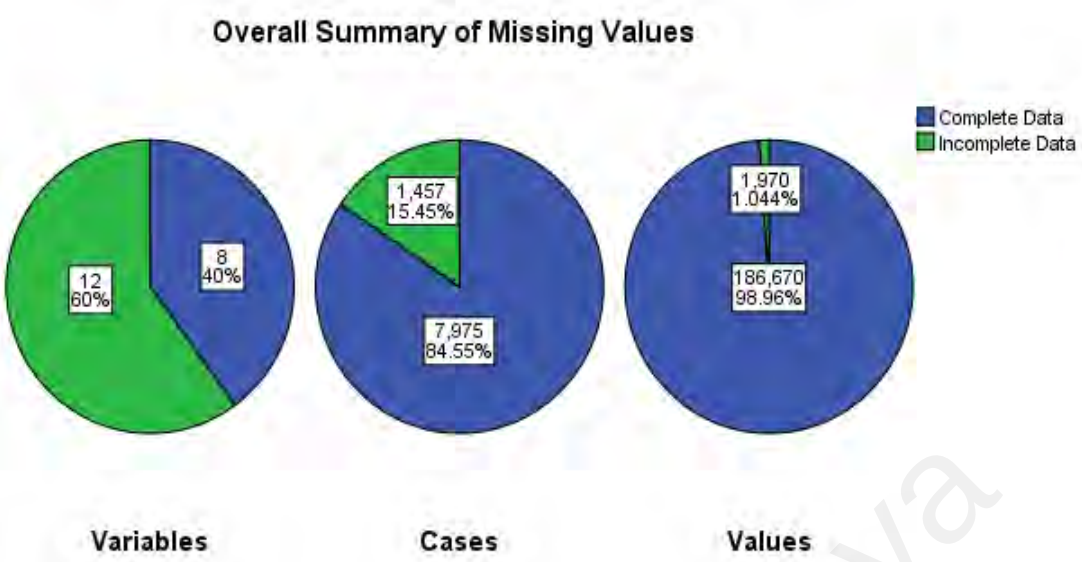

Figure 3.2: Estimated Missing Data
Source: Author's computation

Secondly, though the missing data value was less than 5% tolerance level and due to the nature of SmartPLS software, the missing values 1.044% were replaced with expectation maximisation (EM) method with the aid of SPSS. From there, a new dataset was generated for the variables that were missing from the study dataset. For the WarpPLS, the algorithm checked for the existence of missing data and replaced them.

3.7.8 Normal Distribution

From the SmartPLS-SEM assumptions (as applicable to WarpPLS), item (iii) states that the data should not be normally distributed. If data is not normally distributed, the acceptable methodology is the application of partial least square, in which the focus shifted from randomised condition to non-randomized analysis. In a randomised research design, the appropriate statistical analysis would be parametric while non-randomized research design would be non-parametric. To determine the type of statistical analysis, test of normality was conducted. Kolmogorov normality test was used because the sample size was sufficiently large, well above 2000 benchmark. The tested null against the alternative hypothesis was as stated below. The tests were conducted at $p < 0.05$ level of significance.

H_0: The observed distribution fits the normal distribution

H_1: The observed distribution does not fit the normal distribution

Decision: Reject H_0 if the if p-value < 0 .05 otherwise accept H_0.

3.7.9 The SEM Path Diagram

Taken together, the preceding discussion on research design, methodological arguments and estimation procedure, the study presented the SEM path diagram to determine the relationships between education inequality and poverty in the SSA countries. This aspect used the cumulative data of the SSA countries. The structural model was presented in Figure 3.3 and the results of the cumulative and the country effect of poverty on education inequality were presented in chapter 5.

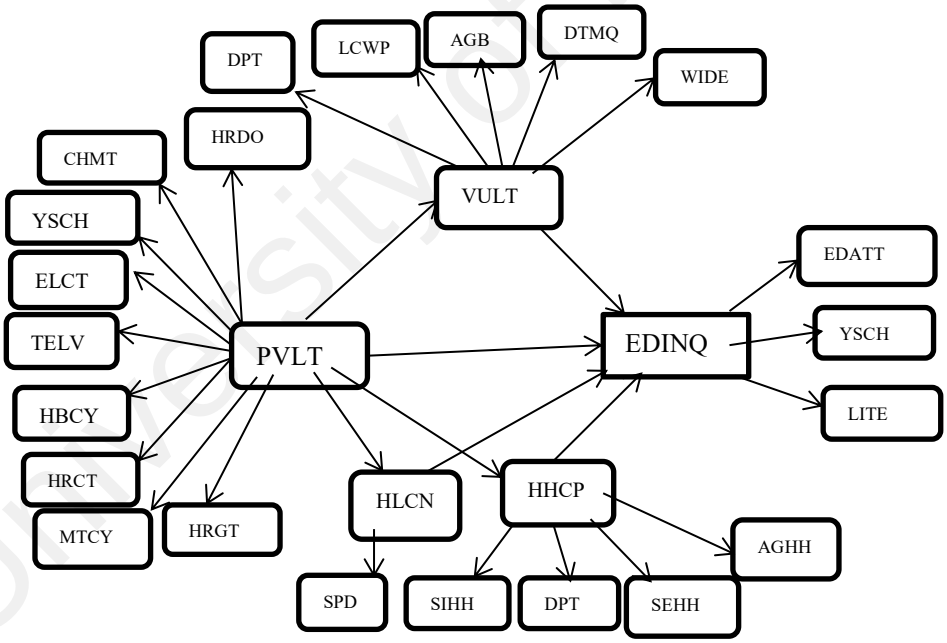

Figure 3.3: Objective 2 Structural Model Source: Author's SEM Framework[15]

Source: Author

[15] See the Variable definition under Appendix A. Note: the YSCH explain both EDINQ and PVLT while DPT explain both VULT and HHCP. Literature evidence shows it is permissible ((Akter et al., 2011a; Guinot, Latreille, & Tanenhaus, 2001; Noonan & Wold, 1982; Tenenhaus, Vinzi, Chatelin, & Lauro, 2005).

3.8 Methodology on Dropout Rate and Stability

The third objective of this thesis was to examine the extent of primary school-age children dropping out of school. The study aimed to determine the rate and the status of dropout in the SSA countries. The objective 3 was achieved by applying a mathematical approach with econometric conditions to identify the equilibrium point condition (EPC) which explained the spread of the dropout problem - in other words, the extent of its epidemiology. Time series data on children out of school at primary level were employed.

For the regional analysis, the data collected from World Bank database covered 1975 – 2013, given a trend of 39 years which were collected from World Bank (2016) for the 25 SSA region. Unlike other time series analysis, the data did not require rigorous screening because the application of the model fit method of the regression curve was sufficient for all the econometric requirements. Also, using a mathematical model which deals with exact relationship made it not necessary to carry out rigorous econometric procedures (Koutsoyiannis, 1973). The data were obtained from the World Bank Database.

Regarding each country data, there were variations in the sample size for each of the countries. Also, because of the insufficient data, the thesis analysed only nine (9) out of the twenty-five sampled countries. The countries whose data were sufficiently available included Burkina Faso, Ethiopia, Guinea, Gambia, Mozambique, Niger, Senegal, Togo and Zambia.

3.8.1 Methodological Framework of Polynomial Regression

Polynomial regression equation (PRE) model was used to estimate the parameters. The rationale for selecting PRE-model holds two reasons. Firstly, the nature of the data we obtained from the World Bank was non-linear which required regularising or standardising (Srivastava, Hinton, Krizhevsky, Sutskever, & Salakhutdinov, 2014). Secondly, the residual plot versus the predictor equally suggested a nonlinear

relationship. To estimate the parameters where time was the predictor and dropout was the response variables, polynomial regression model was applied. To develop the model, the author specified an econometrics equation, as presented in equation 3.18:

$$DRT = \alpha_0 + \beta T_{it} + \phi_{kt} T^2{}_{kt} + \xi_i \qquad 3.18$$

Where the DRT is the dropout of school children and the dependent variable of the regression equation. The T_{it} is the time variant of the series. The α_0 is the constant of the regression equation. The β represents the linear parameter of the function of the time, and the ϕ_{kt} indicate the lower degree (k) where k = 2 known as quadratic. The ξ_i is the stochastic term. The first part of the vector is the linear relationship while the second part is the quadratic system. The equation is linear because the parameters are linear (PennState, 2016).

Since the equation is a linear relationship with quadratic expression, we begin to proof as follows.

From equation 3.18, let DRT = 0

$$0 = \alpha_0 + \beta T_{it} + \phi_{kt} T^2{}_{kt} + \xi_i \qquad 3.19$$

The equation 3.19 is an un-estimated econometric linear relationship between dependent variable and the time independent variables. The estimated of the equation 3.19 becomes

$$\alpha_0 + \beta T_t + \phi_{kt} T^2{}_{kt} = 0 \qquad 3.20$$

Re-write equation 3.20 as

$$\phi_{kt} T^2{}_{kt} + \beta T_t + \alpha_0 = 0 \qquad 3.21$$

Divide equation 3.21 by ϕ_{kt} to produce equation 3.22

$$T^2_{it} + \frac{\beta}{\phi_{kt}} T_t + \frac{\alpha_0}{\phi_{kt}} = 0 \qquad 3.22$$

Substitute for $T = drt + d$. For easy computation let drt = y. So, $T = y + d$

$$(y+d)^2 + \frac{\beta}{\phi_{it}}(y+d) + \frac{\alpha_0}{\phi_{it}} = 0 \qquad 3.23$$

$$y^2 + 2dy + d^2 \frac{\beta}{\phi_{it}} y + \frac{\alpha_0}{\phi_{it}} = 0 \qquad 3.24$$

$$\mathrm{y}^2 + (2d + \frac{\beta}{\phi_{it}})y + \frac{\alpha_0}{\phi_{it}} = 0 \qquad 3.25$$

Now let $d = -\frac{\beta}{2\phi_{it}}$, then equation 3.25 becomes

$$y^2 - \frac{\beta^2}{4\phi^2} + \frac{\alpha_0}{\phi_{it}} = 0 \qquad 3.26$$

$$y^2 = \frac{\beta^2 - 4\phi\alpha_0}{4\phi^2} \qquad 3.27$$

From equation 3.27, the nature of the roots concerning the quadratic equation was identified as:

$$D_0 = \beta^2 - 4\phi\alpha_0 \qquad 3.28$$

The equation 3.28 is the discriminant expression of the quadratic system where D_0 is the discriminant of the quadratic function which is helpful to determine equilibrium of the dropout spread in the nine (9) sampled SSA countries.

Now, let us re-write the equation 3.9 as

$$y = \pm\sqrt{D}/2\phi \quad \text{or } y = \pm\frac{\sqrt{\beta^2 - 4\phi\alpha_0}}{2\phi} \tag{3.29}$$

Hence, the equation provides the two case sequences which explained the nonlinearity of the data as presented in equation 3.30

$$\mathrm{T} = d + y = \frac{-\beta}{2\phi} \pm \frac{\sqrt{\beta^2 - 4\phi\alpha_0}}{2\phi} \tag{3.30}$$

The nonlinearity of the data produces positive and negative relationships as explained in equation 3.31.

$$\mathrm{T} = d + y = \frac{-\beta \pm \sqrt{\beta^2 - 4\phi\alpha_0}}{2\phi} \tag{3.31}$$

Equation 3.29 showed the estimated quadratic parameters after the model was fitted to the data. To fully capture our objective, the parameters $\phi, \beta \; and \; \alpha$ represented lower degree and slope of the quadrant T^2, the slope of the linear T_{it} and constant of the PRE respectively. The outcome of equation 3.31 demonstrated two case sequences. The first case sequence was a positive value defining the speed at which dropout crisis in SSA was increasing. The second case sequence explained the degree to which the crisis was reducing.

3.8.2 The Equilibrium Point Condition

The equilibrium points condition (EPC) is a technique to analyse the status of an economic variable of the extent of the spread, dominance or epidemic. Hence, EPC presented the conditions that existed in the dropping out of school children at primary level education given the quadratic system equation. From the equation 3.28, the nature of the roots concerning the quadratic equation, restated as:

$$D_0 = \beta^2 - 4\phi\alpha_0 \qquad 3.28$$

The letter D_0 in equation 3.28 is known as *a discriminant* expression of the quadratic system. It defines the characteristics of the roots of a quadratic equation if the parameters are rational numbers. It helps to establish real solutions in a practical sense (PennState, 2016). Hence, the behaviour of D_0 enables us to take a stand on the spread of dropout of PRE-result. First, if $D_0 > 0$, the dropout syndrome is an epidemic, unstable or nonstationary. Secondly, if $D_0 < 0$, we consider the dropout syndrome as endemic, stationary or stable. Finally, if $D_0 = 0$, then there is a shift either from epidemic or endemic, but we do not deny that the syndrome exists in the study area. Finally, the study parameters defined the rate at which dropout existed at primary school level which explained the extent of the country human stock.

3.8.3 Polynomial Regression Assumptions

The following assumptions hold for Polynomial regression (PennState, 2016).

1. The sample size must be large to have a reliable model fit
2. Careful extrapolation is required especially when the polynomial function is curved pronounced. Careless extrapolation would distort the accuracy of the result.
3. Take into consideration the largeness of the predictor (s) variable when an attempt to increase the degree, i.e. from k = 2 to k = 3 (Cubic function). If not considered, the effect will be on statistical software intended to use which might give spurious results.
4. Determine "practical significance and statistical significance". Do not be head bent of the poor probability values before taken a step to incorporate higher

degree. Instead, the study may keenly use the probability value when the residual plots are good.

5. Adhere to the principle of hierarchy. It states that "if your model includes Xh and Xh is shown to be a statistically significant predictor of Y, then your model should also include each Xj for all j < h" (PennState, 2016, p.2).

3.8.4 Estimation Technique of Polynomial Regression Equation

As earlier discussed, the author used polynomial regression equation, that led to derivation of the quadratic function. To estimate the quadratic equation, regression curve estimation (RCE) technique was employed. In the process, model fit was conducted following equation 3.31. The output of the estimation was presented in the analytical chapter 6 of this thesis. In our estimation, we computed for the (1) SSA countries as a region and (2) we computed for the countries whose dropout data were available for the analysis. From all the twenty-five countries of this thesis, the study estimated the polynomial regression equation (PRE) for Burkina Faso, Ethiopia, Guinea, Gambia, Mozambique, Niger, Senegal, Togo and Zambia because their data were sufficiently available for the analysis. These countries helped in the countries comparative analysis.

3.8.5 Summary of the Thesis Methodology

This chapter was the strength of this thesis because it explained the methodological framework required to achieve the three specific objectives of the thesis. It also justified every method of analysis chosen. It explored what it takes to select rationally among the three available research designs. As such, quantitative research design was chosen which focused on prediction and theory confirmation. For objective 1 and 2, the scope covered twenty-five countries of SSA due to the availability of data. Where missing data existed, they were replaced and deleted variables that had over 15% data. In that respect, from the different type of techniques, with an argument for and against, secondary survey data obtained from DHS for 25 countries in line with research objectives 1 and 2 were used.

In addition, the study sample data were randomly selected from the pool of respondents of each country's data as they were obtained from USAID-DHS. The thesis used time series data for research question 3 as obtained from the World Bank Database (WoldBank, 2016) on the out-of-school children at the primary education level to predict the rate and stability of dropout from school. The summary is presented in Table 3.4.

Table 3.4: Summary of Research Question, Data Sources and Analysis

S/N	Research Questions	Data Sources	Data Analysis
1	What is the level of education inequality across Sub-Sahara Africa countries?	USAID – Demographic Health Survey database	Education Inequality Gini (EIG), Lorenz Concentration Curve (LCC) and Generalised Lorenz Curve (GLC) with STATA Version 13.0
2	What is the relationship between education inequality and poverty in the Sub-Sahara Africa countries?	USAID – Demographic Health Survey Database	Structural Equation with SmartPLS version 2.0 and WaepPLS Version 6.0
3	What is the status of dropout of the primary-school children in the education distribution of the Sub-Saharan African countries?	World Bank Database	Polynomial Regression Equation using SPSS version 22

Note: The Research Questions are as stated in Chapter 1.

Source: Author

CHAPTER 4: THE SUB-SAHARAN AFRICAN EDUCATION INEQUALITY

4.1 Introduction

Sub-Saharan African countries have development challenges ranging from poverty, health and standard of living. Due to its perpetual development, the region was labelled fragile (Worldbank-IDA, 2016). Previous empirical studies presented education, in other words, human capital, as a driver of growth (Becker, 1964; Bonal, 2007; Bowman, 2007; Kueger & Lindhal, 2001) while growth remains the indicator to reduce poverty (Aigbokhan, 2008; Dollar, et al., 2013; Fatah et al 2012). In consequence, objective 1 of this thesis focused on the examination of how education that contributed to growth were distributed across the SSA households.

The findings in this chapter would help to visualize and compare countries educational performance, vis-à-vis their educational inequalities. Although. This chapter 4 is the first analytical chapter of this thesis, thus, the chapter presented the findings of the findings of the education inequality (EIG) across twenty-five (25) sampled countries, the wealth concentration across educational levels as well as gender decomposition. Finally, the chapter discussed the findings according to three different categories including oil and non-oil producers, income classification and International Development Associations (IDA). Thus, the chapter was divided into four sections and subsections.

4.2 Empirical Results

The empirical results of objective 1 were presented in this section. The objective was achieved with the education inequality Gini model, the Lorenz Concentration Curve and Generalised Lorenz Curve.

4.2.1 Empirical Results - Education Inequality Gini and MYS

Firstly, Using the EIG as modified in this subsection presented the results of the levels of education inequality and the mean years of schooling (MYS) for the twenty-five (25) sampled SSA countries (Agrawal, 2014; Thomas et al., 2001) (see Table 4.1).

Table 4.1 Results of Education Inequality Gini and MYS

Country	DHS - SP	MYS	EIG	Year	EIG Ranking
Angola	8242	3	0.5088	2011	10
Burkina Faso	56166	1	0.9091	2010	25
Cameroon	36225	8	0.4789	2011	9
Comoros	11466	3	0.6760	2012	15
Congo Republic	31948	6	0.3150	2011	2
Congo DR	59276	5	0.4524	2013	7
Cote D'Ivoire	28211	2	0.7933	2011	17
Ethiopia	45540	1	0.8292	2011	19
Gambia	26601	2	0.7978	2013	18
Gabon	23109	6	0.5689	2012	13
Ghana	23119	4	0.5493	2014	12
Guinea	27683	1	0.8936	2012	23
Kenya	83591	5	0.4551	2014	6
Mali	33803	1	0.8889	2012	22
Mozambique	37984	3	0.5405	2011	11
Namibia	18090	7	0.3230	2013	3
Niger	44114	1	0.9011	2012	24
Nigeria	11938	4	0.6288	2013	14
Rwanda	3104	4	0.4051	2013	5
Senegal	42510	1	0.8581	2011	21
Sierra Leone	47392	2	0.8304	2013	20
Togo	26264	2	0.6794	2011	16
Uganda	28609	4	0.4648	2011	8
Zambia	49177	5	0.3888	2013	4
Zimbabwe	19279	7	0.2368	2011	1

Note: The result in Table 4.1 were classified into Very Low (EIG $\geq 0 \leq 0.25$); Moderately Low (EIG $> 0.25 \leq 0.5$); Moderately High Education Inequality (EIG > 0.5 but ≤ 0.75); Extremely High (EIG > 0.75). The DHS – SP represents the DHS sampled population; MYS represents Mean years of schooling, EIG represents the education inequality Gini; PE and PI represent the ranking from perfect equality to perfect inequality. The higher

the values moves away from 0, the higher the inequality that existed in the corresponding country.

Source: Author's Computation

The findings of education inequality Gini (EIG) in Table 4.1 indicated that education inequality was prevalent across the 25 sampled SSA countries. The lowest education Gini result was found with Zimbabwe that has 23.68% and ranked 1st while Burkina Faso has the highest of the inequality with 90.91% and ranked 25th. Among others, Nigeria, Angola, Comoros, Ghana, Gabon, Mozambique, and Togo showed moderately high education inequality (EIG $\geq 0.5 < 0.75$). Countries that showed extremely high, in other words, severe education inequalities included Cote d'Ivoire, Mali, Guinea, Gambia, Niger, Ethiopia, Senegal, Siera Leone and Burkina Faso, (EIG ≥ 0.75). Countries like Cameroon, Congo DR, Congo Republic, Namibia, Rwanda, Kenya, Zambia, and Uganda showed moderately low inequality (EIG $\geq 0.25 < 0.5$). Since the mean years of schooling (MYS) is to understand the distribution of educational attainment in a singular number and determines countries human capital stock (Potančoková & Goujon 2014), MYS was calculated for the 25 countries sampled. The findings showed that Burkina Faso, Ethiopia, Guinea, Mali, Niger and Senegal had 1 year of MYS, and the highest was Cameroon with 8 mean years of schooling. It is apparent then to argue that the current study confirmed high inequality od education, confirming an exclusion and low human development in the 25 sampled countries (Agrawal, 2014; Muddiman, 2000; Nour, 2016; Thomas et al., 2001; Sen, 1999).

4.2.2 Empirical Results -Wealth Concentration Across Educational Levels

This subsection presented the findings of wealth concentrarion which explained how welath was distributed across educational levels. The summary of the the graphical results were presented in Table 4.2. while the overall graphical results of the LCC were presented in Appendix H.

Table 4.2: Summary of Wealth Concentration Results

Description	Country	Interpretation
Lying above 45^0 Equality line	Comoros (1 country representing 4% of the countries sampled).	Wealth is concentrated in the **no** education and **low** boundary of educational levels
Lying on 45^0 Equality line	Angola, Burkina Faso, Niger and Zambia (4 Countries representing 16% of the total countries sampled).	**Zero** Concentration
Lying below 45^0 Equality line	Cameroon, Congo Republic, Congo Democratic, Ethiopia, Cote D'Ivoire, Gabon, Gambia, Guinea, Ghana, Kenya, Mali, Mozambique, Nigeria, Namibia, Sierra Leone, Rwanda, Senegal, Uganda, Togo and Zimbabwe (20 Countries representing 80% of the total countries sampled).	Wealth is concentrated in the **upper boundary** (higher levels of education) of the distribution

Note: Lorenz concentration Curve otherwise known as concentration index is a curve that explains how ranked economic indicator (e.g., wealth) yields inequality in education distribution (e.g., educational attainment)

Source: Authors' Summary from the Lorenz Concentration Curve.

Interestingly, Table 4.2 showed that the wealth of the Comoros lies above the egalitarian line of 45^0, representing the lower boundary of educational distribution. Specifically, the Comoros new evidence showed that wealth concentrated in the hands of households with low levels of educational credentials in the country's educational distribution. This is in contrast with Barro and Lee (2010) and Barro (2013) that education is a strong component for growth and with existing proposition that increase in educational attainment correlated with the rate of return to education (Psacharopoulos & Patrinos, 2004).

Furthermore, the Table 4.5 showed that out of 25 countries sampled, twenty (20) countries representing 80% had their wealth concentrated below the egalitarian line. The 80% of the countries had their wealth concentrated in the upper boundary of educational distribution. In other words, wealth concentrated in the hands of the households with higher levels of education. This aspect agreed with Barro (2013), Krueger and Lindahl

(2001) and Todaro and Smith (2012) that education positively correlated with productivity and growth. Finally, the Table 4.5 showed that out of the 25 countries, 4 countries representing 16% have zero wealth concentration indicating equality between the low and high in the distribution. In other words, household wealth was in the hands of both the households whose levels of education do not exceeded secondary education.

In summary, the result of Comoros contrasted the existing assumption that wealth concentrated in the upper quintile of education distribution (Kuznets, 1955; Pan, 2016). Comoros is an island and its economy depends on agricultural productions. In so doing the results of Comoros could have been exacerbated by the household land transferred inheritance (Kohli, 2004). The household transferred inheritance does not necessarily require education before the acquisition. In so doing, the thesis posited that wealth sometimes might be influenced by the characteristics of the society such as inheritance instead of higher level of education.

4.2.3 Empirical Results - Gender Decomposition

This sub-section of the thesis chapter, presents the results of the decomposition of inequality of education by gender. Although the twenty-five (25) sampled countries were educationally deprived, the thesis equally provided the understanding of the inequality between the subgroups that have the large share of the inequality (See Appendix H). The overall findings of the subgroup gender decomposition estimated with GLC was presented in Table 4.3.

Table 4.3: Summary of GLC Subgroup Gender Education Inequality

Description	Country	Interpretation
No Gender Gap	Comoros, Angola, Burkina Faso, Congo Republic, Congo Democratic, Ethiopia, Gabon, Kenya, Mali, Mozambique, Niger Rwanda, Uganda Zambia and Zimbabwe (15 countries representing 60% of the total countries sampled).	Though education inequality exists, 15 countries shared the inequality in education equally between male and female.
Fairly Gender Gap	Namibia and Togo, (2 Countries representing 8% of the total countries sampled).	Though education inequality exists, 2 countries fairly shared the inequality in education equally between male and female.
Gender gap	Cameroon, Cote D'Ivoire, Gambia, Ghana, Guinea, Nigeria, Senegal and Sierra Leone, (8 Countries representing 32% of the total countries sampled).	In all the education inequality existing in the 8 countries, the female is **worse-off** than male sex.

Note: The Table explained the summary of results got from GLC estimation.

Source: Authors' Summary from GLC estimation

Table 4.3 showed that fifteen (15) out of the 25 countries sampled, representing 60%, have no gender gap which was plausible. This was an indication that male and female shared the inequality of education equally. The findings contrasted with Cooray and Podfke (2011) that gender gap existed in the Islamic dominated countries. The countries included Angola, Comoros, Ethiopia Kenya, Gabon, Congo Republic and Congo DR. Others were Mali, Burkina Faso, Niger, Mozambique, Uganda, Rwanda, Zimbabwe and Zambia. Whereas, Namibia and Togo had a slight difference of the inequality between the sexes, representing 8% of the total sampled countries. Furthermore, Table 4.6 showed that eight (8) countries representing 32% of the sampled countries face the problem of gender gap. These countries included Cameroon, Cote D'Ivoire, Nigeria (oil producing countries); Ghana, Gambia, Guinea, Senegal and Sierra Leone (non-oil and gas producing countries). Here, the new evidence was that half (that is, 3 out of 6 countries) of the oil and gas producing sampled countries have an acute gender gap in the education

distribution. In other words, female bears the larger part of the inequality of education. This supported the UIS-UNESCO (2018) on out-of-school data and UNDP (2013) on education index data.

4.3 Discussion of Findings

In section 4.2 of this chapter, the empirical findings were presented. In this section the findings were discussed under two main classification which included income classification and major resources influencing the sampled countries.

4.3.1 Countries Income Classification and Education Inequality

This sub-section presented the discussion by comparing the EIG findings according to the World Bank (2018) income classification. According to the World Bank, the twenty-five sampled countries were classified into low income, low-middle income, upper-middle income and high income to understand if each country's income level could be responsible for the inequalities arose in the education distribution. Table 4.4

Table 4.4: Education Inequality and Income Classification

Classification	Country
Low Income	Burkina Faso, Comoros, Congo DR, Rwanda, Uganda, Mozambique, Togo, Ethiopia, Gambia, Guinea, Mali, Niger, Senegal, Sierra Leone and Zimbabwe,
Low-Middle Income	Angola, Cameroon, Congo Republic, Kenya, Zambia, Ghana, Nigeria and Cote D'Ivoire
Upper middle Income	Namibia, Gabon
High Income	Nil

Note: This Table displayed the inequalities of education by World Bank (2018) income classification

Source: World Bank (2018) Income Classification

Table 4.4 presented the income classification of the 25 SSA sampled countries under very low, moderately low, moderately high and extremely education inequality. According to Digdowiseiso (2009), poverty reduction was achieved through equal education. The

current EIG findings supported Barro (2001), Krueger and Lindal (2000) and Todaro and Smith (2012) that the level of education correlated with income and productivity. In other words, an unequal educational attainment negatively affect growth. Hence, the current findings showed that 15 out of the 25 sampled countries representing 60% are classified into low-income countries. According to World Bank, these countries included Burkina Faso, Comoros, Congo DR, Rwanda, Uganda and Mozambique. Others included Togo, Ethiopia, Gambia, Guinea, Mali, Niger, Senegal, Sierra Leone and Zimbabwe. However, while countries exhibited moderately low to extremely high, Zimbabwe has very low education inequality with 23.68%. despite the lowest in the low-income group, the country ranking in human development index for 2013 showed that if the achievement in education was combined with health, and standard of living, Zimbabwe was influenced by the country GNI per capita. Besides Zimbabwe, Burkina Faso (90.91%), Ethiopia (82.92%), Niger (90.11), Rwanda (40.11% and Zambia (38.88) are landlocked countries whose economies are largely influenced by agriculture. Although they are landlocked countries, Zambia and Rwanda considerably reduced their inequalities than Burkina Faso and Ethiopia. The current findings of Burkina Faso supported the HDI Report of 2013 where the country had its education index estimated as 25% which was very low. The country faced the challenge of fiscal vulnerability which could have affected income redistribution, and in turn, affected educational distribution. In the low-income group, Guinea and Mali equally had severe inequalities of education. For example, Mali had 88.89% inequality in education which supported the UNDP data on education index of 30.4% in 2013. Although the economy was based on agriculture, the country faced challenge of political instability which would have contributed to the poor distribution of both income and education across the households. Similarly, the Guinea findings showed 89.36% and the human capital stock indicated one (1) MYS which could be due to low income. Others in that group included Comoros, Congo DR, Rwanda, Uganda,

Mozambique, Togo, Gambia, Niger, Senegal, and Sierra Leone that showed moderately low and moderately high inequalities. In the low-middle income countries, Cote D'Ivoire has an extreme high inequality of education with 79.33%. The extremely high education inequality of Cote D'Ivoire was not unlikely to impact significantly on growth. Whereas, Angola, Ghana and Nigeria had their inequalities moderately high, in other words, they had 50.88%, 54.93% and 62.88% respectively regarding the inequalities. Cameroon, Congo Republic, Kenya, and Zambia had their inequalities moderately low. The country with highest human capital stock was Cameroon with 8 MYS. Cameroon was followed by Congo Republic, Kenya, and Zambia with 6, 5 and 5 respectively. Ghana and Nigeria have 4 MYS. The countries with poorest human capital stock were Cote D'Ivoire and Angola with 2 and 3 respectively. In comparism, despite that Zambia is a landlocked compare with Kenya, the education inequality of Zambia was 38.88% lower than Kenya of 45.51%, While Nigeria and Angola with abundant resources had their inequalities fell at 62.88% and 50.88% respectively. Similarly, Ghana with little natural resources compared with Nigeria had lower inequality of 54.93% than Nigeria with abundant natural resources with estimated inequality of 62.88%. but had the same level of human stock 4 years of MYS.

Finally, only Namibia and Gabon were classified as upper-middle income countries among the 25 sampled countries. Despite being classified into upper-middle income, both countries have their inequalities ranging from moderately low to moderately high. Gabon had a value of 56.89% and Namibia had a value of 32.3% inequalities of education. However, both maintained a very high human stock where Gabon had six (6) years and Namibia had 7 years MYS. The inequalities of Rwanda, Uganda and Zimbabwe, classified as low-income countries, had strong control of their inequalities than Nigeria classified as lower-middle income country. For example, Rwanda, Uganda and

Zimbabwe had 40,51%, 46.48% and 23.68% in that order, compare with Nigeria of 62.88%

In summary, using the income classification to understand the inequalities in the twenty-five countries sampled, the thesis findings indicated that the levels of education inequality were found in 15 countries representing 60% of the 25 sampled countries fall within the group of low-income countries. The low-middle income and upper-middle income countries had 24% and 16% respectively. Moreover, the level human capital stock for the countries explained by the MYS showed poor stock of human capital. The findings of mean years of schooling (MYS) indicated that Burkina Faso, Ethiopia, Guinea, Mali, Niger and Senegal have only one (1) year of MYS, showing poorest degree of human stock in those countries. Cameroon had the highest with eight (8) year MYS. Besides Cameroon, others that their MYS with five years and above in the MYS estimated were Namibia, Zimbabwe, Gabon, Congo Republic, Congo DR, Kenya, Zambia with 7,7,6.6.5,.5 and.5 respectively.

As such, the thesis findings on the 25 sampled SSA's level of education showed that out of the twenty-five countries, inequality of education dominated the low-income economies with 60%% out of the twenty-five sampled countries. Thus, this aspect of the thesis findings supported the view of Barro (2001, p.16) that "growth is positively related to the starting level of average years of school attainment ". In that respect, the sharing of economic resources would elude the excluded households in education distribution, which in turn, supported the proposition of Muddiman (2000) that those excluded in the society would be deprived of education, employment and other economic resources.

4.3.2 Countries Oil and Gas Classification and Education Inequality

From the sampled countries profile, the author argued that the SSA countries are endowed with oil and other natural resources. In this section, the study compared the oil producing

countries with the non-oil. Six of the sampled countries in this thesis were driven by oil and gas and members of OPEC countries (Takebe & York, 2011; Zhan & York, 2009). This became necessary to compare the results of the oil and non-oil countries to understand their education distribution performances. Thus, the results of the oil and non-oil classifications of the countries were presented in Table 4.5 and 4.6 respectively. Accordingly, the level of inequality of the groups of the countries were ranked

Table 4.5: Education Inequality and Oil Producing countries

Country	DHS -SP	MYS	EIG	Year	EIG Ranking (PE Versus PI)
Angola	8242	3	0.5088	2011	3
Cameroon	36225	8	0.4789	2011	2
Congo Republic	31948	6	0.3150	2011	1
Cote d'Ivoire	28211	2	0.7933	2011	6
Nigeria	119386	4	0.6288	2013	5
Gabon	23109	6	0.5689	2012	4

Note: The result in Table 4.1 explained the degree of the inequalities in the oil producing countries, using Very Low (EIG $\geq 0 \leq 0.25$); Moderately Low (EIG $> 0.25 \leq 0.5$); Moderately High Education Inequality (EIG > 0.5 but ≤ 0.75); Extremely High (EIG > 0.75); The DHS – SP represents the DHS sampled population; MYS represents Mean years of schooling, EIG represents the education inequality Gini; PE and PI represent ranking from perfect equality to perfect inequality. The higher the values the higher the inequality that exists in the corresponding country.

Source: Author's Estimation

Table 4.5 provided a new evidence among the oil producing countries. Although these countries have similar characteristics in natural resources, they differ in educational distribution performance. Nigeria with the largest oil field in the SSA was having a surprising education inequality result. The result showed that Nigeria fell on the moderately high education inequality (EIG > 0.5 but ≤ 0.75) despite its numerous educations institutions across the 772 Local Governments and the Federal Capital Territory. In fact, among the six oil producing countries, Nigeria was ranked 5th with the value of 62.88% and 4 MYS. However, Nigeria has perpetual development challenges such as insecurity of the Boko Haram insurgencies, the Niger Delta militants and oil pipe

vandalizers. The Boko Haram and the Jihadists that captured students in the public schools in the northern part of the country created tension and terror in the people's mind (Achumba, Ighomereho & Akpor-Robaro 2013; Katsina, 2012). In consequence of the insurgencies, as at the time of writing this thesis findings, substantial population are currently living in the IDP locations. Thus, many households in the affected five (5) Northern States abandoned education to protect their lives thereby increases the level of education inequality in the process of distributing education in Nigeria (Achumba, et al., 2013; Katsina, 2012). Furthermore, Cote D'Ivoire had acute or extreme inequality of education (EIG > 0.75). given by 79.33%. Surprisingly, only Cameroon and Congo DR demonstrated a moderately low-education inequality in the oil group. They had their education inequalities fell within EIG > 0.25 ≤ 0.5, that is, 47.89% and 45.25% respectively. The findings of Cameroon of moderately low, would have been accounted for by the poor policy on education and income inequality that ravaged the economy (Mefire et al., 2017).

In a nutshell, the results of the oil dependent economies of the SSA demonstrated that the oil and gas rent proceeds have not been efficiently distributed across their population. In other words, the oil rent proceeds are concentrated in the hands of the few opportunists of the six sampled countries in the SSA.

Regarding the non-oil classification, the results were presented in Table 4.6.

Table 4.6 Education Inequality and Non-Oil Producing Countries

Country	DHS -SP	MYS	EIG	Year	EIG Ranking (PE versus PI)
Burkina Faso	56166	1	0.9091	2010	17
Comoros	11466	3	0.6760	2012	10
Congo DR	59276	5	0.4524	2013	5
Ethiopia	45540	1	0.8292	2011	13
Gambia	26601	2	0.7978	2013	12
Ghana	23119	4	0.5493	2014	9
Guinea	27683	1	0.8936	2012	7
Kenya	83591	5	0.4551	2014	6
Mali	33803	1	0.8889	2012	16
Mozambique	37984	3	0.5405	2011	8
Namibia	18090	7	0.3230	2013	2
Niger	44114	1	0.9011	2012	8
Rwanda	3104	4	0.4051	2013	4
Senegal	42510	1	0.8581	2011	15
Sierra Leone	47392	2	0.8304	2013	14
Togo	26264	2	0.6794	2011	11
Uganda	28609	4	0.4648	2011	7
Zambia	49177	5	0.3888	2013	3
Zimbabwe	19279	7	0.2368	2011	1

Note: The result in Table 4.1 explained the degree of the inequalities in the oil producing countries, using Very Low (EIG $\geq 0 \leq 0.25$); Moderately Low (EIG $> 0.25 \leq 0.5$); Moderately High Education Inequality (EIG > 0.5 but ≤ 0.75); Extremely High (EIG > 0.75); The DHS – SP represents the DHS sampled population; MYS represents Mean years of schooling, EIG represents the education inequality Gini; PE and PI represent ranking from perfect equality to perfect inequality. The higher the values the higher the inequality that exists in the corresponding country.

Source: Author's Computation

The Table 4.6 showed that, in the non-oil sector, Burkina Faso, Ethiopia, Gambia, Guinea, Mali, Niger, Senegal and Sierra Leone had an extreme inequality of education (EIG > 0.75) with values of 90.71%, 82.92%, 79.78%, 89.36%, 88,89%, 90.11%, 85.81% and 83.04% respectively. In fact, Burkina Faso was more acute in its inequality than the others, not only in the non-oil countries but in the whole sample. Zimbabwe in the group showed a new revelation whose inequality falls within the low education inequality (EIG $> 0 \leq 0.25$) with 23.68% and 7 years of MYS. Zimbabwe, a country where female constitute the largest population (52%) and major exporter of raw tobacco was not only taking the lead in reducing its education inequality among the non-oil but across the whole

sample of this thesis. Those countries whose inequalities were moderately high (EIG > 0.5 ≤ 0.75); were Comoros (67.6%), Ghana (54.93), Togo (67.94%) and Mozambique (54.05%), Finally, those countries whose inequalities were moderately low (EIG > 0.25 ≤ 0.5) were Congo republic (31,5%), Namibia (32,3%, Rwanda (40,51%), Uganda (46,48%), Zambia (38,88% and Kenya (45,51%). In this moderately low group, Congo Republic and Namibia did better than others in reducing their education inequality. Comparing the oil producing countries who are in affiliation with OPEC with the non-oil and gas countries, those countries in the non-oil who performed in the reduction of education inequality included Zimbabwe, Namibia, Rwanda, Uganda, Congo DR, Kenya and Zambia. In so doing, the thesis posited that having large field of oil and gas does not matter in the human development of a country and the accumulation of human capital stock overtime. With this scenario, the findings of the high inequality in the SSA countries could have been exacerbated by the poor sharing of the oil and gas rent' proceeds. Historically, the poor sharing could have been caused by the effect of the Dutch disease which affected many of the Africans whose economies were driven by oil thereby causing fiscal vulnerabilities in the long run. (Zhang & York, 2009).

4.4 Summary of the Findings

In this chapter, the findings of the magnitude of education inequality, using education inequality Gini, for the twenty-five sampled countries were presented. Firstly, we found that all the countries have their education unequally distributed but at varying degrees. The maximum inequality was found with Burkina Faso having 90.91% educational inequality with a poor human capital stock of one (1) MYS. The minimum was found with Zimbabwe whose inequality was 23.68% with better human capital stock of seven (7) MYS. Secondly, the thesis classified the results by World Bank income classification. The findings showed that the inequality of education concentrated in the group of low-income countries, where fifteen (15) out of the 25 countries sampled, representing 60%

of the total sample were educationally trapped because of income inequality. Only 6 (24%) countries out of the sample fell within the lower-middle income group and 4 (16) countries fell on the upper-middle income group. No country fell within the high-income countries' group in the sample used. Thirdly, the thesis confirmed the existing proposition that human freedom correlated with those with high levels of education (Barro & Lee, 2010, 2013; Sen, 1999). This proposition was found in the case of wealth distribution across educational levels where wealth concentrated within the group that has higher levels of educational attainment. However, Comoros had its wealth concentrated in the low levels of education. This result of Comoros could have arisen due to inheritance transfer such as family land because Comoros economy largely depended on agriculture (Kohli, 2004; Korom, 2016). Fourthly, we compared the findings of oil producing countries with non-oil and gas producing countries. Interestingly, the study found out that Zimbabwe, a non-oil country had the lowest inequality, implied that Zimbabwe performed in reducing the education than countries with abundance oil. Likewise, other countries like Cote D'Ivoire and Namibia have their inequality lower than 35%, better off than other oil producing countries such as Nigeria with 62.88%. This could have been caused by the Dutch disease that affected the African oil producing countries in the recent past. Thus, the thesis positioned that having a large field of oil and gas do not matter in the human development of a country and the accumulation of its human capital stock overtime. Finally, the thesis confirmed that, in the decomposition analysis, 60% of the twenty-five sampled countries have no gender gap while 32% face gender gap. The countries that faced the gender gap included the oil producing countries such as Nigeria, Cote D'Ivoire and Cameroon. So, we concluded this chapter by asserting that the high and extremity of inequality of education in the 25 sampled countries cut across income, sharing of the oil proceeds and other natural resources, gender inequality and region. This

suggested that government should be proactive in the distribution of education by paying attention to income, gender, region and the sharing of extraction proceeds.

CHAPTER 5: EDUCATION INEQUALITY AND POVERTY

5.1 Introduction

The chapter 4 of this thesis presented the degree of inequality of education in the SSA countries. It confirmed that the high and extremity of inequality of education in the 25 sampled countries cut across income group, sharing the proceeds of natural resources, gender inequality and region. Having the background of the SSA education inequality, there was a necessity to find out the extent of how household poverty influenced the high inequality of education across the sampled countries. To this end, this chapter documented the results of the relationship of poverty and education inequality in the SSA, particularly the twenty-five sampled countries. Firstly, we presented the results of the SSA cumulative findings. Thereafter, we presented each country result explaining the relationship of poverty and education inequality. Thus, in SEM, two approaches were used to present the estimated results. These included presentation of measurement models and the structural models in that sequence. Equally, in PLS estimations, checking for normality and multicollinearity are necessary conditions before estimating the parameters. The reason for checking these was to confirm the normality criterion to comply with smartPLS software. If the distribution is normal, confirmatory method of SEM would be required otherwise, the partial least square (PLS) methodology would be used (Hair, et al., 2014; Wong, 2013). So, we followed this pattern in our presentation by presenting the result of the normality test. The chapter was of divided into five sections and subsections. The study reported the findings of the twenty-five countries pooled data analysed (see section 5.2) and each country findings were later presented (see section 5.3).

5.1.1 Kolmogorov-Smirnov Normality Test

The statistical data screening began with testing for normal distribution of the data using Kolmogorov-Smirnov test. The study tested the null against the alternative hypothesis as stated below

H_0: The observed distribution fits the normal distribution

H_1: The observed distribution does not fit the normal distribution

Decision Rule: Reject H_0 if $\rho < 0.05$, otherwise accept H_0 (See Appendix D).

Appendix D showed the result of the Kolmogorov-Smirnov normality test calculated. The result indicated $p < 0.05$, which implied that all the variables data were not normally distributed.[16], that is, the result of the Kolmogorov-Smirnov normality test was $(X_i; df = 9432; \rho < 0.05)$.[17]. Hence, the result of the Kolmogorov-Smirnov normality test showed that all the variables were $\rho value = 0.000,$ that is , $\rho < 0.05$, indicating that the data were not normally distributed. Since the results suggested not normal distribution, the study met the non-parametric of SEM-PLS condition of prediction instead of CFA.

5.1.2 Synopsis of the Analysis

The author followed Wong (2013) and Hair et al. (2014) structural model estimation procedure using the following SmartPLS assumptions during the data analysis.

i. The minimum value of outer loadings after estimation should be 0.7

ii. Any value of the outer loadings construct that is negative should be deleted.

[16] Hence, the result of the Kolmogorov-Smirnov normality test is presented in Appendix D

[17] The X_i represents all the manifest variables (MV) listed on the table. The statistic values column can be substituted. Also, the skewness and Kurtosis for each of the variables had been presented in subsection 4.1.

iii. The model stability is ensured at the maximum of 300 algorithm iterations.

Hence, the model estimation, was at first instance, had problems of outer loadings. The results showed that some manifest variables (MV) that included CHMT, HCRT, HRDO, MTCY, HBCY, AGB, DTMQ, DPT and SEHH (see Appendix A for the list of variables) were having values less than 0.7. To satisfy the assumption (ii) and (iii) in section 5.2.1, we deleted those manifest variables (Wong, 2013). In consequence, the conceptualised structural model was modified to satisfy the SmartPLS assumptions. Then, we applied bootstrapping technique to establish the statistical significance of the modified structural model (Wong, 2013). Hence, the SmartPLS generated the T-Statistics and the SEs of the estimated parameters. Finally, we re-estimated the bootstrapped structural model which produced a final structural model for determining the relationship of EDINQ and PVLT. The model of the study was a reflective measurement model.

5.1.3 Multicollinearity Test

In our structural model, the researcher estimated the hierarchical variables with the use of cross-sectional survey data. In a survey data, there is the likelihood that the manifest variables (the predictors) are highly correlated (Akter et al., 2011b; Wong, 2013). To understand the collinearity among the predictor variables, the study used SPSS version 22 to estimate the regression equation using the latent variable scores (LVS) values from the calculated results (Wong, 2013). The result of the regression equation was presented in table 5.1. The regression collinearity statistics provided two results - the tolerance and variance inflation factor (VIF). If VIF calculated value is less than 5, multicollinearity does not exist among the manifest variables (predictors). On the other hand, if estimated Tolerance value is equal or greater than 0.2, the predictors are not linearly correlated (Hair et al., 2014; Wong, 2013). The null and alternative hypotheses were as stated below:

H_0: There is no presence of multicollinearity among the MVs (H0 = 0)

H_1: There is presence of multicollinearity among the MVs ($H_0 \neq 0$)

Decision Rule: Reject H_0 if the calculated value of Tolerance is less than 0.2

Reject H_0 if the VIF value is greater than or equal to five (Wong 2013).

HENCE, The result of the multicollinearity was presented in 5.1.

Table 5.1: Multicollinearity Test

Latent Variable	Tolerance	VIF
HHCP	0.985	1.015
HLCN	0.550	1.818
PVLT	0.537	1.861
VULT	0.637	1.569

Source: Author's Computation

Table 5.1 showed the estimated latent variables' where the Tolerances were greater than 0.2 that is, HHCP = 0.985; HLCN = 0.550; PVLT = 0.537 and VULT = 0.637. As such, H_0 could not be rejected. This implied that there was no presence of linear collinearity among the MVs of the latent variables. On the other hand, the calculated values of the VIF were lower than 5, that is, HHCP = 1.015; HLCN = 1.818; PVLT = 1.861 and VULT = 1.569. We accepted H_0 that there was no presence of multicollinearity among the MVs. So, evidence of tolerance and variance inflation factor suggested that multicollinearity was not an issue. All the the predictor manifest variables influencing latent variables were not linearly correlated.

5.2 Empirical Results - The Cumulative SSA Countries

After fulfilling the conditions of PLS regarding normality and multicollinearity, this section presented the results of the measurement model and the structural model.

5.2.1 The Measurement Model

This section presented the results of the estimated measurement models which explained how robust the estimated paramours were posited. The robustness was carried out to ensure that the estimated β_{is} reported were genuinely representative of the parameters. Measurement model results were categorized into model stability, indicator reliability, composite reliability, convergent validity and discriminant validity tests. (Campbell & Fisk, 1959; Guo, Fielding & Sutton, 2008; Hair et al., 2014; Wong, 2013).

5.2.2 Model Stability

The author checked for the estimated model stability. In SmartPLS-SEM estimation, a structural model would be stable in either of these two criteria. Firstly, the SmartPLS calculation would stop when it reaches the maximum iteration of 300. Secondly, when the SmartPLS calculation of "stop criterion" (Wong, 2013; p.19) ended before the 300 maximum iteration (Hair et al., 2014). If either of the two occurs, it shows that the model is stable. The earlier of the algorithm iteration stops, the best the stability of the model. So, in the estimated structural model, the SmartPLS algorithm converged when the maximum iteration was 6. Thus, the SEM estimation of the structural model confirmed best model stability because the algorithm iteration reached faster and earlier than the maximum iteration of 300.

5.2.3 Indicator Reliability Test

In this sub-section, the author tested for validity and reliability of the structural model. Here, the reliability checks included indicator reliability and internal consistency. From the criteria of PLS-SEM estimate, the acceptable indicator and internal consistency reliability value were with a minimum of 0.4, but the preferred level is 0.7 (Wong, 2013). The validity of the structural model estimated was placed on two benchmarks, convergent and discriminant validity. The benchmark of convergent validity was 0.5 while the

discriminant validity was computed following Fornell and Larkerr (1981) methodology (See Chin, 2010; Wong, 2013).

In SEM estimations, the MV models were the core variables that explained the latent variables. The indicator reliability was computed by the square of each indicator path coefficient estimated. The result of the manually computed value for indicator reliability was presented in Table 5.2.

Table 5.2: Indicator Reliability

Manifest Variable	Path Coefficient	Indicator Reliability	Interpretation[18]	Rank[19]
EDATT	0.96	0.93	> 0.7	4
YSCH	0.97	0.94	> 0.7	3
LITE	0.86	0.74	> 0.7	6
ELCT	0.85	0.72	> 0.7	7
HRGT	0.70	0.49	> 0.4 < 0.7	11
TELV	0.81	0.65	> 0.4 < 0.7	10
YSCH	0.76	0.58	> 0.4 < 0.7	9
AGHH	0.78	0.61	> 0.4 < 0.7	8
SIHH	0.87	0.76	> 0.7	5
SPD	1.00	1.00	> 0.7	1
WIDE	1.00	1.00	> 0.7	1

Source: Author's Computation

From Table 5.2, the indicator reliability in column 3 showed that seven of the manifest variables were greater than 0.7 the benchmark of indicator reliability. The remaining four MVs had the value greater than 0.4 but less than 0.7. According to Wong (2013), the MVs met the criteria for indicator reliability though HRGT appears too low (0.49) in the model. In consequence, the model manifest variables survived indicator reliability test.

[18] IR implies that the 'indicator is reliable.'

[19] The ranking implies the proportion at which each of the manifest variables is demonstrating reliability.

5.2.4 Internal Consistency Test

It is a custom in Social Sciences research to measure the internal consistency of an estimate. Hence, internal consistency was tested using the Cronbach Alpha (CA) and composite reliability. The outcome of the Cronbach Alpha estimation was presented in Table 5.3

Table 5.3: Cronbach Alpha (CA) Test

Latent Variable	CA Result[20]
EDINQ	0.92
PVLT	0.79
HHCP	0.55
HLCN	1.00
VULT	1.00

Source: Author's Computation

The results of CA in Table 5.3 indicated 0.92, 0.79, 1.00 and 1.00 for EDINQ, PVLT, HLCN and VULT respectively. Except for the HHCP value of CA to be 0.55 below the threshold, all other latent variables were greater than 0.7 threshold.

In chapter 3, the author argued that using Cronbach Alpha method to measure the internal consistency in PLS-SEM estimation was weak. The argument was on the premise that it provides a conservative measurement in PLS-SEM (Chin, 2010; Wong, 2013). Meanwhile, the alternative analysis was provided to measure the internal consistency of the latent variables (Bagozzi & Yi, 1988; Hair, Sarstedt, Ringle & Mena, 2012) that composite reliability is more appropriate to analyse the internal consistency of a PLS model. In this respect, composite reliability was calculated to check for the internal

[20] The Cronbach Alpha criterion is that the LV is internally consistent when the estimated value of CA is 0.7 or greater $(CA \geq 0.7)$.

consistency (Bagozzi & Yi, 1988; Guo et al., 2008; Hair et al., 2014; Hair et al., 2012; Wong, 2013) . As such, we presented the composite reliability and AVE in Table 5.4.

Table 5.4: Composite Reliability and AVE

1 **Latent Variable**	2 **Manifest Variable**	3 **Composite[21] Reliability***	4 **AVE[22]**
EDINQ	EDATT YSCH LITE	0.95	0.87
PVLT	ELCT HRGT TELV YSCH	0.86	0.61
HHCP	AGHH SIHH	0.81	0.69
HLCN	SPD	1.00	1.00
VULT	WIDE	1.00	1.00

Source: Author's Computation

Table 5.4 presented the composite reliability results for the latent variables, EDINQ. The composite reliability was computed for HHCP, HLCN, PVLT and VULT. The values were 0.95, 0.86, 1.00, 0.81 and 1.00 respectively. The values for the composite reliability were larger than the values of the threshold of composite reliability (CR) of 0.6. So, the internal consistency reliability of the structural model was achieved among all the five reflective latent variables.

5.2.5 Convergent Validity Test

Next, convergent validity of the structural model was tested, using the values of average variance extracted (AVE). The threshold of the convergent validity is a value greater or

[21] The composite reliability benchmark is greater or equal to 0.6 $(CR \geq 0.6)$ (Wong, 2013)

[22] The Average Variance Extracted (AVE) threshold is a value greater or equal to 0.5 $(Estimated\ AVE \geq 0.5)$ (Wong, 2013).

equal to 0.5. From the Table 5.4, the AVE estimated values were 0.87, 0.61, 1.00, 0.69 and 1.00 for the latent variables EDINQ, HHCP, HLCN, PVLT and VULT respectively. They were higher than the AVE benchmark of 0.5. So, the structural model achieved the convergent validity of the structural PLS-SEM estimation.

5.2.6 Discriminant Validity Test

Finally, discriminant validity of the structural model was estimated. Fornell and Larcker (1981) methodology for measuring discriminant validity was employed (Chin, 2010; Wong, 2013). In SmartPLS algorithm, the procedure is to manually calculate the discriminant validity using the AVE result and the latent variable correlation (LVC). For each of the latent variable, we calculated the square root of AVE value. Then, the result of the AVE and the LVC were compared. In that case, if the square root of AVE ($\sqrt{AVE_i}$) is higher than other correlation values both at vertical and horizontal of the latent variables, then discriminant validity is achieved. Table 5.5 showed the LVC from the result of SmartPLS quality criteria. The manual calculated results of Fornell and Larcker (1981) Criterion analysis was shown in Table 5.6.

Table 5.5: Latent Variable Correlations

Latent Variable	EDINQ	HHCP	HLCN	PVLT	VULT
EDINQ	1.00				
HHCP	-0.22	1.00			
HLCN	-0.41	0.12	1.00		
PVLT	0.73	-0.10	-0.63	1.00	
VULT	0.31	-0.08	-0.54	0.55	1.00

Source: Author's Computation

The DVT values were computed, and the results were presented in Table 5.6.

Table 5.6: Discriminant Validity Test

Latent Variable	EDINQ	HHCP	HLCN	PVLT	VULT	AVE
EDINQ	**0.93**[23]					$\sqrt{0.8681}$
HHCP	-0.22	**0.83**				$\sqrt{0.6854}$
HLCN	-0.41	0.12	**1.00**			$\sqrt{1}$
PVLT	0.73	-0.10	-0.63	**0.78**		$\sqrt{0.6108}$
VULT	0.31	-0.08	-0.54	0.55	**1.00**	$\sqrt{1}$

Source: Author's Computation

The Fornell and Larcker (1981) criterion analysis results on the latent variables EDINQ, HHCP, HLCN, PVLT and VULT in Table 5.6 were interesting. The discriminant validity values appeared in bold form. The EDINQ had the value of 0.93 which was higher than all the vertical LVC values, that is, - 0.22, - 0.41, 0.73 and 0.31 respectively. As well, the HHCP had the discriminant validity value of 0.83 which was higher than all the vertical values (0.12, - 0.10 and – 0.08) and horizontal values of - 0.22. The HLCN had discriminant validity absolute value of 1.00 which was higher than all the vertical values of - 0.63 and – 0.54 and horizontal values of -0.41 and 0.12. Similarly, the PVLT provided a value of 0.78 that was greater than the vertical value of 0.55 and horizontal values of 0.73, -0.10 and -0.63. Finally, like HLCN with one MV, the discriminant validity value of VULT was 1.00 which was higher than all the horizontal values of 0.31, - 0.08, - 0.54 and 0.55. In summary, all the values of the latent variables in the result of Fornell and Larcker (1981) criterion analysis were higher than the values of vertical and horizontal of

[23] The values bold in the diagonal represent the result of the $\sqrt{AVE_i}$ explaining the discriminant validity (Campbell & Fisk 1959)

the LVC values calculated. In so doing, the latent structural variables of the conceptualised structural model survived the discriminant validity test.

5.2.7 Empirical Findings: The Structural Model

In this subsection the findings of the structural model were presented (Chin, 2010; Wilson, 2010). Going by assessment of our PLS structural model, the study adhered to the basic rules of reporting PLS-SEM results. In a reflective measurement model, the study reported the target dependent variable variance, outer loadings, inner path coefficients and checking for statistical significance of both the inner and outer loadings (Wong, 2013). These represented structural model results.

5.2.8 The Variance of the Structural Model Outcome.

The target endogenous variable of the structural model was EDINQ. Hence, the study reported the target endogenous variable variance (Wong, 2013). The calculated goodness of fit, R^2 of EDINQ was 0.569 indicating 56.9% explained by the explanatory variables. The value of the R^2 implied that the other four latent independent variables (PVLT, HHCP, HLCN and VULT) moderately explained 56.9% of the variation in EDINQ. The remaining 43.1% were accounted for by the unobserved variables that could influence EDINQ.

Other hierarchical variables of the study with the goodness of fit, R^2 were VULT (R^2 0.305; HLCN 0.398 and HHCP = 0.010 in which variances were explained by PVLT respectively. Summarily, the total variance of VULT which was explained by poverty was 30.5%. PVLT explained the HLCN variance of 39.8%. However, the HHCP total variance of 1% was explained by PVLT which was the lowest variance among the four latent variables.

5.2.9 The Inner Path Coefficients

In this subsection, we presented the findings of the inner path coefficients of the structural model in Table 5.7

Table 5.7: Results of Inner Path Coefficients

Latent Variable	Path Parameter	S.E[24]	T. Statistics[25]
PVLT path to EDINQ	0.82	0.0057	143.41
HHCP path to EDINQ	-0.15	0.007	21.08
HLCN path to EDINQ	-0. 06	0.0093	6.20
VULT path to EDINQ	-0.13	0.0081	15.61
PVLT path to HHCP	-0.10	0.0098	10.43
PVLT path to HLCN	-0.63	0.0071	88.49
PVLT path to VULT	0.55	0.0086	64.02

Source: Author's Computation

Table 5.7 presented seven (7) inner path coefficients. The path coefficient that runs from PVLT to EDINQ has the strongest effect. We report the value of the PVLT path coefficient as $(\beta = 0.82; T = 143.41 > 1.96; SE = 0.0057)$. It implied that a unit increase in PVLT caused 82.14% contribution to EDINQ. The T-statistics and corresponding Standard error (SE) showed that the path coefficient was statistically significant.

[24] Conventionally, the result of SE is expected to be smaller. The smaller the SE, the better the path coefficient.

[25] The T-Statistics critical value is 1.96 which is equivalent to probability critical value of 5% ($(\rho = 0.05)$. If the T-Statistics value estimated is greater than or equal to 1.96 $(\beta \geq 1.96)$, the path coefficient is statistically significant. In SmartPLS, the T-Statistics is generated by the estimated original sample divided by SE.

The latent variable HHCP had a negative relationship with the endogenous variable, EDINQ with the path coefficient $(\beta = -0.15; T = 21.08 > 1.96;\ SE = 0.007)$. The path coefficient accounted for an inverse relationship of 15% to the endogenous variable, EDINQ. Both the T-statistics and the corresponding SE explained that the path coefficient was statistically significant.

In Table 5.7, the path coefficient that ran from HLCN to EDINQ provided the estimated results as $(\beta = -0.06; T = 6.20 > 1.96;\ SE = 0.0093)$. This shows an inverse of 6% contribution to the endogenous variable, EDINQ. Taking together the results of the T-statistics and SE, it showed that the HLCN path coefficient was statistically significant.

Considering the VULT path that ran toward the endogenous variable, the result showed that the VULT path coefficient equally had a negative relationship with EDINQ $(\beta = -0.13; T = 15.61 > 1.96;\ SE = 0.0081)$. This showed an inverse relationship of 13% with the endogenous variable, EDINQ. The path was statistically significant.

Furthermore, there were other three latent variables which were influenced by PVLT. Firstly, the path that ran from PVLT to HHCP provided an inverse path coefficient value of $(\beta = -0.10; T = 10.43 > 1.96;\ SE = 0.0098)$. This represented 10% contribution of an inverse relationship with PVLT. Hence, the results of the T-statistics and SE of PVLT to HHCP, demonstrated statistical significance.

Second, the path that ran from PVLT to HLCN provided the path coefficient of $(\beta = -0.63; T = 88.49 > 1.96;\ SE = 0.0071)$. The path contributed an inverse of 63% relationship with HHCP latent variable. So, statistical significance was achieved.

Finally, the path that ran from PVLT to VULT latent variables showed that the path coefficients of the PVLT to VULT had the value of

$(\beta = 0.55; T = 64.02 > 1.96;\ SE = 0.0086)$. The path demonstrated that there was a 55% contribution of PVLT to VULT. The results showed that the path coefficient was statistically significant.

In summary, all the inner path coefficients of the structural model were statistically significant. The current study structural equation modelling had the confidence to rely on the estimated path coefficients and the goodness of fit of the model.

5.2.10 The Outer Path Loadings

The outer loadings of the structural model results were presented in Table 5.8

Table 5.8: Structural Model Outer Loadings[26]

Latent Variable	Manifest Variable	Path Coefficient	SE	T-Statistics
EDINQ	LITE	0.86	0.0023	125.01*
	YSCH	0.97	0.0019	211.77*
	EDATT	0.96	0.0017	219.18*
PVLT	ELCT	0.85	0.0026	130.46*
	HRGT	0.70	0.0032	74.06*
	TELV	0.81	0.0026	114.24*
	YSCH	0.76	0.0039	102.96*
HHCP	AGHH	0.78	0.0227	23.10*
	SIHH	0.87	0.0204	33.10*
HLCN	SPD	1.00	0.0000	0.0000 (SIC)
VULT	WIDE	1.00	0.0000	0.0000 (SIC)

Note: *Significance at T > 1.96

Source: Author's computation

[26] Note: The PLS assumption indicates that all the outer loadings must be 0.7 or greater $(Pc \geq 0.7)$ (Wong 2013). Also, the SIC means Single Item Construct. It indicates that it is just a single manifest variable that determines the latent variable. The effect is that it has 100% path coefficient loading and it is significant (Wong, 2013)

According to the PLS-SEM methodology (Wong, 2013), it was crucial to report all the factor loadings that predicted the latent variables of the structural model. The Table 5.8 explained the outer model loadings of the structural model.

The results of the estimated structural outer model path coefficients showed much about the contributions made to the hierarchical latent variables. Table 5.8 showed that the EDINQ latent variable had three manifest variables after model modification. These manifest variables were LITE, YSCH and EDATT. Hence, the LITE path coefficient was $(\beta = 0.86; T = 125.01 > 1.96;\ SE = 0.0076)$. This represented 86% contribution to the latent endogenous variable, EDINQ. So, the path coefficient was statistically significant.

Second, the path that ran from YSCH to EDINQ showed a path coefficient value of $(\beta = 0.97; T = 211.71 > 1.96;\ SE = 0.0019)$. This implies that YSCH explained 97% contribution to the latent endogenous variable, EDINQ. The path coefficient was significant.

Third, the path that ran from EDATT to EDINQ presented a value of $(\beta = 0.96; T = 219.18 > 1.96;\ SE = 0.0017)$. It indicated that the path contributed 96% to the endogenous latent variable, EDINQ. Therefore, the values of the T-statistics and SE confirmed that the path coefficient was statistically significant.

Considering the PVLT latent variable after the modification of the structural model, the MVs were ELCT, HGRT and TELV and YSCH. First, the path coefficient that ran from ELCT to PVLT showed $(\beta = 0.85; T = 130.46 > 1.96;\ SE = 0.0026)$. This implied that the path contributed 85% to the latent variable PVLT and significant.

Second, the results got on the path that ran from HRGT to PVLT showed the path coefficient which explained $(\beta = 0.70; T = 74.06 > 1.96;\ SE = 0.0032)$. The path contributed 70% to the latent variable PVLT and it was significant.

Third, the parameter value estimated on the path that ran from TELV was $(\beta = 0.81; T = 114.24 > 1.96;\ SE = 0.0026)$. This indicated that the path coefficient explained 81% contribution to the latent variable PVLT and significant.

Finally, the path that ran from YSCH contributed $(\beta = 0.76; T = 102.96 > 1.96;\ SE = 0.0039)$. This path explained 76% contribution to the latent variable PVLT. Hence, the path coefficient was significant.

In summary, among the four manifest variables, ELCT had the strongest contribution while HRGT contributed the lowest. Nevertheless, all the path coefficients were statistically significant at 1.96 T-statistics level of significance.

Considering the manifest variables that influence HHCP latent variable, there were two manifest variables, AGHH and SIHH. The path of AGHH to HHCP contributed $(\beta = 0.78; T = 23.10 > 1.96;\ SE = 0.0227)$ indicating a 78% contribution to the latent variable HHCP and the path coefficient was significant.

The second manifest variable was SIHH. It contributed $(\beta = 0.87; T = 33.10 > 1.96;\ SE = 0.02)$ showing a strong statistical significance. In summary, the SIHH path coefficient maintained the strongest contribution to the latent variable HHCP than the AGHH manifest variable. Nevertheless, the two constructs demonstrated that the coefficient could explain the response variable, EDINQ.

In Table 5.8, there were two latent variables that had only one MV to report. According to Wong (2013), such constructs are called “Single item Construct” (SIC, Wong, 2013,

p.26). The constructs explained 100% contribution to the latent variables. In this thesis, the latent variables were SPD and WIDE that explained 100% contribution to HLCN and VULT respectively. The statistical significance was ensured since the results of SE for the two MVs were 0.00[27]. As a rule of thumb in statistical significance, the smaller the value of SE, the stronger is the estimated coefficient.

5.2.11 The Total Effects of the Structural Model

The result of the total effect of the latent path analysis was presented in this section. Hence Table 5.9 showed the findings of the total effect of the estimated model

Table 5.9: Total Effect Results

Variable	Effect
HHCP to EDINQ	-0.15
HLCN to EDINQ	0.06
PVLT to EDINQ	0.73
VULT to EDINQ	-0.13
PVLT to HHCP	-0.10
PVLT to HLCN	-0.63
PVLT to VULT	0.55

Source: Author's Computation

The focus of the thesis was to determine the effect of poverty on education inequality. This impact was found in the path coefficient that ran from PVLT to EDINQ which demonstrated a strong effect than other paths of the structural model. It had an effect of 0.73 representing 73% positive effect of PVLT on EDINQ. (See Table 5.9).

5.2.12 Fixing the Regression Equations

In this subsection, the study fixed the regression equation of the estimated parameters. There were four regression equations in the structural model. According to Piaw (2016b),

[27] Note: The value of 0.000 does not mean total zero but that it has a very smaller value closer to zero.

the regression equations must be fixed to see the contribution of the exogenous variables on the endogenous variable in the complex linear relationships. In so doing, the regression equations were fixed accordingly (see equations 4.1 – 4.4).

$$EDINQ = 0.8214PVLT - 0.15HHCP - 0.06HLCN - 0.13VULT \quad 4.1$$
$$R^2 = 0.569$$

$$HHCP = -0.1024PVLT \quad 4.2$$
$$R^2 = 0.01$$

$$HLCN = -0.6307PVLT \quad 4.3$$
$$R^2 = 0.398$$

$$VULT = 0.5519PVLT \quad 4.4$$
$$R^2 = 0.305$$

The crucial coefficient from the structural model to this thesis was the path than ran from PVLT to EDINQ. The path showed that poverty had 82.14% positive effect on the quantity of education inequality in the twenty-five (25) sampled countries in the SSA. Other latent variables such as HLCN, HHCP and VULT contributed negatively to the relationship.

5.3 Empirical Results - Individual Country Findings

This section presented the findings of the individual country regarding the relationship between poverty and education inequality. Hence, the measurement and the structural models for the twenty-five sampled countries were presented. In this aspect, the author used WarpPLS version 6.0 to estimate the parameters because the sample was at the range of the software and it was easier to use. The WarpPLS advantages over SmartPLS include - the software is able to calculate and replace the missing data problem, generate p-value instead of T-Statistics of SmartPLS, calculate the multicollinearity test and compute discriminate validity without manual computation like SmartPLS.

5.3.1 The Measurement Model

The result of the of the Model fit, indicator reliability, convergent validity and discriminant validity were presented in this subsection. The thesis wished to document that the findings of Burkina Faso were not reported in this thesis because the poverty finding contradicted the existing economic theory.

5.3.2 Model Fit and Quality of Indices

The result of the model fit, and quality of the overall indices were presented in Table 5.10.

Table 5.10: Model Fit and Quality of Indices Results

Country	AFVIF (Model Multicollinearity Test)		Tenenhaus Goodness of Fit Test T(GoF)		Simpson Paradox Ratio (SPR)	
	Value	Decision	Value	Decision	Value	Decision
Angola	1.989	Absence	0.559	Large	1	
Burkina Faso	-	-	-	-	-	-
Cameroon	3.276	Absence	0.656	Large	1	Satisfied
Comoros	1.801	Absence	0.550	Large	1	Satisfied
Congo DR	1.870	Absence	0.665	Large		Satisfied
Congo Republic	1.090	Absence	0.274	Medium	1	Satisfied
Cote D'Ivoire	1.010	Absence	0.279	Medium	1	Satisfied
Ethiopia	1.560	Absence	0.496	Large	1	Satisfied
Gabon	1.701	Absence	0.468	Large	1	Satisfied
Gambia	1.163	Absence	0.354	Medium	1	Satisfied
Ghana	2.195	Absence	0.583	Large	1	Satisfied
Guinea	1.163	Absence	0.354	Medium	1	Satisfied
Kenya	1.068	Absence	0.195	small	1	Satisfied
Mali	3.418	Absence	0.746	Large	1	Satisfied
Mozambique	1.512	Absence	0.475	Large	1	Satisfied
Namibia	1.280	Absence	0.384	Large	1	Satisfied
Niger	1.537	Absence	0.535	Medium	1	Satisfied
Nigeria	1.085	Absence	0.189	Medium	1	Satisfied
Rwanda	2.486	Absence	0.571	Large	1	Satisfied
Senegal	1.571	Absence	0.533	Large	1	Satisfied
Sierra Leone	1.322	Absence	0.416	Large	1	Satisfied
Togo	1.780	Absence	0.529	Large	1	Satisfied
Uganda	1.334	Absence	0.372	Large	1	Satisfied
Zambia	1.302	Absence	0.447	Large	1	Satisfied
Zimbabwe	1.493	Absence	0.587	Large	1	Satisfied

Note: Average full collinearity VIF (AFVIF): **Threshold** - Acceptable if <= 5, ideally <= 3.3. Tenenhaus GoF (GoF): **Threshold** - Small >= 0.1, Medium >= 0.25, Large >= 0.36. Simpson's paradox ratio (SPR): **Threshold** - Acceptable if >= 0.7, ideally = 1.

Table 5.10: Model Fit and Quality of Indices Results (Continued)

Country	RSCR		SSR		NLBCDR	
	Value	Decision	value	Decision	Value	Decision
Angola	1	Satisfied	1		1	Satisfied
Burkina Faso	-	-	-	-	-	-
Cameroon	1	Satisfied	1	Satisfied	1	Satisfied
Comoros		Satisfied		Satisfied		Satisfied
Congo DR	1	Satisfied	1	Satisfied	1	Satisfied
Congo Republic	1	Satisfied	1	Satisfied	1	Satisfied
Cote D'Ivoire	1	Satisfied	1	Satisfied	1	Satisfied
Ethiopia	1	Satisfied	1	Satisfied	1	Satisfied
Gabon	1	Satisfied	1	Satisfied	1	Satisfied
Gambia	1	Satisfied	1	Satisfied	1	Satisfied
Ghana	1	Satisfied	1	Satisfied	1	Satisfied
Guinea	1	Satisfied	1	Satisfied	1	Satisfied
Kenya	1	Satisfied	1	Satisfied	1	Satisfied
Mali	1	Satisfied	1	Satisfied	1	Satisfied
Mozambique	1	Satisfied	1	Satisfied	1	Satisfied
Namibia	1	Satisfied	1	Satisfied	1	Satisfied
Niger	1	Satisfied	1	Satisfied	1	Satisfied
Nigeria	1	Satisfied	1	Satisfied	1	Satisfied
Rwanda	1	Satisfied	1	Satisfied	1	Satisfied
Senegal	1	Satisfied	1	Satisfied	1	Satisfied
Sierra Leone	1	Satisfied	1	Satisfied	1	Satisfied
Togo	1	Satisfied	1	Satisfied	1	Satisfied
Uganda	1	Satisfied	1	Satisfied	1	Satisfied
Zambia	1	Satisfied	1	Satisfied	1	Satisfied
Zimbabwe	1	Satisfied	1	Satisfied	1	Satisfied

Note: R-squared contribution ratio (RSCR): Threshold - Acceptable if >= 0.9, ideally = 1. The APC = Average path coefficient; ARS =Average R-squared and AFVIF = Average full collinearity Variance inflation factor and NLBCDR = Nonlinear bivariate causality direction ratio

Source: Author.

Table 5.10 showed the overall model fit and the quality of indices of the structural models regarding the individual sampled countries. The AFVIF tested for the overall average of the variance inflator factor to determine if there was overall existence of multicollinearity in the system. For all the 25 countries' structural models, they were free from multicollinearity problem because all values in column 2 were less than 5, the benchmark of VIF. The column with Tenenhaus Goodness of Fit Test T(GoF) explained the overall

goodness of fit of the model with Tenenhaus methodology of global Goodness of Fit Test (T- GoF) (Tenenhaus, et al., 2004). The Tenenhaus index measured the global criterion of goodness of fit. The T(GoF) results were to be interpreted as small, medium and large. Firstly, Kenya and Nigeria had a small T- GoF. Secondly, Congo Republic, Cote D'Ivoire, Gambia and Guinea had a medium global effect in the estimated T-GoF. Finally, all other countries in the sample, except Burkina Faso[28], have global large effect in the estimated T-GoF.

Furthermore, Table 5.10 showed the Simpson's paradox among variables within the system. Simpson paradox is a situation where the trend appears in various groups of data but found missing later when the various groups of the data are combined (Matheson, 2008). Thus, the Simpson's paradox index did not exist in the estimated results presented in the Table 5.10 because all the countries' Simpson's paradox values were 1. The SPR in the estimated model satisfied the Simpson's paradox criterion for all the countries. The R-squared contribution ratio (RSCR), SSR and NLBCDR were satisfied in the structural model. The most preferable conditions for the RSCR, SSR and NLBCDR were to have a maximum value of 1. In a nutshell, the model fit and the quality indices for all the sampled countries were achieved.

5.3.3 Reliability Test – Internal Consistency

This subsection presented the results of the internal consistency of the model in Table 5.11.

[28] Burkina Faso estimated results showed that poverty was negatively related which is out of the scope of the existing theory or assumptions of education, growth and poverty (Barro, 2001; Dollar & Kraay, 2000, Dollar, et al., 2013; Krueger & Lindahl, 2001)

Table 5.11: Internal Consistency Results

	Cronbach Alpha		Composite Reliability	
Country	**EDINQ**	**PVLT**	**EDINQ**	**PVLT**
Angola	0.889	0.74	0.932	0.818
Burkina Faso	-	-	-	-
Cameroon	0.876	0.488	0.926	0.631
Comoros	0.958	0.70	0.973	0.757
Congo DR	0.927	0.713	0.954	0.813
Congo REP	0.933	0.530	0.957	0.691
Cote D'Ivoire	0.890	0.404	0.933	0.629
Ethiopia	0.833	0.580	0.903	0.731
Gabon	0.513	0.574	0.750	0.714
Gambia	0.942	0.438	0.963	0.629
Ghana	0.880	0.577	0.928	0.733
Guinea	0.942	0.438	0.963	0.629
Kenya	0.830	0.622	0.902	0.751
Mali	0.966	0.597	0.978	0.709
Mozambique	0.922	0.70	0.951	0.773
Namibia	0.879	0.663	0.927	0.772
Niger	0.941	0.620	0.963	0.748
Nigeria	0.547	0.431	0.763	0.628
Rwanda	0.808	0.605	0.891	0.720
Senegal	0.963	0.70	0.976	0.744
Sierra Leone	0.977	0.606	0.985	0.738
Togo	0.929	0.680	0.956	0.780
Uganda	0.887	0.532	0.932	0.676
Zambia	0.909	0.619	0.944	0.729
Zimbabwe	0.937	0.665	0.960	0.766

Source: Author's computation

Table 5.11 presented the Cronbach Alpha results that determined the internal consistency of the model. All the countries satisfied the 0.7 threshold of Cronbach Alpha in EDINQ. However, in the PVLT, only Angola, Comoros, Congo DR, Mozambique and Senegal that satisfied the threshold of 0.7. Nevertheless, the composite reliability test carried out indicated that all the countries met the threshold of 0.6 for both EDINQ and PVLT. This implied that all the twenty-four sampled countries structural models achieved internal consistency.

5.3.4 Convergent and Discriminant Validities and Multicollinearity Tests

This subsection presented the results of the convergent validity, discriminant validity and multicollinearity test. The findings were presented in Table 5.12.

Table 5.12: Convergent and Discriminant Validities and Multicollinearity

	AVE		Multicollinearity	Discriminant Validity
Country	**EDINQ**	**PVLT**	**Value**	**Condition**
Angola	0.822	0.398	1.989	Satisfied
Burkina Faso	-	-	-	-
Cameroon	0.808	0.403	3.276	Satisfied
Comoros	0.922	0.340	1.801	Satisfied
Congo DR	0.875	0.50	1.870	Satisfied
Congo RE	0.882	0.310	1.090	Satisfied
Cote D'Ivoire	0.824	0.306	1.010	Satisfied
Ethiopia	0.762	0.391	1.560	Satisfied
Gabon	0.631	0.337	1.701	Not satisfied PVLT
Gambia	0.897	0.301	1.163	Satisfied
Ghana	0.813	0.418	2.195	Satisfied
Guinea	0.897	0.301	1.163	satisfied
Kenya	0.759	0.301	1.068	satisfied
Mali	0.937	0.427	3.418	Satisfied
Mozambique	0.867	0.387	1.512	Satisfied
Namibia	0.811	0.369	1.280	Satisfied
Niger	0.896	0.371	1.537	Satisfied
Nigeria	0.586	0.279	1.09	Satisfied
Rwanda	0.737	0.339	2.486	satisfied
Senegal	0.931	0.374	1.571	Satisfied
Sierra Leone	0.956	0.340	1.322	Satisfied
Togo	0.878	0.376	1.780	Not satisfied in PVLT
Uganda	0.821	0.273	1.334	Satisfied
Zambia	0.848	0.313	1.302	Satisfied
Zimbabwe	0.890	0.351	1.493	Satisfied

Source: Author's Estimations

Table 5.12 showed that the convergent validity was achieved when the value of AVE ≥ 0.5. For the EDNQ latent variable, all the countries have values greater than 0.5. However, the PVLT only Congo DR met the condition. Nevertheless, we checked for

discriminant validity of the structural model for further testing of model system. All the countries except Gabon and Togo did not satisfied the discriminant validity. Further attempt was taken to see if the manifest variables were having problems of multicollinearity. All the sampled countries were multicollinearity free because the VIF for each country exhibited value less than 5, and as such relied on the measurement model results.

5.3.5 The Structural Model Results

This subsection presented the path of the coefficients regarding loadings and cross loadings. The findings of the loadings and the cross loadings were presented in sub-subsection 5.3.2.1.

5.3.5.1 Combined Loadings and Cross Loadings

Each country of the cross loadings for the latent variables were presented in Appendix I. According to the Appendix I, the findings of the loadings and the cross loadings were all statistically significant at $P < 0.05$. The loadings were greater than the threshold of 0.7.

5.3.5.2 Presentation of Poverty Path Coefficient

This subsection presented the path coefficient of poverty for each twenty-four-sampled country. Poverty path coefficient was expected to be positive to satisfy economic theory. However, the author like to document that there was no result presented for Burkina Faso because the coefficient of the poverty path was negative. As such, only twenty-four countries findings were presented in this aspect of the thesis. Further work would be required in case of Burkina Faso in the future studies. Thus, the path coefficient results, p-value, standard error (SE), effect size, and R^2 were presented in Table 5.13.

Table 5.13: Poverty Path Coefficients Results

Country	Coefficient	p-value	SE	Effect Size	R^2 - EDINQ
Angola	0.716	0.001*	0.047	0.513	0,513
Burkina Faso	-	-	-	-	-
Cameroon	0.843	0.001*	0.046	0.710	710
Comoros	0.692	0.001*	0.047	0.479	0.479
Congo DR	0.804	0.001*	0.052	0.647	0.647
Congo Republic	0.354	0.001*	0.049	0.126	0.126
Cote D'Ivoire	0.371	0.001*	0.049	0.137	0.137
Ethiopia	0.653	0.001*	0.047	0.426	0.426
Gabon	0.673	0.001*	0.047	0.453	0.453
Gambia	0.458	0.001*	0.048	0.210	0.210
Ghana	0.743	0.001*	0.046	0.552	0.552
Guinea	0.458	0.001*	0.048	0.210	0.210
Kenya	0.268	0.001*	0.049	0.072	0.072
Mali	0.903	0.001*	0.045	0.815	0.815
Mozambique	0.600	0.001*	0.047	0.360	0.360
Namibia	0.501	0.001*	0.048	0.251	0.251
Niger	0.672	0.001*	0.047	0.452	0.452
Nigeria	0.287	0.001*	0.049	0.082	0.082
Rwanda	0.779	0.001*	0.048	0.607	0.607
Senegal	0.660	0.001*	0.047	0.435	0.435
Sierra Leone	0.517	0.001*	0.048	0.267	0.267
Togo	0.668	0.001*	0.047	0.447	0.447
Uganda	0.503	0.001*	0.048	0.253	0.253
Zambia	0.587	0.001*	0.047	0.345	0.345
Zimbabwe	0.745	0.001*	0.046	0.555	0.555

Note: Dependent Variable = EDINQ; *Significant at $p < 0.05$.
Source: Authors Estimations

Table 5.13 showed the results of the 24 sampled countries except for Burkina Faso. The findings showed that poverty influenced education inequality at varying degrees. All the path coefficients were statistically significant at $p < 0.05$ level of significance. Furthermore, using the Cohen (1988) Table, the effect size of the path coefficient was explained as small, medium and large. Those countries that had their small effect sizes included Congo Republic, Cote D'Ivoire, Kenya and Nigeria. Those countries that had their effect sizes at medium level included Angola, Comoros, Ethiopia, Gabon, Gambia, Guinea, Mozambique Namibia, Niger, Senegal. Other countries included Sierra Leone, Togo, Uganda and Zambia. Cameroon, Congo DR, Rwanda, Ghana Mali, and Zimbabwe

had large effect sizes. In the same order, the R^2 values showed similar values with the effect sizes.

5.4 Discussion of Findings

Previous studies showed that the problem of the developing countries, particularly the rural areas, maintained a high level of education inequality across households and poverty (Bonal, 2007; Gruber & Kosack, 2014; Wu et al., 2008). Hence, the thesis position was to document that, at the kickoff of this thesis - chapter one and from the research gap - the purpose of the study was not to determine whether differences in education or low education causes poverty nor investigated relationship between educational inequality and growth. Instead, the thesis bordered to test the hypothesis if poverty positively predicted education inequality. To re-emphasise the focus of the thesis objective 2, the previous study of Wu et al. (2008) delved into the understanding that households with differences in education fell into poverty faster than those with similar economic advantage. In other words, education inequality caused poverty. In this chapter, we analysed the relationship between education inequality and poverty in the sampled twenty-five SSA countries and presented their results. Firstly, cumulatively, the author analysed for the twenty-five SSA and results were presented in section 5.2. Secondly, individual country results were presented for comparative perspective in section 5.3. In this section, discussion on the relationship between poverty and education would give us the understanding of the sampled countries. The results were discussed in two parts. Part 1 was based on the general discussion on the cumulative Sub-Saharan African results. Part 2 was based on (i) Country income classification (ii) IDA classification and (iii) Natural resources – oil and gas and non-oil and gas countries.

5.4.1 General Discussion –Results of Sub-Saharan African Countries

Capitalism is a form of an economy, but it is exploitative. Although capitalism was good for some certain countries, the current trend of development has shifted from capitalism to knowledge-based economy (Barro, 2001, 2013, Nussbaum, 2000a). For example, most of the OECD countries diverted their attention to the knowledge-driven economy instead of capitalism (Iles, 2001). However, knowledge is achieved through sufficient human capital development that produces manpower for human to gain freedom (Sen, 1999). A low-level education was assumed to bring about low development (Capra, 2009). With that reasoning, evidence from existing data of Sub-Saharan African countries on education index for 2013 (UNDP, 2013) demonstrated that the countries in the SSA are educationally deprived, both at international and across households. the low education was the unreadiness of the countries to accept the change from the conventional capitalism to knowledge-based economy.

Since 1957, when Ghana became the first African country to gain independence, there had been changes in social, economic and the political terrain in the Sub-Saharan African economies. Although changes had took place in handling of the economic resources, little development was witnessed in the last 4 decades, as the region remained the poorest continent compared to other parts of the world (World Bank, 2018). It is much reasonable to assert that the SSA could attain a high level of development if the 'will to do' is built-in into the development models by all the development stakeholders of each country. This optimistic assertion rested on the issue that Sub-Saharan African countries are endowed with abundant natural resources. Most of its natural resources are sufficient to transform the economies to a high-income economic status. In other words, the resources are sufficient to bring about better performance in achieving multidimensional indices of human development such as health, education and standard of living.

Prior to 2000, growth was the main target of development and to relieve the poor from survival. For example, in the year 2000, Dollar and Kraay (2000) maintained that growth was good for the poor and in 2013 Dollar et al. (2013) found that growth remained an indicator to remove the poor from poverty status. In this context, substantial number of the SSA countries enlarged their economies. Because of the macroeconomic instability, there were variations in many of the SSA countries' annual growth rate. Taking the 2017 annual growth rate of the twenty-five countries sampled in this thesis, with exception of Namibia, the overall growth rate was 5.12% for 24 countries (without Namibia because of no data at the time of writing) (World Bank, 2018). Ethiopia had the highest growth rate of 10.2% while Ghana, Guinea and Nigeria had 8.5%, 8,2% and 8% respectively. The lowest among the countries was Gabon with 1.1%.

However, despite the aggregated over 5% annual growth rate of the 24 countries, development changes taking place was very slow to keep pace with the competitive world economies. These development challenges included the low level of education across household, poor diversification of its economies, poor health facilities and personnel, and poorly handling multidimensional indices of living standard, such as toilet, housing, owing a car, bicycle and able to pay rent. These are the indices of human development challenges confronting the Sub-Saharan African countries. In this thesis, the overall findings of the SSA confirmed that poverty with multidimensional indices has a strong influence on households being deprived of education. From the DHS pooled data of 9,432 for 25 countries sampled in this thesis, the thesis confirmed that poverty caused education inequality to increase by 82.14%. In other words, cumulatively, a unit increase in poverty caused 82% increase in education inequality regarding the pooled data of the 25 countries sampled. This result was consistent with the argument of Apata et al. (2010) and Babatunde, Olorunsanya and Adejola (2008) that poverty affected the rural sector and socioeconomic characterizes such as education in the Southern Nigeria States. Although

Wu et al. (2008) directly found that education inequality caused poverty in the rural China, this current study confirmed that relationship is bi-directional. Expectedly, with household income capability, children are privileged to enroll, stay in school during the expected years of schooling and complete the seven levels of education (Barro & Lee, 2013), otherwise exclusion would be promoted (Stiglitz, 1999) and education inequality will be on the high side.

Viewing from the perspective of growth, the existing theory on growth explained that growth is still good for the poor to cross the poverty region (Aigbokhan, 2008; Dollar & Kraay, 2000 Fatah et al., 2012). The growth was influenced by development of human capital as explained by the level of education of the household (Barro, 2001; Krueger & Lindahl, 2001), Theoretically, education positively correlates with growth and growth has an inverse relationship with poverty because growth will lift the poor out of poverty. However, the current findings showed that poverty positively correlated with education inequality, whereas expectedly, education was assumed to correlate with growth that will reduce poverty. More simply, poverty is multiplying education inequality. The more the level of educational inequality caused by poverty resulting to low educational attainment, the far apart would development be taking place. The consequence would be less freedom/autonomy (Sen, 1999) and aggravate high rate of exclusion (Muddiman, 2000). Thus, as a matter of development, the thesis positioned that emphasis should be laid on poverty indices instead of growth. For example, Glomm and Ravikumar (1992) argued that household could prefer public schools to private if the household income capacity is insufficient for private schools. In other words, if income inequality is uncontrolled, substantial household would be deprived from schooling because of low income. The justification for laying emphasis on poverty indices instead of growth was of two-fold. Firstly, although public schools offered low cost of schooling, most of the countries sampled in this thesis are having educational infrastructural decay to provide quality

education for the household children in school (Bonal, 2007). Hence, more children were vulnerable to be out-of-school system as well as hinder required knowledge for functional participation in societal activities. Secondly, high income inequality existed in these countries. According to World Bank (2018), there were political mayhem in most of the countries such as Nigeria, Cameroon Niger which caused the income gap between the political capitalist and the people.

From the gender decomposition, a further understanding of the inequality was presented. Comparing the male and female educational distribution, the gender equality in education distribution was compromised to some extent (Cooray & Potrafke, 2011; Baliamoune-Lutz & McGillivray, 2015). Though there was a continued presence of inequality in education distribution and that 60% of the countries sampled had no gender gap, some countries demonstrated that the female sex were at disadvantage of education distribution. In other words, out of the 25 sampled SSA countries, 10 countries representing 40% of the total countries sampled, the female subgroup was worse off than the male counterpart in the distribution. These countries' gender analysis shows that the female carried the substantial part of the incidence of education inequality. These countries included Cameroon, Cote D'Ivoire, Gambia, Ghana, Guinea, Nigeria, Senegal and Sierra Leone. For example, in 2013, the SSA report showed that 70% of girls never been to school (UNESCO-EFAGMR, 2013). Nevertheless, Namibia and Togo have a slight share of the incidence of education inequality across the sexes. The result agreed with Baliamoune-Lutz & McGillivray, (2015) that gender inequality in education caused an inverse relationship with income in the SSA.

5.4.2 Discussions – Individual Results of Sub-Saharan African Countries

This subsection discussed the findings of individual sampled countries in the thesis. It is imperative to remind that Burkina Faso was not included in the sampled countries for

discussion because the estimated results showed that poverty was negatively related to education inequality contrary to economic proposition. Also, the country was not included because no justification found to support the results in the previous findings. Being that said, the discussion was based on the premise that countries characteristics differ, though similar in some cases such as natural endowment. The result of the twenty-four countries were discussed under the income, IDA and, Oil and gas and Non-oil and gas classifications.

5.4.2.1 Poverty and Country Income Classification

Essentially, to understand each of the countries, their income status would explain why poverty influenced education inequality across the twenty-four sampled countries. According to World Bank, the countries were grouped into low, low middle, upper middle and high-income countries. the degree of effect of poverty on the rising of education inequality was classified into very low poverty impact (PVLT > 0 ≤ 0.25) moderately low poverty impact (PVLT > 0.25 ≤ 0.5); moderately high poverty impact (PVLT > 0.5 but ≤ 0.75) and extremely high poverty impact (PVLT > 0.75). Hence, the countries income classification was presented in Table 5.14.

Table 5.14: Comparative Analysis – Poverty and Income Classification

Classification	Country			
Range →	> 0 ≤ 2.5	> 2.5 ≤ 0.5	> 5 ≤ 75	> 75
Low Income		Gambia, and Guinea	Comoros, Ethiopia, Mozambique, Niger, Senegal, Sierra Leone, Togo and Uganda Zimbabwe	Congo DR, Mali and Rwanda
Lower Middle Income		Congo Republic, Cote D'Ivoire, Kenya Nigeria	Angola, Ghana, Zambia	Cameroon,
Upper middle Income			Gabon, Namibia,	
High Income	Nil	Nil	Nil	Nil

Note: Very low poverty impact (PVLT ≥ 0 ≤ 0.25); moderately low poverty impact (PVLT > 0.25 ≤ 0.5); moderately high poverty impact (PVLT > 0.5 but ≤ 0.75) and extremely high poverty impact (PVLT > 0.75).
Source: Author.

Table 5.14 showed that fourteen (14) countries representing 58.33% had poverty impact on the education inequality at the low-income countries' status. The findings showed that the GNI per capita used that classified the countries was essentially important to control the rising of educational inequality across the sampled countries. The Table 5.14 also put on record that the countries occupying the upper-medium income countries had moderately high poverty impact on the dependent variable, education inequality. The countries included Gabon and Namibia. Although Namibia poverty reduced from 31.5% in 2003 to 13.4% in 2015, the current finding of poverty impact on education inequality explained clearly that education inequality of the countries was influenced by poverty. According to World Bank estimation, the inequality of Namibia could be due to the Gini coefficient that remained averagely high, that is, 59.1% in 2015. Commendably, the Namibia government's effort to reduce education inequality was found in its reduction of out-of-school from 43,755 in 2012 to 8,724 in 2017 which accounted for 80% reduction during the period.

Another evidence of this thesis was the findings of Cameroon having 84.3% poverty impact on the country's education inequality. This finding falls within the lower upper income countries where poverty shredded education distribution of the country. Again, although this thesis confirmed that Zimbabwe had the strongest ability to reduce the education inequality, the existing inequality was highly motivated by poverty of the country. According to World Bank Poverty and Equity Portal database November 2018, the poverty profile of Zimbabwe was 21.4% in 2011, This percentage strongly impacted positively on the country's educational distribution. In other words, the strength of multidimensional poverty which was extremely high for Zimbabwe pulled the households into the education inequality experienced in the country. Those in the same category were Congo DR, Mali and Rwanda. Notably, Mali had the highest poverty impact of 90.3% indicating that Mali education distribution had been strongly influenced by the quantity of multidimensional poverty in the country, which was 49.7% in 2009. Also, the countries within the low-middle income classification included Congo Republic, Cote D'Ivoire, Kenya, Nigeria, Angola, Ghana, Zambia and Cameroon. Those countries under the upper-middle income countries group had their poverty impact ranging from moderately low to extremely high on the response variable, educational inequality.

In a nutshell, the result was in line with Glomm and Ravikumar (1992) that if income inequality does not arise, household would be opportune to choose suitable schools for their wards. Hence, the GNI per capita that classifies the countries suggested that there were income inequalities among the countries sampled in the thesis. Hence, attention is necessary to be paid to income distribution and multidimensional poverty indices. Although other indicators influencing human development are important, it is imperative that government of Cameroon, Congo DR, Mali, Rwanda and Zimbabwe with extreme poverty impact on education inequality should pay attention to multidimensional poverty indices to control the extremely rising of educational inequality in their countries.

5.4.2.2 Poverty and IDA Borrower Countries

The findings regarding poverty impact were classified according to the World Bank International Development Association (IDA) regarding countries obtaining concessional loans and the comparative analysis were presented in Table 5.15. The discussion would assist to understand if loans obtained from the World Bank was evenly distributed to benefit the household in fulfilment of IDA condition World Bank, 2018).

Table 5.15: Comparative Analysis – Poverty and IDA Borrower Countries

Classification	**Country**			
Range →	**> 0 ≤ 2.5**	**> 2.5 ≤ 0.5**	**> 5 ≤ 75**	**> 75**
IDA countries		Gambia, and Guinea Congo Republic, Cote D'Ivoire, Kenya, Nigeria	Comoros, Ethiopia, Ghana, Mozambique, Namibia, Niger, Senegal, Sierra Leone, Togo, Uganda and Zambia	Cameroon, Congo DR, Mali, Rwanda and Zimbabwe
Non-IDA Countries			Angola, Gabon, Namibia	

Source: Author's summary from the Poverty estimated results regarding the World Bank IDA Borrowing Countries

Table 5.15 showed the classification of IDA and non-IDA countries. Thus, 21 out of 24 countries presented representing 87.5% are IDA borrowers. Firstly, Cameroon, Congo DR, Mali, Rwanda and Zimbabwe taking loans from the IDA were extremely having their poverty impacted on the rising of education inequality, which varies from 76% through 90.3%. Likewise, Comoros, Ethiopia, Ghana, Mozambique, Namibia, Niger, Senegal, Sierra Leone, Togo, Uganda and Zambia have a moderately high poverty impact on the education inequality despite loans taken from the IDA. Secondly, Congo Republic, Cote D'Ivoire, Gambia, Guinea, Kenya and Nigeria - comprising of low-middle income countries - had moderately low of their poverty impacted on the rising of education inequality of the sampled countries. In the non-IDA borrowing group, Angola, Gabon and Namibia have their poverty impact moderately high. Thus, these findings showed that

most of the loans taken from the IDA were not significantly reflecting in the life of the households to improve household income to have a secondary effect on reduction of education inequality across the households.

5.4.2.3 Natural Resources – Oil and Non-Oil Perspective.

The discussion in this subsection deals with the understanding of the sampled countries regarding effect of natural resources on education distribution. The economic proposition was that wealth in terms of natural resources was expected to transform a low-income economy to a high-income country. Also, the abundant resources, with proper management was expected to impact on human development as explained by health, education and standard of living (Sen,1999). Hence, the thesis like to document that, either in large or small quantities, all the sampled countries sufficiently have mineral resources to transform its economy. Among the resources are gold, oil and gas, diamond, iron ore and zinc. Oil and gas is the most prominent among them which is produced in large quantity in major six oil-producing countries. The thesis hereby, classified the twenty-five sampled countries - except Burkina Faso - into oil and non-oil and gas countries. This would assist to understand the impact of the accrued revenue from oil and gas across the countries which might exacerbated the rising of inequality of education. Table 5.16 presented the comparative analysis of oil and non-oil countries.

Table 5.16: Comparative Analysis – Poverty and Oil and Non-Oil Countries

Classification	**Country**			
Range →	**> 0 ≤ 2.5**	**> 2.5 ≤ 0.5**	**> 5 ≤ 75**	**> 75**
Oil		Congo Republic Cote D'Ivoire, and Nigeria	Angola, and Gabon	Cameroon
Non-Oil Countries		Gambia, Guinea and Kenya	Comoros, Ethiopia, Ghana, Mozambique, Namibia, Niger Senegal, Sierra Leone, Togo, Uganda and Zambia	Congo DR Mali, Rwanda and Zimbabwe

Source: List of the oil producing countries was retrieved from Zhang and York (2009).

Table 5.16 presented the findings of poverty impact by comparing the oil and non-oil producing countries. In the thesis sample countries, there are six oil and gas producing countries in the SSA that are members of OPEC. These countries included Cote D'Ivoire, Nigeria, Angola, Gabon and Cameroon and Congo Republic. Although these are members of OPEC and have large field of oil and gas, the countries had varying and surprising results. Firstly, Cameroon and Congo DR with large field of oil have extremely high impact of poverty on education distribution with 84.3% and 80.4% of poverty impact on the countries education inequality. Secondly, Angola and Gabon had moderately high poverty impact on education inequality with the estimated value of 71.6% and 67.3% respectively. Thirdly, Cote D'Ivoire and Nigeria have a moderately low of poverty impact on the education inequality with 37.1% and 28.75% in that order. Although international headcount poverty ratio of Nigeria was 53.9% in 2009 (according to World Bank Poverty and Equity Portal Database), the 28.75% of poverty impact in this thesis indicated that poverty was not the major influential indicator for the 62.88% education inequality estimated in this thesis (See Chapter 4). Gregorio and Lee (2002) argued that where there is disequilibrium in education distribution, it was caused by the inequality of income.

Hence, income inequality expressed in the GNI per capita, school vulnerabilities, corruption, inappropriate application of loans, political instability and insecurity could be responsible indicators for the inequality of education in Nigeria (Achumba, et al., 2013; Adewale, 2017; Katsina, 2012).

Comparing the non-oil producing countries, Mali, Rwanda and Zimbabwe have extremely high poverty impact on the education inequality. Considering the range (> 2.5 ≤ 0.5), Comoros, Ethiopia, Ghana, Mozambique, Namibia, Senegal, Sierra Leone, Togo, Uganda and Zambia have moderately high poverty impact on the dominance of inequality of education representing 68.75% in the non-oil group and 45.83% in the whole sample of the thesis.

Notably, in this group, we have the Namibia whose economy currently is upper-middle income with 50.1% poverty impact. Cumulatively, though non-oil country but upper-middle country, Namibia findings showed that income inequality in Namibia exacerbated the depth of poverty across households which in turn promoted the inequality of education with 32.3%, as estimated in this thesis (See Chapter 4).

5.5 Summary of the Findings

Extensively, the thesis delved into the analysis of the relationship between education inequality and poverty in this chapter. The author estimated the parameter on poverty for both cumulative data of twenty-five (25) sampled countries and the twenty-four (24) individual countries except for the deletion of Burkina Faso whose poverty was negatively related to inequality of education.

Firstly, the cumulative result showed 82.14% poverty impact on the rising of education inequality in the 25 sampled SSA countries. The current findings showed that poverty positively correlated with education inequality, whereas, according to Krueger and Lindahl (2001) and, Barro (2001), education correlates with growth that will reduce

poverty. More simply, the issue here in the thesis findings indicated that poverty is multiplying education inequality across the SSA households, with reference to Angola, Cameroon, Congo DR, Ghana, Mali, Rwanda and Zimbabwe, whose poverty impact were higher than 70%. The more the level of educational inequality caused by poverty resulting to low educational attainment, the far apart is development taking place. The consequences are on the reduction of human freedom in the sharing of the economic resources (Sen, 1999) that would aggravate high rate of exclusion (Muddiman, 2000). Thus, as a matter of development, the thesis prefers more emphasis be laid on multidimensional poverty indices in those countries instead of growth.

Secondly, the thesis classified the understanding of individual country results into income classification, IDA and non-IDA borrowing classification and oil and non-oil classification. Thus, the income classification analysis was in line with Glomm and Ravikumar (1992) who argued that if income inequality does not arise, household would be opportune to choose suitable schools for their wards to have quality education and complete the seven levels of education (Gregorio & Lee, 2002). Hence, the GNI per capita that classified the countries suggested that there was income inequality, as well as the households occupied low income status across the countries sampled in the thesis. Hence, considerable attention would be necessary on income redistribution that could result to human development within the realm of multidimensional poverty indices.

Thirdly, the IDA classification analysis showed that IDA group accounted for 21 out of 24 countries presented representing 87.5% countries that are IDA borrowers. Being a member of IDA, it is economically expected that such concessional loans on the country development should promote wellbeing. However, the concessional loans obtained from IDA did not impact positively on the household income such that poverty could reduce to have secondary effect on education distribution. Thus, it may be necessary that loans

be taken with caution. In other words, loans were expected to be obtained on productive projects that could translate the household living standard. It would be implied that an effective application of the concessional loans would have a multiplier effect on the household's income.

Fourthly, the thesis realised that 62.5% of the oil and gas producing countries had poverty impact on the rising of education inequality. These countries include Angola, Cameroon and Gabon. It was equally noted that Nigeria - largest producer of oil among the eight countries – had little poverty impact on the education inequality as moderately low, that is, 28.75%. This development could imply that (i) income inequality expressed in the GNI per capita for countries income classification existed in the Nigeria (ii) schooling vulnerabilities (iii) corruption (iv) inappropriate application of concessional loans (v) political instability and (vi) insecurity - could be responsible development challenges that triggered inequality of education in Nigeria (Achumba, Ighomereho & Akpor-Robaro 2013; Katsina, 2012).

Finally, the results supported the social exclusion and human development theories used in this thesis (Iles, 2001; Silver, 1994; Sen, 2000; The Social Exclusion Unit, 2004). Coupled with Todaro and Smith (2012) argument regarding the effect of education on productivity, the poor development in the SSA was accounted for by the high level of poverty that exacerbated the rising of education differentials in the twenty-five sampled countries. The government of the SSA countries demonstrated the lack of hyper-activity to recognise education as a global human development indicator to transform poor economy to the one prosperous to increase human welfare.

CHAPTER 6: THE SSA SCHOOLING DROPOUT AND STABILITY

6.1 Introduction

In chapter 4, the thesis analysed and presented the findings of the quantity of education inequality for the twenty-five sampled countries of the SSA. Equally, the chapter 4 presented the relationship between education inequality and poverty in the sampled countries in chapter 5. To achieve objective 3, this chapter presented the speed of dropout spread among the primary school-age children that triggers educational inequality. Hence, the author presented the objective 3 where the objective was to determine the proportion of dropout among the eligible primary school children and the status of dominance in the Sub-Sahara Africa countries. This was because, over the years, dropout has been a strong challenge in educational development particularly in the developing countries (UNESCO-EFAGMR, 2013; Yi, Zhang, Luo, Shi, ….,Rozelle, 2012). For example, Balfanz et al. (2010), and Bonaldo and Pereira (2016),) argued that dropout is a social crisis that spread across the school age children and at all levels of education in America. Thus, dropout is an educational and social problem that negatively and strongly influencing education distribution. The dropout negative influence on human capital accumulation often led to low status → low income → poverty. Since dropout is a crisis, it did not just occur perchance (Burrus & Robert, 2012; Rumberger, 2011). Dropout is usually triggered by various socioeconomic indicators - among others, poverty and the high cost of schooling (Psychology-Glossary, 2017; Burrus & Roberts, 2012; Sum et al., 2009). Being that said, the thesis presented the findings obtained from the polynomial regression equation (see chapter 3), that predicted the rate and the stability of dropout using the SSA primary school data as well as individual twenty-five sampled countries in the thesis. However, due to unavailability of data, only nine (9) out of the twenty-five countries were analysed. The justification for the nine countries was because there were

missing data above 15% in the rest of 16 countries sampled in the thesis (Hair et al., 2014).

The chapter was organised into two empirical results. Firstly, we presented the cumulative results of the Sub-Saharan African countries as a region. Secondly, nine (9) of the twenty-five Sub-Saharan African countries were presented to explain the extent of the dropout for each country and their stabilities. So, the countries presented included Burkina Faso, Ethiopia, Gambia, Guinea and Mozambique. Others included Niger, Senegal, Togo and Zambia. The sampled countries that were not included in this chapter included Angola, Cameroon, Comoros, Congo Republic, Congo DR, Cote D'Ivoire, Kenya Gabon, and Ghana, Others were Namibia, Mali, Rwanda, Nigeria, Sierra Leone, Uganda and Zimbabwe. In overall, the chapter was organised into five sections.

6.2 Empirical Results – Sub-Saharan African Countries

This section presented the results of the polynomial regression equation comprising of the rate and the equilibrium point condition of dropout for the SSA as a region. In sequential, we presented the descriptive statistics results, normality test, goodness of fit, the model fit and the polynomial coefficients.

6.2.1 Descriptive Statistics

The descriptive result of the dropout school children in the SSA countries was presented in Table 6.1.

Table 6.1: Descriptive Statistics of Dropout Crisis

Item	Mean	Minimum	Maximum	skewness	Kurtosis
Dropout	36371494	28991192	45660088	0.25 (SE= 0.38)	1.44 (SE = 0.74).

N = 39; SD = 5259233.39

Source: Author's estimations.

The Table 6.1 result of dropout for the Sub-Saharan African countries showed that $n = 39$ $(\mu = 36371494.31; SD = 5259233.39; df = 95)$. The standard deviation result of dropout demonstrated that the individual item of the distribution deviated considerably from the mean value computed with 95% confidence interval. This implies that the dropout mean value was not closed to the actual mean of the total population. The 28991192.00 and 45660088.00 were the minimum and maximum values of the distribution. There were no missing values. The skewness result was given as: $Statistics = 0.25;\ SE = 0.38$ and the Kurtosis was given as: $Statistics = -1.44;\ SE = 0.74$

6.2.2 Normality Test

In statistical analysis, it is a requirement to test for normality of the distribution. Shapiro-Wilk test of normality was conducted because of the sample size, n, is less than 2000. The hypothesis of the Shapiro-Wilk normality test was stated as:

H_0: The observed distribution fits the normal distribution

H_1: The observed distribution does not fit the normal distribution

Reject null hypothesis when p < 5% because the Shapiro-Wilk test was not significant

Hence, the outcome of the Shapiro-Wilk normality test was presented in Table 6.2.

Table 6.2: Shapiro-Wilk Normality Test

Statistics	df	P - value
0.91	39	0.004*

Note: Significant p < 0.05

Source: Author's Estimations

Table 6.2 showed the Shapiro-Wilk normality test $Statistics(0.91;\ \mathrm{df} = 39; p = 0.004)$ where skewness was given as (0.25), and Kurtosis was given as (-1.44). Hence, the null hypothesis was rejected. The results suggested that the data was not normally distributed.

6.2.3 Linearity of the Model

Since the polynomial regression model specified in this study was linear, the linearity of the model was tested for using regression curve estimation (RCE) method. The data covered 1975 to 2013 (39 data points). The scatter-plot showed that the model was not linearly fit the data as shown in Figure 6.1.

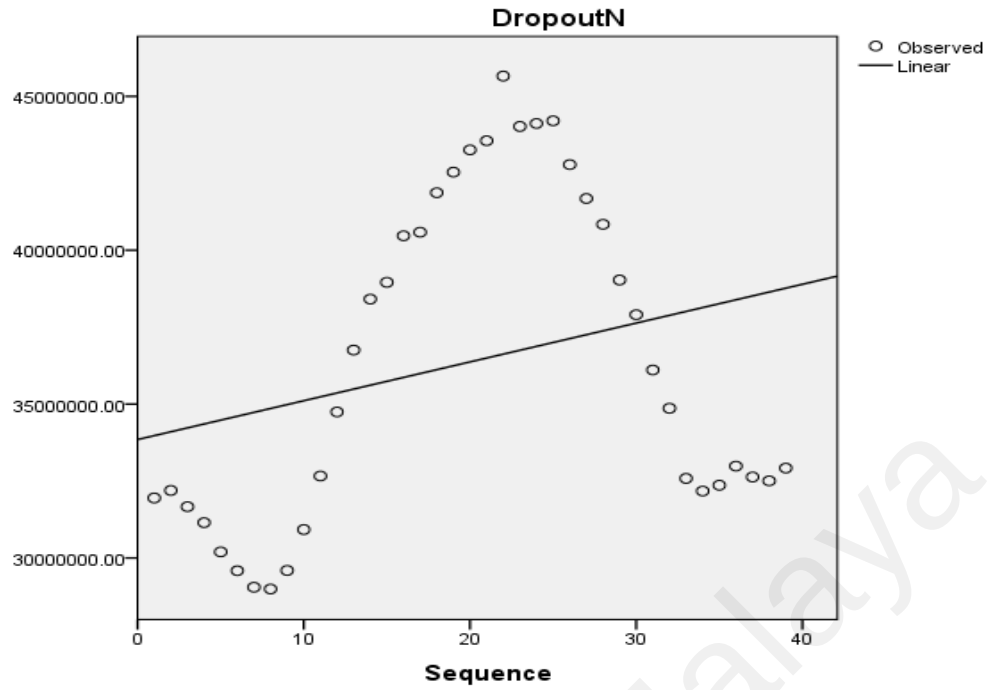

Figure 6.1: Linear Determination of Model Fit

Source: Author's computation

Figure 6.1 showed the model could not be fitted to the data. That is, the independent variables Xi scattered-plot and the dependent variable (dropout) indicated that the assumptions of linearity were violated. The breakdown suggested a further application of a mathematical model, a nonlinear relationship such as the polynomial modelling. As discussed in Chapter 3, we developed the polynomial equation that led to the quadratic function of the relationship. The polynomial regression equation (PRE) was introduced using the RCE technique to estimate the quadratic function and fit the model to data.

6.2.4 Nonlinear Model Fit

Since the linearity of the PRE assumption brokedown, the study used the RCE technique to fit the model to data. The model fit was ensured with the use of statistical package for social scientist (SPSS, version 22) as presented in Figure 6.2.

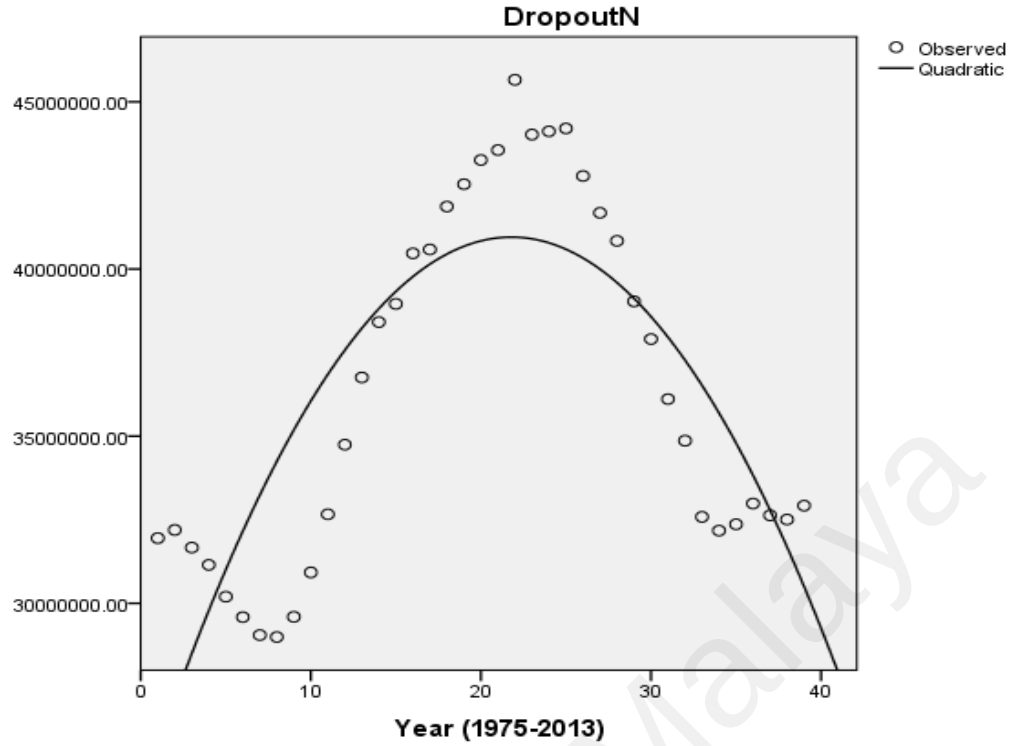

Figure 6.2: Nonlinear Model Fit

Source: Author's computation

The Y-axis of Figure 6.2 represented the dropout while the X-axis represented the time variant of the distribution. From the Figure 6.2, the quadratic of the polynomial model fitted to data. The model was fitted to data in the Figure 6.3.

6.2.5 Model Goodness of Fit

In a regression equation, the goodness of fit of the regression model (R^2) explained the total variation of the dependent variable as explained by the explanatory variables (Lehmann, 1975). It provided the power of prediction of the explanatory variables. The goodness of fit of the model was 0.667 which represented 66.7% that was explained by time variant in the estimated quadratic function. The adjusted R^2 computed produced the total adjusted variation of 0.648 representing 64.8% variation of the time indicator contribution to dropout. The R^2 complemented the model fit presented above.

6.2.6 Presentation of Regression Coefficient and Significance

The findings of the unstandardised and standardised coefficients; standard error, t-statistics and p-value were presented in Table 6.3.

Table 6.3: Dropout Coefficients and Significance

	Unstandardised Coefficients		Standardised Coefficients		
	B	Std. Error	Beta	t	Sig.
Case 1	1537506.90	182069.12	3.33	8.45	0.00
Case 2	-35284.31	4414.35	-3.16	-7.99	0.00
Constant	24204425.24	1579170.81		15.33	0.00

Source: Author's estimations

In Ferreira and Gignoux (2011), applying Gini coefficient and Theil index in education inequality estimation "are not event ordinally invariant to standardisation". (p.24). According to them, standardising the data during estimation is more efficient compared with the unstandardized, most especially when examining education achievement across geo-economic zones (Ferreira & Gignoux, 2011). In measuring the dropout, calls for standardisation of the estimated coefficients. Nevertheless, the two results were presented in Table 6.3 to help us explain the stability of the dropout crisis in education distribution.

Hence, the result of the polynomial regression model explained that a sizable proportion of the dropout variation was attributed to time variant. In other words, we reported that the unstandardised and standardised slopes for case sequence 1 produced 1537506.90 and 3.33 respectively ., where $\left(t = 8.45; SE = 182069.12;\ p = 0.00\right)$. The p-value of $p < 0.00$ suggested that the null hypothesis was rejected. For the case sequence 2, the unstandardised and standardised slopes produced the result of $-32584.31\ and\ -3.16\ respectively$, where $\left(t = -7.99; SE = 4414.35;\ p = 0.00\right)$. The p-value less than 0.05 equally suggested that the parameters estimated were statistically

significant at 5% level of significance. So, the dropout crisis had a significant impact on the prevalence of education inequality as confirmed in the estimated results for the 25 sampled SSA countries in chapter 4. It also showed that the region had been excluded considerably from equal distribution of education in the past 39 years. As a result, the human capital stock overtime was low due to substantial dropout from schooling each year. Furthermore, the constant when the time factor was considered zero, the average dropout of school children in the SSA countries for the two case sequences was 24,204,425.24. The result showed two scenarios. Firstly, the 24,204,425.24 was less than the average UNESCO official report of actual dropout for the region. Second, the average dropout calculated was a substantial value that considerably affect human capital stock of the sampled SSA countries.

6.2.7 The Equilibrium Point Condition

To predict the stability of dropout which was overlooked quantitatively in the previous studies (Balfanz et al., 2010), the study took a step further to estimate the equilibrium point condition (EPC). The EPC analysis followed the methodology of the discriminant of the quadratic function as specified in chapter 3. The EPC is hereby re-presented.

$$D0 = \beta - \phi\alpha_0 \qquad \text{(See equation 3.28)}$$

Hence, we used 2016 Microsoft excel to calculate the value of D_0 in the equation.

$$D_0 = \beta^2 - 4\phi\alpha_0$$
$$D_0 = 1537506.904^2 - 4(-35284.308 * 24204425.24)$$
$$D_0 = 5.78E + 12$$
$$Hence,\ D_0 > 0$$

Reference to the explanation of EPC in chapter 3, the result of the discriminant D_0 was understood as:

1. If $D_0 > 0$, the dropout crisis in SSA countries was epidemic, unstable or non-stationary overtime.
2. If $D_0 < 0$, the dropout in the SSA countries was endemic, stable or stationary overtime.
3. If $D_0 = 0$ then there is a shift either from stable or unstable, but no denial that the syndrome existed in the SSA countries. Hence, the study parameters define the rate at which it existed.

From the discriminant (D_0) result presented above, the $D_0 > 0$ with a value of $D_0 = 5.78E+12$. Hence, the assumption that the dropout was not stable in the SSA countries, hereby not rejected. This implied that dropout was unstable and severe for the period of 39 years.

6.3 Empirical Findings – Results of Individual Countries

This subsection presented the dropout of the nine (9) countries that their data were available, to provide understanding of the individual country's status on dropout and be useful to draw meaningful policy implication on the problem. Hence the results of the nine countries were presented in Table 6.4.

Table 6.4: Individual country's Dropout Coefficients and Significance

Country	Constant			Unstandardized Coefficients						Standardized Coefficient		R^2
	Value	SE	P value	Case 1	SE	P-value	Case 2	SE	P-value	Case 1	Case 2	
Burkina Faso	13.57	0.03	0.00	0.04	0.04	0.00	-0.001	0.000	0.000	3.44	-3.40	0.709
Ethiopia	15.45	0.08	0.000	0.50	0.012	0.000	-0.03	0.000	0.000	1.25	-2.09	0.862
Gambia	10.82	0.08	0.000	-0.001	0.009	0.905	0.000	0.000	0.106	-0.06	0.76	0.504
Guinea	12.31	0.91	0.000	0.033	0.012	0.012	-.0.001	0.000	0.000	1.45	-2.01	0.199
Mozambique	13.49	0.12	0.000	0.058	0.014	0.000	-0.002	0.000	0.000	2.18	-2.54	0.465
Niger	13.72	0.026	0.000	0.032	0.004	0.000	-0.001	0.000	0.000	2.80	-2.13	0.815
Senegal	13.27	0.34	0.ooo	0.016	0.004	0.000	0.000	0.000	0.000	2.25	-2.45	0.376
Togo	12.11	0.173	0.000	0.003	0.020	0.880	-0.001	0.173	0.130	0.08	-0.76	0.479
Zambia	12.02	0.115	0,000	0.075	0.013	0.000	-0.001	0.000	0.000	2.71	-2.33	0.531

Table 6.4 presented the results of the nine countries regarding the rate of dropout and the stability of this educational problem. The Table presented the rate at which dropout increased (case 1) and decreased (case 2). Firstly, out of the nine countries, Gambia and Togo had their parameters not significant at 5% level of significance. The Gambia p-values for case 1 and case 2 were 0.905 and 0.106 respectively while Togo p-values for care 1 and case 2 were 0.880 and 0.130 respectively. Other seven countries had their p-values for both case 1 and 2 to be ($p<0.05$). The smaller of the standard errors for both cases and the remaining seven countries confirmed the significance of the parameters estimated. Besides Guinea, Mozambique, Senegal and Togo that had goodness of fit (R^2) below 50%, the remaining countries had their goodness of fit above 50%.

Furthermore, the coefficients for each country were presented with standardized and unstandardized. The standardised coefficients were used to understand the rate of dropout for each country while the unstandardised was further used to estimate the equilibrium point condition (EPC). As earlier said, the case 1 of the standardised coefficient explained the rate of increase. On the one hand, among the significant variables, Burkina Faso had the higher rate at which dropout occurred in the country with value of 3.44. This was followed by Niger and Zambia with 2.80 and 2.71 respectively. The lowest rate of increase was Ethiopia with 1.25, followed by Guinea with 1.45. Others included Mozambique and Senegal with 1.45 and 2.25 respectively. On the contrary, there were variations in the rate of decrease. Burkina Faso, Mozambique, Senegal, Zambia, Niger, Ethiopia and Guinea had their rate of reduction with the values of -3.40, -2.54, -.2.45, -2.33, -2.13 and -2.01 respectively. Further explanation was provided in the discussion of findings sections.

6.3.1 Empirical Results – Dropout Gender Decomposition

This section 6.3.1 presented the findings of the gender decomposition for the nine countries whose data were available at the time of this study. Although there was insufficient data to estimate for the remaining sixteen countries, the results here presented would further expatiate the depth of dropout that increases education inequality in the SSA countries. Also, the findings provided the understanding of dropout, to which consideration was given to the extent of gender inequality across the nine sampled SSA countries in this chapter. The result was presented in Table 6.5.

Table 6.5: Individual Country's Dropout Gender Results

Country	Gender	Constant			Unstandardized Coefficients						Standardized Coefficient		
		Value	SE	P value	Case 1	SE	P-value	Case 2	SE	P-value	Case 1	Case 2	R^2
	Male	12.88	0.04	0.000	0.28	0.004	0.000	-0.001	0.000	0.000	3.15	-.3,40	0.582
Burkina Faso	Female	12.88	0.03	0.000	0.04	0.004	0.000	-0.001	0.000	0.000	3.60	-3.55	0.776
	Male	14.68	0.09	0.000	0.05	0.01	0.000	-0.003	0.000	0.000	1.23	-2.08	0.866
Ethiopia	Female	14.83	0.08	0.000	0.05	0.01	0.000	-0.002	0.000	0.000	1.26	-2.09	0.848
	Male	12,31	0,09	0.000	0.03	0.01	0.012	-0.001	0.000	0.001	1.45	-2.01	0.484
Guinea	Female	12.62	0.07	0.000	0.03	0.01	0.004	-0.001	0.000	0.000	1.77	-2.21	0.440
	Male	9.87	0.12	0.000	-0.002	0.013	0.858	0.001	0.000	0.035	-0.071	0.87	0.636
Gambia	Female	10.82	0.08	0.000	-0.001	0.000	0.905	0.000	0.000	0.106	-.056	0.76	0.504
	Male	12.74	0.13	0.000	0.055	0.015	0.001	-0.002	0.000	0.000	1.849	-2.32	0.475
Mozambique	Female	12.85	0.107	0.000	0.062	0.013	0.000	-0.002	0.000	0.000	2.45	-2.71	0.469
	Male	12.96	0.033	0.000	0.031	0.005	0.000	-0.001	0.000	0.000	2.98	-2.54	0.645
Niger	Female	13.07	0.022	0.000	0.033	0.003	0.000	-0.001	0.000	0.000	2.55	-1.75	0.905
	Male	12.49	0.31	0.000	0.009	0.004	0.012	-8.7E-5	0.000	0.312	1.19	-0.46	0.566
Senegal	Female	12.64	0.038	0.000	0.023	0.004	0,000	-0.001	0.000	0.000	1.86	-2.54	0.746
Togo	Male	11.34	0.557	0.000	-0.081	0.065	0.225	0.001	0.002	0.63.7	-0.75	0.29	0.224

Table 6.5: Individual Country's Dropout Gender Results (Continued

	Female	11..72	0.115	0.000	0.009	0.013	0.489	0.001	0.000	0.025	0.32	-1.05	0,565
	Male	11,1	0.106	0.000	0.089	0.012	0.000	-0.002	0.000	0.000	2.84	-2.30	0.691
Zambia	Female	11.52	0.128	0,000	0.064	0.014	0.000	-0.001	0.000	0.000	2.42	-2.24	0.360

Like the regional analysis, the thesis provided the overall results for the nine countries used in this study, with emphasis on the p-values, SE, R^2 and the standardised result. Firstly, Table 6.9 regarding case 1, the parameters were not significant for both male and female in Gambia and Togo. Other countries were significant. In case 2, male parameter in Gambia was significant but insignificant for female. In Senegal and Togo, male was not significant but significant for female in the two countries. The coefficient of the constant was significant for all the countries. The standard errors confirmed if the parameters were significant. The R^2 values were at varying degrees. In male, Ethiopia, Zambia, Niger, Gambia and Burkina Faso had 86.6%, 69.1%, 64.5%, 63.6% and 58.2% respectively, for the findings of the goodness of fit (R^2). Others included Senegal, Guinea, Mozambique and Togo accounted for 56.6%, 48.4%, 47.5% and 22.4% respectively. Regarding female, Niger, Ethiopia, Burkina Faso, Senegal, had their goodness of fit as 90.5%, 84.5%, 77.6%, 74.6% and Togo 56.5% respectively. Others included Gambia, Mozambique, Guinea and Zambia with R^2 values of 50.4%, 46.9%, 44.0% and 36.0% in that order.

The result of the standardised for case 1 showed that Gambia and Togo had the reversed sign of negative (-), hence, they are ignored. In male, Burkina Faso, Niger, and Togo had their rate of dropout increasing at the speed of 3.15, 2,98 and 2.84 respectively. Others in the group included Ethiopia (1.23), Guinea (1.45) and Mozambique (1.85). The female rate of the spread of dropout in Burkina Faso, Niger, Mozambique and Zambia were 3.60, 2.55, 2.45 and 2.42 in that order. On the other hand, the rate of reducing the dropout showed that Burkina Faso, Niger, Mozambique, Ethiopia, Zambia, Guinea and Gambia had the values of -.3.40, -2.54, -2.32, -2.08, -2.30, -2.01, and 0.87 respectively in the male group. In the female group, Burkina Faso (-3.55), Mozambique (-2.71), Senegal (-2.54), Zambia (-2.24), Guinea (-2.21), Ethiopia (-2.09), Niger (-1.75) and Togo (-1.05), which demonstrated the speed at which dropout was reduced overtime.

6.3.2 Empirical Results – The Equilibrium Point Condition

This subsection 6.3.2 presented the gender EPC results for the nine countries whose data were available at the time of this study. Although there was insufficient data to estimate for the remaining sixteen countries, the results here presented would further explain how dropout was stable or unstable across the countries and between the sexes in the SSA. The findings of the equilibrium point condition (EPC) according to each country and decomposed by gender were presented in Table 6.6. The EPC measured the stability of the dropout over the period under consideration.

Table 6.6: The EPC – Individual Country and Gender Results

Country	Individual Country	Male	Female
Burkina Faso	0.05588	0.12992	0.05312
Ethiopia	2.104	0.17866	0.12114
Gambia	PNS	PNS	PNS
Guinea	0.006013	-0.03948	0.000001
Mozambique	0.111284	0.104945	0.106644
Niger	0.055904	0.052801	0.053369
Senegal	0.000256	0.00445	0.051089
Togo	PNS	PNS	PNS
Zambia	0.053705	0.096721	0.050176

Note: PNS represented parameter that was not significant at $p<0.005$, for Burkina Faso, hence ignored. Taking the value of the findings, if - $D_0 > 0$ = Unstable; $D_0 < 0$ = Stable and $D_0 = 0$, There is a balance between the stable and unstable.
Source: Author

Table 6.6 showed the individual countries and the gender of the EPC results. Besides Gambia and Togo that their parameters were not significant, the EPC of individual country results showed that all the countries had their dropout unstable (that is $D_0 > 0$), in other words, dropout problem was epidemic, where the EPC of Ethiopia was as higher as 2.1 demonstrating much severity of the dropout problem. (see subsection 6.2.7 for interpretation). Thus, the Ethiopia $D_0 = 2.104$ showed that dropout was a serious educational problem in the country. Although the spread of dropout was unstable in other

countries, their D_0s were at varying degrees showing the level at which dropout was uncontrolled.

Regarding the gender results of the EPC, except Guinea that its D0 was -0,004 for male indicating stability, all other countries have their EPC higher than zero indicating dropout unstableness (that is. $D_0 > 0$) for both male and female groups but at varying degrees. Hence, the thesis confirmed that dropout was uncontrolled among the sexes in the countries sampled except for Guinea.

6.4 Discussion of Findings

In this chapter, the author conducted a study of the rate and condition of stability of dropout using the SSA regional data and nine individual countries whose data were available at the time of this study. Also, the findings of individual country were decomposed into gender to understand if inequality existed and the extent of its stability which was analysed with polynomial regression. Previously, the analysis of dropout in education distribution had mainly confirmed with qualitatively and descriptive (Balfanz et al., 2010). The novel of this thesis was that the thesis examined quantitatively the spread of the dropout in educational distribution. The study examined the controversial debate on the rate of dropout and the extent of its spread with mathematical technique (Lu et al., 2016). As such, the results discussed in two dimensions under two subsections. The first dimension was discussed based on the result on SSA education in relation to the dropout problem. The second dimension focused on the gender analysis on dropout and efforts put in place by the coordinate countries.

6.4.1 SSA Education and Dropout Problem

Certainly, the experience of dropping out of school was not perchance, and as well as, it has characteristics of positive and negative (Burrus & Roberts, 2012). Certain socioeconomic indicators are responsible to abandon schooling (Finn, 1993; Rumberger,

2011). For example, Lewin and Sabates (2012) argued that some students were coming to school, marked attendance and participated but failed to grab daily classroom lessons. The persistent of not grabbing the lessons' taught would lead to poor performance and in turn, lead such student to abandon schooling. On the other hand, the positivity for dropping out from schooling was linked to economic advantage (De-Witte et al., 2013). Because of the positivity and negativity of the dropout, the SSA large number of out of school could be a mixture of the characteristics requiring further investigation.

Essentially, there were two scenarios arising from the findings of this chapter in association with social exclusion and human development. The first scenario was for a child to be born into wealthy class (extremely rich and or averagely rich classes). With the wealth of the family, children progress from primary enrolment to school completion at all levels of education. After that, the child enjoys his freedom to become a stakeholder in the sharing of economic resources. Not only that the child escaped exclusion, but he has sufficient freedom to be in possession of good health, attain highest levels of education and benefit more from the indices of standard of living (Nussbaum, 2000b; Sen, 1999; Welzel et al., 2001).

The second scenario was for a child to be born into poor class (extremely poor or averagely poor) and enjoys an exclusion in the sharing of economic resources including education. The poor people falls on the labour class with low wages. Earning the low-wage within the family, sometimes with large family size, in effect, make children susceptible to schooling risks and eventually dropout. Hence, socioeconomic status of a household, household contexts, the student test scores at the exam, the progression of academic grade (1st position or 20th position in the class) explained why the victims were falling into the dropout region (Berktold et al., 1998; Hunt, 2008).

Furthermore, as the result showed, the overall dropping out of school in the SSA with a rate of 3.33 overtime was not suitable for the education distribution of the region. Knowing fully that human development enhances household freedom (Nussbaum, 2000a, 2000b; Sen, 1999), the prevalence of dropout, no doubt, would impact on the human development indices that include household health, years of schooling and the living standard. Besides, social vices were associated with this side of educational development including "fluid reasoning skills" and substance use (Burrus & Roberts, 2012; Lu et al., 2016; Pagani et al., 2017; p.1).

Noticing this development, the effort of UNESCO through EFA international policy provided a further understanding of the Kuznets inverted-shaped curve (See Figure 6.2) (Kuznets, 1955) found in the SSA estimated results. At first, dropout began to increase either through poor education policy, society tradition/custom or the child faced schooling risks (Finn, 1993; Rumberger, 2011) to a level that got international attention in the MDG 2000 at Dakar Senegal. The international focus on education for all (EFA) was proposed in the year 2000 with universal objective, which was to "ensure that every boy, girl, youth and adult have access to quality education and training for peace and prosperity or every society" (UNESCO-EFA, 2015a). The efficient implementation of the EFA policy significantly affect the reduction of dropping out of school. Subsequently, the UNESCO effort in promoting access to education for all children resulted to greater achievement for many of the SSA countries through equal access to enrolment. Although some SSA countries' dropout were substantial, Table 6.7 showed the extent of the achievement of UNESCO between 2012 and 2017 on ensuring children were back to schooling.

Table 6.7: UNESCO-EFA Report on Out-of-school Children

Country	2012	2017	Percentage Change (%)
Angola	-	=	-
Burkina Faso	944,661	746,623	-20.96
Cameroon	196,915	185,366	-5.87
Comoros	-	-	-
Congo Republic	-	-	-
Congo DR	-	-	-
Cote D'Ivoire	1,084,851 (2013)	419,597	-61.32
Ethiopia	3,152,376	2,221,454	-29.53
Gambia	81,095	72,584	-10.50
Gabon	-	-	-
Ghana	716,870	622,861	-13.11
Guinea	433,171	406,478	-6.16
Kenya	1,214,199	No data	-
Mali	864236	1159687	34.19
Mozambique	697,823	728,531	4.40
Namibia	43,755	8,724	-80.06
Niger	1,158,516	1,223,142	5.58
Nigeria	-	10,500,000	-
Rwanda	-	76897	-
Senegal	543,210	628,099	15.63
Sierra Leone	74,458	10,119	-86.41
Togo	714,319 (2013)	No data	-
Uganda	-	-	-
Zambia	288,743	363,385	25.85
Zimbabwe	314,374	398,579	26.79

Note: The data were extracted from the UNESCO Institute of Statistics for comparing countries findings.
Source: UIS-UNESCO (2018) Database, Adewale, 2017)

Table 6.7 provided the understanding on the achievement of UNESCO through EFA policy in ensuring that all children acquire a primary level education. Between 2012 and 2017, substantial number of the countries made effort to control the out-of-school children, which was plausible, Although the reduction was at varying degrees, Sierra Leone, Namibia and Cote D'Ivoire reduced the out-of-school by 86.41%, 80.06% and 61.32% respectively. However, Mali, Zimbabwe and Zambia increased the out-of-school children by 34.19%, 26.79% and 25.85% respectively, which was between 2012 and 2017. Although the substantial number out of school children would have been caused by

Boko Haram insurgence, the substantial out-of-school children in Nigeria - an oil producing country that belong to low-middle income - had a higher number of out-of-school children in 2017 with a total of 10,500,000 (Adewale, 2017). As such, the human development of those countries would considerably have impacted on educational attainment, health and standard of living which are indicators of human development (Chang et al., 2016; Gill & Kharas, 2015). No doubt, the low-level education because of the social exclusion in education distribution would, in turn, impacted on productivity and growth in those countries where out-of-school were multiplying (Barro, 2001; Todaro & Smith, 2012). In the current findings, although there were some countries that reduced their dropout crisis when the two period were compared, the findings of these thesis that investigated the trend of dropout indicated that dropout was unstable with implication that dropout was uncontrolled across the seven countries whose parameters were significant, With the exception of Guinea, all other countries estimated showed unstableness and uncontrolled behavior of dropout between the sexes.

Furthermore, although Dollar et al. (2013) re-emphasized that growth is still good for the poor, evidence from previous studies had shown that education promises, if not fulfilled, usually would positively influence poverty status (Aigbokhan, 2008; Wu et al., 2008). Although growth is essential for the poor, the distribution of the proceeds of growth was not equally shared across households that would affect poverty. As such, poverty positively had been causing educational inequality across the households through dropout (Bonal, 2007; Dollar et al., 2013; Nesiba, 2014).

For further evidence, from the thesis sample, some economies derived their revenue from agriculture such as Comoros and Senegal. Because of the prevalence of agricultural seasonality distress (Khandker & Mahmud, 2012), poverty was prevalent. In those agricultural dependent economies such as Comoros and Senegal, no doubt, poverty would

be a development challenge in providing equal education for the school-age children. For example, according to World Bank, Comoros' headcount poverty rate increased from 13.5% in 2004 to 18.1 percent in 2013, which was largely reflected at the rural areas. Similarly, according to UNESCO data, Senegal, with same poverty characteristics in this thesis, increased its out-of-school from 543,210 in 2012 to 628099 in 2017 representing 15.63% of percentage increase (See Table 6.9). As such, according to the result in chapter 5 of this thesis and the findings of Wu et al. (2008), poverty and educational inequality are having bi-directional relationship, where dropout is positively contributing to the share of the education inequality.

Moreover, understanding that most of the poor live in the rural areas (Leary, 2016), often accounted for the exclusion in education and in the sharing of economic resources across households. This was because the rural residents were dominantly having farming as occupation and agricultural products as main source of income (Cutter et al., 2003; Fischer & Buchenrieder, 2010). In other words, the spread of out-of-school children was noted to be causing a digital divide in education across the households school-age children, in turn have strong effect on the national and regional development of the SSA (Rasiah & Oyelaran-Oyeyinka, 2004).

Finally, dropout as a social exclusion problem, which imposes heavy educational cost on human development indicators such as health, educational attainment and standard of living, often triggered educational inequality and aggravated poverty across the families living with dropout problem (Burus & Roberts, 2012; Hunt, 2008; Wu et al., 2008) In turn, the recycling of education poverty remains perpetual problem for the sampled 25 countries in this thesis. So, we argue that the SSA countries have been regenerating education inequality and poverty for an extended period due to the presence of enormous dropout from schooling. Despite considerable effort made by the UNESCO through EFA,

substantial number of out-of-school children would be making future education inequality difficult to control, especially where poverty is heavily prevalent as confirmed in chapter 5 of this thesis .

6.4.2 Dropout Crisis and Gender Inequality

This subsection discussed the stability and rate of dropout regarding gender education distribution. In the previous studies, emphasis was laid on the inequality of education across sexes (Cooray & Potrafke, 2011; Baliamoune-Lutz & McGillivray, 2015). Also, the World Bank and UNESCO official data showed that most of the sample countries in this study exhibited disparity in educational distribution. For example, the SSA countries with 31 million out-of-school, UNESCO reported that 53% of them were girls. While this current study did not look at the headcount of the out-of-school but the rate and epidemiological status of the problem, the thesis ascertained that both equality and inequality existed in our findings between the sexes and across the nine sampled countries considering the rate of dropout increase. Specifically, Ethiopia and Guinea have equal rate of increase of dropout problem. Burkina Faso and Zambia had the rate higher for male than for female group. Finally, Mozambique, Niger and Senegal had their rate of increase higher for female than for male. The thesis had a mixing finding regarding gender issue of dropout across the countries. This implies that Mozambique, Niger and Senegal with the high inequality that was negatively skewed to female, requires prompt action to reduce inequality of education among the female group.

The focus of international educational development as expressed in Dakar, Senegal in 2000 was to see that education is accessible to all children and complete primary education. In other words, both access and completion were the primary focus of UNESCO and the stakeholders. Hence, effort was made to reduce inequality in enrolment and out-of-school children across SSA (UNESCO-EFA, 2014). Having that background

knowledge, another new evidence in the thesis was that both equality and inequality existed in the rate of reducing children abandoning schooling. Firstly, out of the nine countries, the gender findings showed that Burkina Faso, Guinea, Mozambique, Niger and Togo had equal rate of reducing the dropout problem. Only Ethiopia and Zambia had their rates higher for male than for female. In case of Senegal, the male coefficient was not significant, but female did. Hence the female rate of reduction was 0.001 for Senegal which was infinitesimal. Another issue of attention in this chapter's findings regarding the gender was that the author could not find substantial quantity of reduction where the highest and the lowest were 0.003 and 0.001 for both sexes which were infinitesimal due to the insignificant role played by the SSA governments in promoting EFA goals (UNESCO-EFA, 2014). Because education provides freedom or autonomy to earn good living (Welzel et al., 2001), the countries in this category could be inspired to provide equal education through household empowerment.

6.5 Summary of the Findings

The novel of this chapter could be understood from three achievements associated with the chapter. Firstly, considering the cumulative aspect, the thesis confirmed that dropout was unstable for the SSA countries using the World Bank SSA reigional data. The findings provided the understanding of the SSA current status regarding the extent of UNESCO-EFA impact on the educational development of the region. Also, the individual country results showed variation across the countries in terms of stability.

Secondly, the thesis provided a new method of analysiing the rate of dropout in educational distribution which helps to explain, simultaneously, the rate (speed) at which dropout was increasing and decreasing overtime. The EPC methodology helped to understand the epidemiological status of dropout, in other words, the spread or dominance of the dropout problem.

Thirdly, the findings on gender showed new evidences regarding the rate at which dropout was reducing in the nine sampled countries whose data were available. Four countries had equal proportion of reducing dropout which included Burkina Faso, Guinea, Mozambique and Niger.

Finally, the thesis posited that if a child was in the state of poverty due to family poor wealth, rank as socioeconomic indicator, there is strong likelihood for such household child to abandon schooling. According to Fujihara and Ishida, 2016) and Rumberger (2011), the abandonment due to poverty could be aggravated by low test scores and grade regarding the child school performances. So, as previously confirmed, household socioeconomic factors contribute significantly to high number of out-of-school children (Fujihara and Ishida, 2016; Rumberger (2011). To that end, the sampled countries that (see chapter 5) had poverty impact between the moderately low to extremely high on education distribution need to pay attention on their out-of-school household children. In addition, concerted efforts would be required on the part of Ethiopia and Zambia to concentrate more on the female group to reduce the dropout stigma among the female counterpart in education distribution.

CHAPTER 7: CONCLUSIONS AND IMPLICATIONS

7.1 Introduction

This thesis quantitatively examined the degree of education inequality and the relationship between education inequality and poverty in the Sub-Saharan African Countries. Firstly, at the household level, the thesis used the Demographic Health Survey (DHS) cross-sectional data to understand the quantity of education inequality and examined the impact of poverty on the inequality of education in the twenty five (25) sampled Sub-Saharan African countries. Secondly, the thesis obtained time series data from the World Bank on out-of-school primary school, which were used to understand the rate and stability of dropout in the SSA education distribution. The chapter was divided into five sections. Thus, the objective of this chapter was to present the summary of the main findings from chapters 4 – 6. After that, contributions of the thesis to knowledge were presented, implications were drawn and the areas for future research were stated.

The thesis at the onset set up three research questions and the research objectives. The three research objectives were empirically achieved. The objectives were re-stated as:

1. To determine the level of education inequality in the Sub-Saran African countries
2. To examine the relationship between education inequality and poverty in the Sub-Sharan African Countries.
3. To determine the proportion of dropout among the eligible primary school children in the Sub-Saharan African countries.

Hence, the summary of the findings was presented in section 7.2

7.2 Summary of the Findings

This section presented the summary, and by extension, provided conclusions regarding the fidings. The chaper 1 of the thesis focused on the background of the study, problemiatised the issues associated with education inequality and poverty and raised the research, questions as well as the research objectives that focused quantitative reserch design. Chapter 2 reviewed theories and empirical works on education inequality and poverty. Chapter 3 delved into the methodology used in achieving the three stated objectives of the thesis.

7.2.1 Summary of Objective 1

Chapter 4 of this thesis addressed the objective 1: *To determine the level of education inequality in the Sub-Saran African countries.*

The study examined quantitatively the levels of education inequality in twenty five sampled Sub-Saharan African countries. To answer the research question 1, the thesis employed educational attainment as a measuring variable to understand each country educational inequalities. The thesis further examined how household wealth was distributed across the educational levels and the inequality was decomposed by gender in the distribution. Following the education inequality Gini, the levels of education were analysed. For wealth and gender decomposition, the Lorenz Concentration Curve and Generalized Lorenz Curve were respectively used to achieve the objective.

Thus, empirical findings on the education Gini showed that Zimbabwe had the lowest inequality of education while Burkina Faso was found with highest in the distribution. To gain more understanding, the result were classified into very low ($> 0 \leq 25$), moderately low ($> 25 \leq 50$), moderately high ($> 50 \leq 75$) and extremely high ($> 75 \leq 100$) of educational inequalities. The only country in the very low group was Zimbabwe representing 4% of the total sampled countries. Nine (9) representing 36% of the sampled

countries occupied moderately low. The countries were Cameroon, Comoros, Congo Republic, Congo DR, Kenya, Namibia, Rwanda, Uganda and Zambia. Furthermore, , Angola, Gabon, Ghana, Nigeria, Mozambique and Togo making six (6), representing 24% of the sampled countries were found in the moderately high education inequality. There were nine (9) countries including Burkina Faso, Cote D'Ivoire, Ethiopia, Gambia, Guinea, Mali, Niger, Senegal and Sierra Leone belonging to the extremely high inequality group.

The author proceded to understand if the oil and gas dominated countries in the Sub-Sahara Africa[29] exhibited significant high inequality compare with non-oil and gas countries. Results showed that only Cameroon and Congo Republic, have their inequality within moderately low whereas other four countries had the inequality above 50% despite the huge oil revenue accrued to the countries. These countries of over 50% were Angola, Gabon and Nigeria that had their inequalities moderately high while Cote Divoire was extremely high. In the non-oil group, although Burkina Faso had extremely high inequality in both the oil and non-oil groups, congo DR Kenya, Namibia, Zambia and Zimbabwe reduced their inequalities than the oil producing countries where their inequalities were below 46%. Among the oil producing countries, Nigeria with the largest oil field and the largest oil and gas producer had its inequality of education as 62.88%.

Furthermore, comparing the countries according to GNI per capita using the World Bank classification, none of the sampled countries fell within the group of high income countries. In the low income group, Zimbabwe (very low) was below 25% inequality. Those countries with moderately low were Cameroon, Congo Republic Comoros, Congo

[29] The six countries are members of OPEC, the oil and gas producing countries. The countries are Angola, Cameroon, Congo Republic, Cote d'Ivoire, Nigeria and Gabon.

DR, Rwanda, Uganda having inequalities of education below 50%. While Angola, Mozambique, and Togo fell within the range of moderately high; while Burkina Faso, Ethiopia Gambia, Guinea, Mali, Niger, Senegal and Sierra Leone had their inequalities extremely high. In a sense, nineteen (19) out of twenty-five (25) countries inequalities were affected by the distribution of the GNI per capita of the countries.

Finally, regarding income classification, only five countries in the low middle-income group had their inequalities ranging between moderately low to extremely high including Kenya, Zambia (moderately low), Ghana, Nigeria (moderately high) and Cote D'Ivoire (extremely high). Gabon and Namibia fell within the low-middle income countries with moderately low and moderately high inequalities of education. So, since education correlated with growth (Barro, 2013; Krueger & Lindahl, 2001), the thesis posited that the persistence of education inequality in the sampled twenty-five countries was due to household low-income to enhance education distribution as well as income inequality among the oil producing countries could have pushed more households to survival levels, in other words absolute poverty.

About the wealth distribution, the economic assumption was that wealth was concentrated in the upper boundary of educational distribution (Bloom et al., 2004). The findings of the 24 out of 25 countries had their wealth concentrated at the upper boundary of the distribution. Only Comoros result showed that wealth concentrated in the lower boundary. The Comoros wealth condition would have occurred due to inheritance transfer since Comoros economy depends largely on agriculture (Kohli, 2004; Korom, 2016; World Bank, 2018). Thus, since the wealth of the 24 countries was concentrated in the upper boundary of education distribution and the larger population were education excluded in the distribution across the sampled countries, it was essential to say that the

poverty and low development of the countries were due to education inequality which supported the findings of Wu et al. (2008).

Regarding the gender decomposition of the inequality, on the one hand, 60% of the 25 countries sampled had no gender gap which was plausible. These countries included Comoros, Angola, Burkina Faso, Congo Republic, Congo Democratic, Ethiopia, Gabon, Kenya. Others included Mali, Mozambique, Niger, Rwanda, Uganda, Zambia and Zimbabwe. Whereas, Namibia and Togo showed a slight variation in the distribution. On the other hand, Cameroon, Cote D'Ivoire, Gambia, Ghana, Guinea, Nigeria, Senegal and Sierra Leone representing 32% of the total countries sampled had gender gap. Again, countries in the oil producing countries including Cote D'Ivoire, and Nigeria appeared to be unequally distributing education across the sexes. Although the gender distribution was in favour of no gender gap, however, those countries with gender gap were, not only having the human stock being declined, but the economic growth would be strongly affected if considerable attention is not paid to equality in the gender education distribution.

The mean years of schooling (MYS) measures the extent that a country was able to accumulate its human capital stock overtime. From the thesis findings, 17 representing 68% of the 25 sampled countries had their MYS lower than 5 years. These countries included Angola, Burkina Faso, Comoros, Cote D'Ivoire, Ethiopia, Gambia, Ghana, and Mali. Others included Mozambique, Niger, Nigeria, Sierra Leone, Rwanda, Senegal, Togo and Uganda. The low development persisting in the sampled countries would have been the low human capital accumulation. This aspect of increasing the MYS requires considerable attention by these countries.

7.2.2 Summary of Objective 2

Chapter 5 of this thesis addressed the objective 2 stated in chapter 1: *To examine the relationship between education inequality and poverty in the Sub-Sharan African Countries.*

The findings of the relationship between education inequality and poverty was presented in chapter 5 of this thesis. Structural equation modelling (SEM) was used to estimate the parameters for the cumulative data of the 25 sampled SSA countries as well as for the individual countries. For the cumulative result of the 25 countries, poverty positively influenced education inequality with 82.14%. The individual countries showed results at varying degrees of influence. Hence, only 6 out of 25 sampled countries had their poverty impact on education inequality below 50% comprising of Congo Republic, Cote D'Ivoire, Gambia, Guinea, Kenya and Nigeria. Whereas Cameroon, Congo DR, Mali, Rwanda and Zimbabwe had their poverty impact above 50%. Specifically, although the education inequality of Zimbabwe calculated in chapter 4 was very low, that is 23.68%, the 23.68% education inequality was strongly influenced by poverty with the value of 74.5%. The rest of the countries that had their poverty moderately high impacted on their educational inequalities at varying degrees. These countries included Angola, Comoros, Gabon, Ghana, Ethiopia, Mozambique, Niger, Namibia, Senegal,Sierra Leone, Togo, Uganda, Zambia and Zimbabwe representing 56% of the sampled countries. Although not in the extremely high group, among the moderately high group, Angola, Ghana and Zimbabwe had over 70% poverty impacted on their inequalities where Zimbabwe took the lead. As for the Burkina Faso, the results were not presented because the poverty expected sign was not achieved and we had no theoretial explanation to justify the finding.

Further understanding of the result was drawn from the income classification group, IDA borrowing counries group and the oil and non-oil producing countries' group. In the

income grouping, Gambia and Guinea (moderately low poverty), Comoros, Ethiopia, Mozambique, Niger, Senegal, Sierra Leone, Togo and Uganda (moderately high) and Congo DR, Mali, Rwanda and Zimbabwe (extremely high poverty) fall on the low-income group representing 56% of the sampled countries. Moreover, Congo Republic, Cote D'Ivoire, Kenya and Nigeria (moderately low), Angola, Ghana and Zambia (moderately high) and Cameroon (extremely high) fell in the low-middle income countries. Despite Gabon and Namibia fell in the upper-middle income countries, their poverty impact on education inequality was at moderately high, in other words above 50%. Thus, having a higher number of countries that fell under the low-income countries group, the thesis posited that the countries involved were likely to be recycling poverty and education inequality because of low income issue. In the countries where they have oil, among other reasons, income inequality and low growth (Gregorio & Lee, 2002) could be attributed to the high poverty that impacted on the education distribution.

Besides the income classification, most of the sampled countries were borrowers from the World Bank under International Development Association (IDA) - except for Angola, Gabon and Namibia. By assumption, it is expected that the loans taken should positively affect the household income and living standard. Instead, among the borrowers, Cameroon, Congo DR, Mali, Rwanda and Zimbabwe had extreme poverty impact on unequal education distribution indicating that the loans had little or no impact on the human development that could enhance household income. Also, Comoros, Ethiopia, Ghana, Mozambique, Namibia, Niger, Senegal, Sierra Leone, Togo, Uganda and Zambia had their poverty as moderately high. The moderately low group included Gambia, Guinea, Congo Republic, Cote D'Ivoire, Kenya and Nigeria. As such, the loans taken had little impact on the life of the household due to how poverty significantly impacted on these countries' educational inequalities, except Burkina Faso. Because poverty significantly impacted on the unequal education distribution where loans obtained had no

effect on the people living standard in the 24 sampled countries, the thesis posited that household low-income and income inequality would have accounted for the persistence of low educational and human development in those countries.

Again, the general economic assumption was that country's wealth (in terms of natural resources) should transform a poor economy to a high-income country (Bloom et al., 2004). Also, the abundant resources, with proper management was expected to impact on human development as explained by health, education and standard of living (Sen,1999). Having the background, the findings showed that 3 out of six oil producing countries sampled in this thesis had their poverty impact on unequal education distribution above 50%. These countries comprised of Angola and Gabon that had moderately high poverty impact while Cameroon fell in the extremely high poverty impact. While there was no country that had their impact of poverty fell below 25% (very low poverty coefficient), only Congo Republic, Cote D'Ivoire and Nigeria had moderately low poverty impacted on the education distribution. Specifically, although Nigeria had its poverty coefficient below 30%, development challenges such as corruption, Boko Haram insurgence, Islamic Jihadist, political instability and internally displaced people (IDP) could account for the 62.88% unequal education distribution estimated in chapter 4 of this thesis. In the non-oil sector, Guinea, Congo Republic and Kenya have a moderately low poverty coefficient. Furthermore, Mali had over 90% of poverty impact on unequal education of the country, indicating that human development in terms of multidimensional poverty indices had little attention. In other words, substantial number of the households enjoined social exclusion in the sharing of economic resources that could assist in promoting children equal education. Besides Mali, Congo DR and Rwanda were of the same category with extreme high poverty impact. Others comprising of Comoros, Ethiopia, Ghana, Mozambique, Namibia, Senegal, Sierra Leone, Togo, Uganda and Zambia had moderately high poverty impact on the unequal education distribution of the countries. In

both categories, Gambia, Guinea, Kenya and Namibia in the non-oil category had their poverty impact lower than Angola, Cameroon and Gabon in the oil producing countries. The results of these countries results that the oil producing countries failed in reducing the multidimensional poverty than the non-oil producing countries. Also, there was a probability that the proceeds of the oil rent were unevenly distributed across the households in Angola, Cameroon and Gabon (Nesiba, 2014).

Finally, the novel of the chapter was the discovery that poverty positively influenced education inequality although at varying degrees.

7.2.3 Summary of Objective 3

Chapter 6 of this thesis presented the findings of the research objective 3: *To determine the proportion of dropout among the eligible primary school children in the Sub-Saharan African countries.*

The chapter 6 of this thesis analysed the rate and stability of dropout among the eligible primary school-age children in the SSA countries. With the use of polynomial regression equation (PRE) and by fitting the model to data, the author estimated the rate at which dropout was increasing and decreasing as a region and nine individual countries of the 25 sampled SSA. The thesis proceeded to use the discriminant of the quadratic function to estimate for the dominance, in other words, the spread or stability of the dropout problem in the SSA. With the same methodology, gender decomposition analysis was carried out to visualise the gender inequality arising from the dropout problem in the nine (9) sampled countries. The remaining sixteen sampled countries in the thesis had over 15% missing data and they were removed in the analysis (Hair et al. 2014). Hence, their dropout problems were not analysed and presented in this thesis.

With the SSA dropout estimations, the findings showed that the region had a significant rate of increasing the dropout with a value of 3.33. On the other hand, although the reduction rate was significantly high, but it was below the rate of increase. As for the stability result, the SSA demonstrated an unstableness of the dropout problem during the period of 39 years, indicating that dropout was not under control based on the regional analysis, as such, the dropout problem was epidemic.

Regarding the individual nine countries estimated, Burkina Faso had the highest speedy rate of increasing dropout followed by Niger, Zambia, Senegal and Mozambique. The lowest rate of increase was Ethiopia with a value of 1.25. On the reduction side, Burkina Faso had the highest rate of reduction of dropout. Burkina Faso was followed by Mozambique, Senegal, Zambia and Niger, arranged according to their speed. Other countries included the Ethiopia and Guinea. Comparing the rate of reduction with rate of increase, Ethiopia, Guinea, Mozambique and Senegal had higher rate of reduction than the rate of increase which was plausible for the countries. Whereas, Burkina Faso, Niger and Zambia had the rate of reduction lower than the rate of increase. However, Gambia and Togo were not statistically significant.

The findings from the equilibrium point condition demonstrated that Ethiopia had a severe of unstable dropout crisis in the country while other six countries were having lesser of the unstableness or highly uncontrolled. Regarding the stability analysis of the gender, the findings showed that, though at varying degree, except Guinea that achieved male stability or under control, other countries' gender EPC showed unstableness between the sexes across the households.

Finally, the thesis therefore drew a conclusion that dropout was high for the SSA as a region, requiring a considerable attention by various governments to tackle dropout problem that usually led to educational inequality, low status and low wage. Again, there

were mixed results regarding gender inequality in the dropout. The dropout rate could have been triggered by low income because there were more households in the sampled countries that fell under the low-income group.

7.3 Contribution of the Study

Based on the summary of the findings presented in the previous section, the thesis achieved the three objectives by extending the previous empirical findings of education inequality and poverty. The thesis employed cross-sectional survey data to achieve objectives 1 and 2 while time series data were used to achieve objective 3. In so doing, the contributions of the thesis were presented in this section.

Firstly, the thesis updated the existing knowledge of the levels of education in the Sub-Saharan African countries by reviewing the empirical literature regarding education inequality. In the same vein, the thesis provided a clear picture of the quantity of inequality for 25 sampled countries, which covered the gap from the previous studies regarding estimation for the SSA as a region. Thus, the thesis had contributed with the updated findings on the quantity of the inequalities of education for the twenty-five sampled SSA countries using the educational attainment cross-sectional DHS data instead of educational attainment time series data.

Secondly, there was existing knowledge that household wealth or income was positively influenced by educational attainment (Krueger & Lindal, 2001). The thesis contributed by extending the knowledge to understand how wealth was proportionaly distributed across the Barro and Lee (2010) educational levels. Through the thesis findings, a new evidence was found where Comoros' wealth lied in the low boundary of educational distribution which could have been caused by the inheritance transfer (Kohli, 2004; Korom, 2016).

Thirdly, another novel contribution made by this thesis was that, the thesis provided an extension to the existing study on the relationship between poverty and education inequality. The existing study provided explanation on how educational inequality positively influenced poverty (Wu et al., 2008). However, because human development indices have strong influence in the sharing of economic resources including education, the thesis extended the knowledge that poverty, with multidimentional indicators, positively influenced the quantity of education inequality in the twenty-four (24) sampled countries. In other words, combining the study of Wu et al. (2008) with the chapter four of this thesis findings, with a framework, the thesis contributed by presenting the position that poverty and education inequality were having bi-directional relationships (see Figure 7.1).

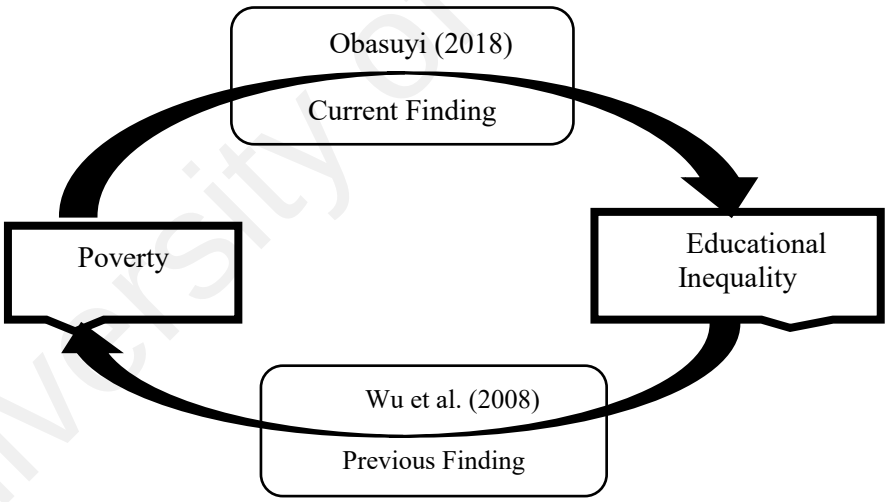

Figure 7.1: Education Inequality and Poverty Nexus

Source: Author

Fourthly, methodologically, the novel of the thesis was the extension of the education inequality Gini methodology to the use of Lorenz Concentration Curve (LCC) and Generalized Lorenz Curve (GLC), as proposed by Jann (2016), to understand the extent of educational distribution in wealth and gender. The methods opened the understanding pictorally on how an economic variable (such as wealth) was proportionally distributed

across the Barro and Lee (2010) educational levels. Moreover, there was researchers doubt on how dropout was determined in the previous studies (Burrus & Robert, 2012; Sum et al., 2009). Hence, another aspect of the the thesis novelty was that the thesis extended the descriptive and qualitative techniques in estimating dropout (Burrus & Roberts, 2012; Sum et al, 2009) to polynomial regression equation where both dropout rate of increase and decrease were econometrically and mathematically determined.

Finally, this thesis contributed to the exsting literature by extending the understanding of the rate of dropout to the knowledge of the epidemiological status of dropout. In other words, although the knowledge of the rate and the quantity of dropout existed in the development literature and in the official data, but the status of its epidemiology - simply put as the stableness and the unstableness conditions of the dropout spread – provided the knowledge of how to prepare policymakers for educational policy towards reducing dropout. Thus, the dropout status findings helped to understand the extent of dropout dominance and the extent of control in each of the sampled SSA countries.

7.4 Implications

This section presented the implications of the thesis from two perspectives – implication for theory and implication for policy. These two aspects were discussed in the next two sub-sections.

7.4.1 Implications for Theory

In the chapter two of this thesis, there were two theories presented that guided the achievements of the three objectives stated in this thesis.

Firstly, the social exclusion theory stipulated that individual, community and country were socially excluded from the available resources and opportunities. Because exclusion emerges from the society, systemic and have injustice characteristics (Byrne, 2005),

deprivations by the oppressors lower household participation in the distribution of both education and economic resources (Muddiman, 2000; Townsend, 1979; The-Social-Exclusion-Unit, 2004; Silver, 1994; Sen 2000). Hence, exclusion was a strong indicator that pulled the households to poverty level through the pillars of human development indices such as the insecurity in health, education, standard of living, unemployment and lack of right to persons full of freedom or autonomy (Duffy, 1995; Muddiman, 2000; Sen, 1999b; Tsiakalos, 1997; Welzel et al., 2001).

Therefore, the findings of the three objectives in this thesis confirmed the excludability of the household in education distribution. In other words, the findings strengthened the social exclusion theory. Essentially, the low development attributed to the SSA countries was no less to the extent of education distribution failure. Education as a public good (Anormaly, 2018), which was unevenly distributed across the sampled 25 SSA countries, was duly confirmed in this thesis as a social exclusion. For example, without mincing words, Burkina Faso with over 90% education inequality confirmed that the households were educationally deprived. Because of the inequality of education distribution, households, in turn, lack freedom or autonomy to have good living. Thus, education deprivation, which Sen referred to as capability failure and capability deprivation, has an extension of excludability to the living standard, because of the household low status and low wages (Sen, 2000). As confirmed in chapter 6 of this thesis, the excludability also arose from the substantial number of annual out-of-school regarding the primary school-age children. In some countries, although at varying degrees, the rate of increase in primary school dropout was higher than the rate of reduction, indicating the extent of education excludability.

Secondly, the human development theory with sophisticated concept of socioeconomic development proposed that human development would be achieved when individual

autonomy triggers the individual capability to participate fully in the market operations. The freedom or the autonomy provides the cognitive resources as well as physical capabilities to enhance access to information, improve skill acquisition and strengthen the household income (Welzel et al., 2001). Thus, as Welzel et al. (2001) and Sen (1999) argued, autonomy resources - in other words, the human freedom - contributes to human choice during various *resources allocation.*

Therefore, the thesis confirmed that education – a human development indicator, non-rivalry and non-excludability (Anormaly, 2018; Moşteanu, & Cretan, 2011) was unequally distributed across the households. For example, in chapter 5, the findings of poverty influence on education distribution was found to be moderately high and extremely high within low-income countries group, the IDA and oil producing countries. Despite that these countries were abundantly endowed with natural resources, the households were deprived of good living because of political upheavals and insecurity prevalence such as Nigeria, Niger, Cameroon and Rwanda, among others. Thus, the wealth of these nations was unequally distributed (Nesiba, 2014).

Furthermore, the human development theory hanged on three pillars including health education and standard of living as advanced by Sen (1999, 2000). Sen proposed that the poor achievement of these three indices would lead to lack of freedom, which Welzel et al. (2001, P.5) called the lack of "autonomy resources". This lack of freedom was reflected in the outcome of the relationship between education inequality and poverty, where poverty positively impacted on the sampled 25 SSA educational distribution. To this end, the lagging in the coordinate human development indices brought about being left behind in the world human development assessment, which included health, education and standard of living (UNDP, 2013).

7.4.2 Implications for Policy

This subsection presented the implication of the finding for policy implementations. A rigorous examination of education inequality and poverty was done on the twenty-five sampled countries of the SSA. Following the findings of this thesis, what changes are expected to take place in the SSA and the individual countries sampled for policy implication? Thus, the thesis presented most important implications for policy that were based on the regional and individual country results, in lieu of each country's overview.

Collectively, this thesis provided evidence on the extent of exclusion regarding the inequality in education distribution of the twenty-five sampled countries of the SSA. So, by focusing on the pulling and pushing changes suggested in this section would enhance a steady recovery from the bag-log of education failure in the affected countries.

7.4.2.1 Pulling Change Strategy

Firstly, in the context of this thesis, the pulling change requires that the countries badly affected to push ahead by revisiting its educational policies to remove all bottlenecks inhibiting equal education across households. The countries should push forward to identify the households whose children were no longer in school premises undergoing learning, identify their immediate schooling risks and formulate direct policy to address those schooling risks. Although poverty was waving its sword against many households in the region, it is necessary to understand that countries like Nigeria, Niger and Cameroon had issues of insecurity (e.g. Boko Haram insurgence) that led many households children to the internally displaced people (IDP) camp. Controlling the inequality of education - in the instance of the prevalence - could be achieved through a formal framework of institutionalisation. In so doing, creation of a special government educational agency would be a necessary strategy in monitoring the education completion and dropout in the 25 sampled countries. In these countries, the thesis suggested that a

National Agency for School Completion and Dropout (NASCD) be created to increase the human capital stock by (1) paying attention to mean years of schooling (MYS) and (2) conscious control of dropout.

Secondly, besides Zimbabwe whose education inequality lied below 25%, the governments of the remaining twenty-four (24) sampled countries should be pulled to adopt universal re-assessment strategy to understand (1) the quality of their education if catching-up up with the international standard of EFA and (2) to enhance education distribution through the NASCD government agency suggested above. The 'quality' in question should include teacher-student ratio, teachers' competencies, attendance ratio and the percentage of financing of education in the national budget. For example, EFA reported in 2015 that in the SSA countries, "education is not a priority in many national budgets" where the national budget on education lied below the range of 15% -20% of UNESCO recommendation the (UNESCO, 2015, p. xiv), thereby failing in the distribution of education across households.

Thirdly, besides the within issues of education distribution, the thesis found that substantial number of the sampled countries that had issues of inequality of education and poverty with over 50%– belong to low-income countries. In so doing, with the assertion of Dollar and Kraay (2000) and Dollar et al. (2013) that growth was still good for the poor, the 25 sampled countries should pull to develop inclusive growth strategies - such as economic diversification, to improve productivity - would be (1) helpful during income distribution and (2) the equal income distribution would in turn improve education distribution across households.

About the gender inequality analysed in chapter 4, the thesis confirmed that gender inequality existed in nine (9) countries in their educational distribution, Because growth is still good for the poor (Dollar & Kraay, 2000; Dollar et al., 2013) and women are

contributing to growth (Benavot, 1989; Cabeza-García, L., Del Brio & Oscanoa-Victorio, 2018; Thévenon, & Del Pero, 2015), countries that included Cameroon, Cote D'Ivoire, Gambia, Ghana, Guinea, Nigeria, Senegal and Sierra Leone should be pulled to focus attention on equal distribution of education across sexes, particularly taking special care of the female characteristics during the distribution.

7.4.2.2 Pushing Change Strategy

Besides, the pulling strategy suggested above, the pushing side addresses the aspect of the school-age children currently schooling and their parents. The pushing change is to place the household (all the school-age children + their parents) in a condition requiring visualising education being worthwhile, to have a positive change against their inherited beliefs/conditions such as the household poverty and societal believe about girl's education. Essentially, like in Cooray and Potrafke (2011), the Islamic dominated countries among the 25 sampled countries of SSA - that view western education as abhorrence - should be pushed to understand that the promises of education go beyond religion but an issue of development.

Although access to education (enrolment) was almost achieved by the Sub-Saharan African countries, substantial number of the enrolled children were shortly out-of-school. To control the situation, either at present level of education or at risk of dropping out, the pushing strategy should focus on inspiring the parents and the children facing challenges of education inequality to understand and accept the promises of education. The promises included higher educational attainment, higher status and higher wages. The inspiration for the children might include provision of good school uniform, provision of writing materials, school functional library that attracts learning, attractive classrooms, given children incentives during class work, improvement in the school environment and have efficient control of teachers' attrition.

7.4.2.3 Policy Focusing Individual Countries

Essentially, most of the 24 sampled countries are rich in natural resources (see country overview). While some countries were undergoing exploration of the mineral resources such as oil, other natural resources were untapped to increase country's revenue. Despite the available natural resources, most countries budget, such as Niger, were financed by grants, remittances and international assistances, the author of this thesis suggested that investment in the exploration of the resources would be a necessary strategy to increase national output (Alby, 2016). Furthermore, countries whose economy depends on oil but has issue of poverty and high inequality of education such as Nigeria, Gabon, Cameroon should pay attention to other proximate causes of education inequality instead of poverty. The attention may be focused on the income distribution and the insecurity. A high inequality of income could exacerbate the rising of educational inequality because of household income poverty (that is household living below $1.25/day). A considerable attention on the income redistribution, no doubt, would enhance the household autonomy in improving the income capability and it would go a long way to tackle the extreme education poverty that ravage the 25 sampled SSA countries.

Regarding the dropout issues, the twenty-five sampled countries (except Burkina Faso), that have poverty impact between the moderately low to extremely high on education distribution need to pay adequate attention on their out-of-school children. In addition, concerted efforts would be required on the part of Ethiopia and Zambia to concentrate more on the female group to reduce the dropout stigma among the female counterpart in education distribution. Ethiopia that had its dropout unstable, as a matter of urgency, the Ethiopia government should investigate the causes of the severeity of out-of-children in the country to control the inequalties.

Although Nigeria had the poverty impact lower in this study, concerted efforts are required in the socioeconomic indicators that could trigger the unequal education distribution such as redistribution of income especially coming from oil rent procedes. Others include stabilising the political system, control the Boko Haram insugencies in the five major captured states that causes IDP camp, control the children kidnapping and eliminate child trafficking in the country. Similarly, Congo Republic Cote D'Voire and Kenya whose poverty impact were found lower than others should concentrate more on identifying other indicators, particulay within education system, that contributed to the high rate of education inequalities.

Moreover, Cameroon and Gabon belonging to OPEC group had high poverty impacted on their educational distribution. So, the two countries should pay adequate attention to the redistribution of oil rent procedes to affect the households' income that would enhance household freedom (that is, the parents income), to enhance equal education distribution across school-age children. More specifically was Mali that had extreme inequality and extreme poverty impact simultaneously. In fact, the condition was found in HDI ranking and education index where Mali was ranked 176th out of 188 countries in HDI and 30.52% in education index. In so doing, Mali government should concentrate more on the country's human development regarding its multidimentional indices that include health, education and standard of living. The recent efforts in infrasratrucure development in the country should continue to be given a serious priority.

Although Comoros' wealth was concentrated in the low education, the poverty impact on educational distribution suggested that the country should work on improving on the education of the households which was found moderately high in this thesis. Effort should be made to diversify the economy beyond agriculture to allow for economic competitiveness and trade openness.

Despite the effort of Rwanda to increase its GNI per capita, the thesis confirmed that the country poverty substantially increased the inequality of education across the households. To this end, Rwanda government and its agencies are required to concentrate more on human development indicators (that is, health education and standard of living) to uplift the country productivity and the income of the households. Also, the current efforts of the government to harmonise the country into a peaceful relationship between and within the households should continue. The efforts are necessary because more educational attainment and skills would be developed through provision of education instead of the previous genocide that killed over 11,000 of the elites, women and children in 1995.

The Uganda education inequality was close to 50% in the distribution and ranked 8th among the 25 countries which requires that Uganda government should give considerable effort to multidimensional indices to discourage exclusion existing in the educational distribution of the country. This was because the country exhibited a high poverty impact on the education distribution as presented in chapter 5. Government of Uganda should focus attention on the out-of-school children. Similarly, Ghana, Mozambique, Namibia, Niger, Senegal, Sierra Leone, Togo and Zambia had their poverty estimated, significantly impacted on education distribution. As such, like Uganda, concerted efforts should be invested into multidimensional indices regarding human development to trim down the rising of education inequality across the households. All the countries should focus attention on the primary out-of-school children as this could trigger more of the national and household's inequalities of education.

Regarding gender, the inequality of education skewed to the female in eight countries representing 32% of the sampled countries. The countries included Cameroon, Cote D'Ivoire, Gambia, Ghana, Guinea, Nigeria, Senegal and Sierra Leone. Likewise, inequality existed in the rate of reducing the dropout across the sexes. So, the government

of these countries should make effort to track the records of the dropout victims and bring them back to school.

7.4.2.4 Human Capital Stock

Since a country level of human capital accumulation was understood by its average years of schooling, those countries whose MYS were less than 5 years need sufficient effort in formulating sustainable educational policy to raise their human capital beyond the present status. These countries included Angola, Burkina Faso, Comoros, Cote D'Ivoire, Ethiopia, Gambia, Ghana, and Mali. Others included Mozambique, Niger, Nigeria, Sierra Leone, Rwanda, Senegal, Togo and Uganda. Adopting the 'Pull' and 'Push' strategies suggested above would not only raise the level of years of schooling but increase the country human capital stock. In turn, the promises of education would speedily impact on the economic transformation thereby raising the development status in these sampled countries.

7.5 Limitations and Suggestion for Future Research

This section presented limitations of the study and areas of further research. The thesis examined the quantity of education inequality and its relationship with poverty in the twenty-five (25) SSA countries. The limitation of the thesis was on the issue of data unavailability for the estimation of dropout for the entire 25 countries sampled. Dropout was examined based on the available data for nine countries. Further studies would be necessary on the examination of dropout rate and its stability regarding the outstanding sixteen (16) sampled countries whose data were not available. Furthermore, only primary level education analysis was carried out in the estimation of dropout in chapter 6. Further studies would be necessary to examine the secondary and tertiary levels of education in the SSA countries.

By deduction, both previous work and the thesis findings concluded that education inequality and poverty were bi-directional although estimated differently and with different data. Nevertheless, Dollar and Kraay (2000), and Dollar et al. (2013) consistently claimed that growth was still good for the poor. Since growth positively correlated with poverty, future research should focus on the nexus between education inequality, poverty and growth to get understanding of the extent of their relationship. Likewise, attempt could be made to examine the relationship between growth, trade openness and educational inequality, particularly in the sampled SSA countries used in this thesis.

Essentially, there is need to test in the future study the examination of the unobserved heterogeneity between education inequality and poverty relationships which was not considered in chapter 5 of this thesis. Examination of the unobserved heterogeneity would help to understand the sub-group interactions regarding the relationship between education inequality and poverty.

In addition, dropout did not just occur (Burrus & Roberts, 2012; Rumberger, 2011). Certain schooling risk indicators could have accounted for the children abandoning schooling. Predicting the probability of dropout using schooling vulnerability indicators were not considered in this thesis. Future research would be necessary to understand levels at which children would be susceptible to educational inequality during years of schooling. Likewise, the thesis conceptual framework proposed schooling vulnerability as a mediating indicator between poverty and educational inequality relationship. This aspect was not considered in this thesis. In so doing, future research should concentrate on determining the mediating effect of schooling vulnerabilities on the relationship between education inequality and poverty.

The Burkina Faso which had poverty negatively related to education inequality which did not agree with economic theory or assumptions was deleted in the findings of the relationship between education inequality and poverty. Further research would be necessary to reexamine the relationship with a new data. Also, countries whose poverty impact were under moderately low, a further study should investigate the proximate causes of educational inequalities to understand the direction of education inequality for policy implication.

Finally, although the output may not generate the rate of reduction as applicable to the polynomial regression equation, future study may concentrate on dropout using the susceptible-infection-recovery (SIR) model to understand the spread of dropout and its level of its stability.

Conclusively, the author liked to document the general position of the thesis regarding the findings that span through chapters 4-6. From the findings, this thesis positioned that the rising of educational inequality constituted poor economic development for the 25 sampled developing countries of Sub-Saharan African. The severity was caused by the prevalence of poverty arising from the poor handling of human development indicators and reoccurrence of social exclusion in education distribution. Thus, the thesis concluded that countries whose educational distribution was substantially influenced by poverty – particularly measured with multidimensional poverty indices - would be recycling education poverty and they would be human capital incapacitated to win the battle of development. In other words, education inequality positively correlates with low development. In so doing, because each country human capital stock depends on the efficient education distribution, before treating out-of-school crisis, poverty that triggered the inequalities of education should be consciously addressed and speedily treated to accommodate development people deserve in education, health and standard of living,

the three pillars of human development theory – capability approach. The treatment would reduce the exclusion in educational distribution. Thus, pull and push strategies suggested in the thesis could be adopted to control the dropout crisis, and in turn subdue deprivation in education distribution.

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