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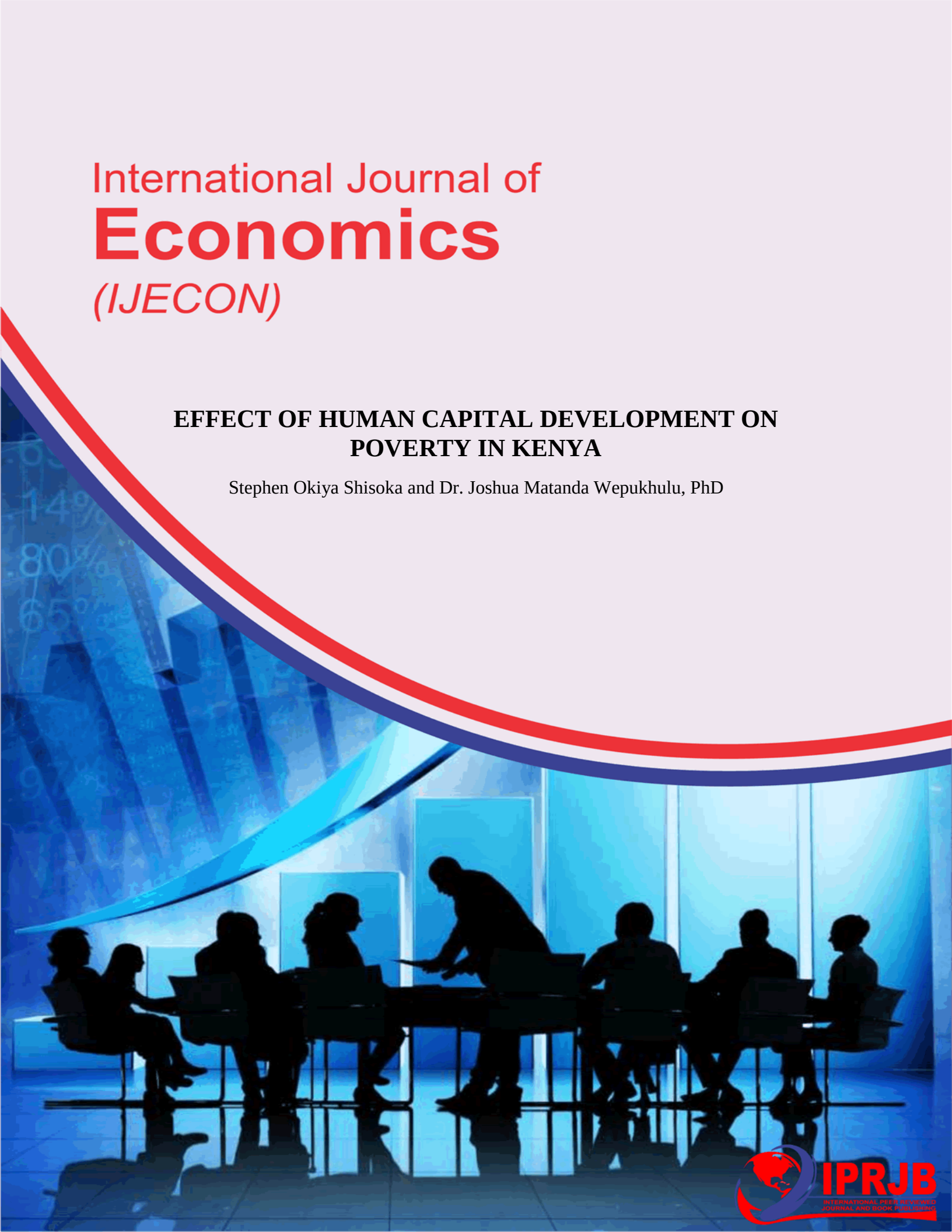
Stephen Okiya Shisoka and Dr. Joshua Matanda Wepukhulu, PhD



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EFFECT OF HUMAN CAPITAL DEVELOPMENT ON POVERTY IN KENYA

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Abstract

Purpose: The purpose of this study was to determine the effect of human capital development on poverty in Kenya.

Methodology: Causal research design was used in this study. The study adopted a non-probabilistic sampling technique and in particular purposive sampling technique. The study used secondary data sources for analysis. The study used time series data for the year 2005 to 2015 for WDR and HDI from World Bank and UNDP respectively for Kenya. The data collected was in soft copy because the study used the secondary data collection method. The data was extracted from data repositories of the World Bank and UNDP. Data analysis involved both descriptive and causal analysis to answer the research questions. The Inferential analysis used Ordinary Least Squares (OLS) Regression model in establishing the relationship between the dependent and independent variables

Results: The study found prevalence of HIV, expected years of schooling and roads paved of total roads to be statistically significant but improved water source wasn't statistically significant at 5 percent level. The study also found negative correlation between poverty expected years of schooling, improved water source and roads paved of total roads and positive correlation between poverty and prevalence of HIV.

Recommendations: The study recommends improvement in education outcomes with the aim of alleviating poverty in Kenya. Since poverty was poverty negatively correlated with poverty, the government and its development partners should design interventions that aim at improving education outcomes. This will in, turn, improve welfare of poor individuals through increased wages and positive externalities on health outcomes. Both attendance and literacy are critical aspects of education outcomes hence the need to have a quantity quality trade-off.

Keywords: *health, education, access to water and sanitation, access to infrastructure, poverty*

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1.0 INTRODUCTION

1.1 Background of the Study

Poverty remains a key issue both locally and internationally. According to World Bank statistics released in 2013, 10.7% of the world's population lived on less than US$1.90 a day (World Bank, 2013). There have been several efforts by the Kenyan government in ensuring high levels of economic growth and reduction in poverty incidence. Poverty is highly correlated with economic growth and development (Plotnick & Skidmore, 1975). Studies have shown that growth in GDP has had positive effect on poverty during expansionary periods (Adams, 2002; World Bank, 2002; Chen, 1997). Cross country studies show that a 10% increase in a country's average income will result in a 20 – 30% decrease in poverty incidence (Adams, 2002; Ravallion & Chen, 1997). Research conducted in several developing countries strongly suggests that sustained high level of economic growth is the most robust way of reducing poverty.

In 2000, the United Nations held a Millennium summit that adopted the United Nations Millennium Declaration and came up with 8 MDGs that were to be met by the year 2015. All the 191 member countries alongside with 22 international organizations made a pledge to make efforts towards achieving these goals. The aim of the declaration was to combat poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. The eight goals include:- eradication of extreme poverty and hunger, achievement of universal primary education, promotion of gender equality and empower women, reduction of child mortality, improvement of maternal health, combating HIV/AIDS, malaria, and other diseases, ensuring environmental sustainability and development of a global partnership for development. A significant number of MDGs fall under health and education outcomes. This is a strong indicator that health, education and infrastructure outcomes remain a vital contributor to poverty reduction.

The MDGs targeted three key areas, namely, human capital, infrastructure and human rights (social, economic and political) with the aim of improving the living standards of the world's population. The target areas of human capital include nutrition, healthcare (including child mortality, HIV/AIDS, tuberculosis and malaria, and reproductive health) and education. The target areas for infrastructure include access to safe drinking water, energy and modern information/communication technology; increased farm outputs using sustainable practices; transportation; and environment. Human rights objectives involve empowering women, reducing violence, increasing political participation, ensuring equal access to public services and increasing security of property rights. The MDGs aimed at increasing an individual's human capabilities and improve his/her productivity. Human productivity is strongly positively correlated to economic growth and development which consequently affects poverty incidence.

In January 2016, MDGs were succeeded by the SDGs. The SDGs build on the success of MDGs. The SDGs are also known as the "Global Goals". These are 17 goals that are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. The goals are set to be achieved by 2030. The 17 goals have 169 targets covering a wide range of sustainable development issues. These issues include ending poverty and hunger,

improving health and education, making cities more sustainable, combating climate change, and protecting oceans and forests. The 17 goals include: - no poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace, justice and strong institutions and partnerships for the goals.

Kenya was a participant in the United Nations summit which formulated the MGDs and therefore became one of its signatories. Since then, there have been efforts in Kenya towards achieving the MDGs. For instance, in 2003 the Kenyan government pursued the universal primary education through provision of Free Primary School Education. In the health sector, the government gave a waiver to mandatory charges for deliveries in public health institutions. Other efforts have been made to reduce prevalence of diseases such as HIV and AIDS, malaria and tuberculosis. In 2012, there were efforts to construct a Standard Gauge Railway that links Kenya, Uganda and Rwanda and possibly South Sudan and Ethiopia. The first phase of the construction of the railway was inaugurated in Mombasa on 28 November 2013 and would cover 937 km at an estimated cost of $13.5 billion. President Uhuru Kenyatta launched the railway in May 2017. There is also the proposed LAPSSET railway project that is to connect Kenya, Ethiopia, and South Sudan. It will be built from Lamu in Kenya to Juba and Addis Ababa. These two projects are a milestone towards increased access to infrastructure.

In June 2008, the then president His Excellency Mwai Kibaki launched Kenya Vision 2030. This is the socio-economic development programme of the country from the year 2008 to 2030. The aim is to make Kenya "newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment" (Vision 2030). The vision is based on three pillars; economic, social and political. The economic pillar aims to achieve an average economic growth rate of 10% per annum and sustaining the same until 2030. The social pillar seeks to engender just, cohesive and equitable social development in a clean and secure environment, while the political pillar aims to realize an issue-based, people-centered, result-oriented and accountable democratic system. The Kenya Vision 2030 is to be implemented in consecutive five-year plans. The first Medium Term Plan was implemented between 2008–2012. The Vision 2030 was to assist the country meet its MDGs by its deadline in 2015. However, this has not been achieved. The Vision 2030 targets 10 key sectors namely;- infrastructure; science, technology and innovation; public sector reforms; tourism; agriculture; trade; manufacturing; BPO (Business Process Outsourcing) and ICT (Information Communication and Technology); financial Services; education and training.

1.2 Statement of the Problem

Goal 1 of the SDGs is "No Poverty" where Kenya is one of the signatory countries and consequently seek to achieve. There are several other goals like good health and well-being (Goal 3), quality education (Goal 4), clean water and sanitation (Goal 6) and industry, innovation and

infrastructure (Goal 9) that are part of SDGs. However, these goals still remain targets for Kenya. According to HDR (2016) report, the poverty rate in Kenya was 45.5% and a human development index of 0.555. As a country there are vital sectors that lie behind in spite of them having an important role in reducing poverty. The aim of the proposed research work is to establish the effectiveness of human capital in achieving poverty reduction.

In their study in Kenya, Duflo *et al.* (2012) found that interventions like improving school governance, providing teacher incentives, and reducing pupil-teacher ratios largely improved education outcomes. There was another study conducted to analyze the effect of subsidizing education by providing textbooks to children in Kenya (Glewwe *et al.* 2009). The authors found improved test scores outcomes for the best students. They also found that most students were not able to use them effectively since the books were written in English which was their third language.

Miguel and Kremer (2004) found great impact of deworming on both education and health outcomes on students in Western Kenya. The intervention led to reduced school absenteeism by 25%. The researchers found that deworming substantially improved health and school participation among untreated children in both treatment schools and neighboring schools. In their study on subsidizing the cost of bed nets, Cohen and Dupas (2012) found that malaria prevalence reduced due to the intervention. They found that little costs have great benefits in improving health outcomes Dreilelbis *et al*. (2014) conducted a cluster-randomized trial in Kenya to assess the impact of school water, sanitation and hygiene interventions on the health of younger siblings of pupils. The study found that WASH improvements were associated with decreased odds of diarrhea (odds ratio [OR] = 0.44; 95% confidence interval [CI] = 0.27, 0.73) and visiting a clinic (OR = 0.36; 95% CI = 0.19, 0.68), compared to control schools. They conclude that robust improvements in water supply can reduce diarrheal diseases among young children.

In spite of the country having very poor health and education outcomes, the government expenditures on health and education sectors still remain very low. The government expenditure on health and education as a share of GDP was 3.5% and 5.51% respectively (Human Development Index, 2016). There's evidence from studies that health, education, access to water and sanitation and infrastructure outcomes have great potential in reducing poverty in Kenya. It's important to outline the untapped potential in human capital as a means of achieving poverty alleviation. There are many interventions that can be undertaken in order to improve health, education, access to safe water and sanitation and access to infrastructure that would lead to reduced poverty incidence in Kenya. The government can undertake such interventions in order to improve these outcomes and as a result, help improve the living conditions of the poor population. The study will inform the government as it formulates and implements its policies such as Vision 2030 as it aims at reducing levels of poverty in Kenya. Vision 2030 doesn't integrate significantly the aspect of human capital (such as health and education) as a potential stimulus for economic growth. The study sought to establish the benefits of targeting sectors such as health, education, access to safe water and sanitation and infrastructure as a way of achieving economic growth and development. Evidence from the study may be a motivation for the government as it comes up with one of the MTP for Vision 2030.

1.3 Study Objectives

The purpose of this study was to determine the effect of human capital development on poverty in Kenya.

The study was guided by the following specific objectives:-

1. To ascertain the effect of health on poverty in Kenya.
2. To establish the effect of education on poverty in Kenya.
3. To determine the effect of access to water and sanitation on poverty in Kenya.
4. To analyze the effect of access to infrastructure on poverty in Kenya.

2.0 LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Classical Poverty Theory

This theory was proposed by Lewis (1961) during his study on poverty in Mexico and Puerto Rico in 1961. Miller (1958); Rainwater (1966); Clark (1965); Liebow (1967) have also contributed to the evolution of the classical poverty theory. Classical poverty theorists argue that individuals are ultimately responsible for their own poverty. This theory proposes that poverty is caused by personal traits. It explains the cause of poverty in the traits of the poor themselves. The theory explains poverty in terms of the conditions under which the poor live: unemployment, underemployment, poor education, and poor health. The classical economic theorists provide a foundation for laissez-faire policies in trying to alleviate poverty. The theory has an advantage of using monetary units to measure poverty and the ease of designing policies in order to alleviate poverty. The theory also deals with the role of incentives on individual behavior and the relationship between income and productivity. The theory encompasses monetary aspects, the individual as opposed to the group, and the limited role played by the government. It also believes that poverty is often cyclic, in other words, successive generations of the same family remain poor.

This theory is criticized since it puts a lot of emphasis on an individual and downplays the role played by other external factors like the macroeconomic policies undertaken by the government. The other criticism is it perceives material means as the principal way to eradicate poverty.

2.1.2 Human Capital Theory

The proponents of this theory are Gary S. Becker in 1962 and Jacob Mincer in 1981. The theory argues that investment in human capital explains a large part in income differentials between different opportunities of employment. Human capital refers to any stock of knowledge or characteristics a worker has that contributes to his or her labor productivity. Human capital aims at improving an individual's working productivity. Investment in human capital involves both direct and indirect costs such as foregone earnings. Modern economists argue that education and health play a major role in improving human capital and as a result increase the economic outputs of a country (Becker, 1993).

The theory postulates that investments in individuals can be seen through their economic value. This value can be measured in mathematical terms. Human capital can fall into sub-categories such as economic, social, cultural and symbolic capital. Economic capital is usually measured through an individual's labor productivity. Economic capital can be measured since one of its impacts is the ability to produce wages. Higher wages can be attributed to the acquisition of knowledge through education, training etc. Social and cultural capital involves the benefits an individual brings to the society. However, there's a challenge in measuring social, cultural, and symbolic capital. This represents the intrinsic value of human capital. All forms of human capital play a critical role since their existence and value can be experienced.

In practice, the theory is used to determine the value of training and education. It enables individuals to estimate the expected future benefits of investing in education. It also allows individuals to quantify the value of intangible assets such as health, education and social status.

The theory can be used in both planning and measurement utility. Welfare economics involves trading off current choices and their long-run benefits and implications. The theory enables one to make decisions between the opportunity costs of present situations and of future opportunities. The theory also helps with decisions in time allocation and the investments in health and social capital. Human capital can be maximized through investment in both physical and mental health.

The theory is subject to several criticisms; one amongst them is the unclear cause of a positive relationship between the individual´s qualifications and earnings. The critics argue that not even quality education is a determinant to high salary if the employee is on the external labor market. The theory is also criticized as putting less emphasis on the rationality of human behavior.

2.2 Empirical Literature Review

2.2.1 Health and Poverty

Health is one of the key components of human capital development. There is strong evidence that good health across the population significantly contributes to labour and human capital to achieve economic growth. (Hsiao & Heller, 2007). Health largely affects human capital which in turn affects an individual's income and well-being. Individuals who are healthy tend to be more productive physically and mentally by enabling them to learn more effectively and retain knowledge. Good health increases an individual's physical capabilities such as strength and mental capabilities such as cognitive skills and reasoning ability. Good health allows individuals to actively participate in activities and to engage socially with family and friends and their communities. Several studies have shown that health outcomes as being correlated with microeconomic variables (Strauss & Thomas 1998; Savedoff & Schultz 2000). There's an indirect effect of health improvements on income through its effect on human productivity, human capital, fertility, labor participation and savings (Bloom *et al.* 2003).

Sarah *et al. (*2016) studied the long-run impacts of child health investment through school-based deworming in Kenya. They found that children who had been dewormed were less likely to have worms, they were much taller, they were less likely to be anemic, they were less likely to miss

school, and they earned more as adults. The intervention led to a 15% increase in school participation. The students earned about 20% extra per year for a life-time. The program had a positive impact on labor supply and education outcomes for men and women respectively. Men who received the intervention ten years earlier work 17% more hours each week, spend more time in nonagricultural self-employment, are more likely to hold manufacturing jobs, and miss one fewer meal per week. On the other hand, women were about 25% more likely to have attended secondary school. They diversify their time from traditional agriculture into cash crops and non-agricultural self-employment. In conclusion, small investments in deworming had positive impacts on both educational outcomes and earnings. The study estimates an annualized financial internal rate of return to deworming of 32%. It further gives evidence that the cost of deworming is less than future government revenue (Sarah *et al*, 2016).

Health has a significant impact on long-run development, economic growth, and poverty reduction (Guillem *et al*, 2007). Better health outcomes lead to increase in labor productivity and wages. Changes in health outcomes had positive significant impact on the growth pattern of 10 countries over a period of 100 to 125 years (Suchit, 2002). The countries experienced an economic growth between 30 to 40 percent as a result of changes in health outcomes. She found that while controlling for physical capital investment, the health variables positively correlated with years of schooling. Barro (1996) argues that health is a capital productive asset and an instrument of economic growth. He found that the growth rate is motivated by higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation, and improvements in the terms of trade for a given starting level of real per capita GDP.

2.2.2 Education and Poverty

There are clear benefits of education both financial and non-financial (Heckman *et al*, 2008). Education not only impacts an individual's knowledge and skills but also bestows values, ideas, attitudes and aspirations which may be in a country's best interest. Education helps one get a job, earn higher wage, improve an individual's life in non-monetary dimensions and makes a person acquire knowledge that is transferable to the rest of the population. In addition, it saves children lives since the mother is able to read, fosters peace, prevents disaster-related deaths, reduces child marriage, reduces maternal health, promotes gender equality and helps to combat HIV and AIDS (Global Partnership for education, 2016). More educated farmers in Thailand were three times more likely to use fertilizer and other modern agricultural inputs than the less educated ones (Birdsall, 1993). A study conducted in rural Nigeria showed that education positively impacted on the agricultural productivity of small scale female maize farmers (Okpachu *et al*. 2014). The study concluded that education had positive effect on the agricultural productivity. In Nepal, one of the education benefits was increased productivity in wheat and rice production by 25% and 13% respectively (Jamison & Moock, 2004).

Duflo (2001) investigated the effects of investing in education in Indonesia. The INPRES program was implemented in Indonesia in the period 1974-1978. The president Suharto used oil money to

build almost 62,000 schools throughout the country. Duflo (2000) evaluates the effect of INPRES program on education and wages by combining differences across regions in the number of schools constructed with difference across cohorts induced by the timing of the program. She found that schools caused an increase in education and wages. The study also found that an extra year spent in school increased wages by about 8%. Kan *et al.* (2010) analyzed the effect of education on mortality in Taiwan. Taiwan in 1968 instituted compulsory schooling for 9 years. This led to an increase in schooling for both boys and girls. Infant mortality declined in the regions where education increased fastest due to the implementation of education reform. Such efforts were effective to improve education quantity since it resulted to an increase in enrollment rates.

2.2.3 Access to Water and Sanitation and Poverty

Access to safe water and sanitation is one of the key drivers to human development (UNDP, 2010). There is close relationship between poverty and access to safe water and sanitation. The impact of inadequate water and poor sanitation falls primarily on the poor (Akter & Jakariya, 2004). Access to safe water sources plays a critical role in poverty reduction. The availability of safe water and sanitation infrastructure remains integral for effective human productivity.

Lack of access to clean water and sanitation directly affects health and education outcomes. Access to safe water and sanitation not only impacts on individuals' health but also their education and economic opportunities (Fogden, 2009). This, in turn, may perpetuate a seemingly inescapable cycle of poverty. Health outcomes are affected through water and sanitation related diseases, stunting from diarrhea caused malnutrition and reduced life expectancy (Christopher *et al*, 2001). Lack of safe water, adequate sanitation and effective hygiene practices is pre-disposal to water-borne diseases. These diseases affect people's productivity and keep them out of the work-force and as a result keep them in poverty (Edelstein, 2013). Both unsafe water and poor sanitation are a major cause of child mortality. Diarrhea disease, usually caused by poor water quality, insufficient hygiene or inadequate sanitation, is the third leading cause of death among children under five (WHO, 2016). Repeated bouts of diarrhea lead to malnutrition. In sub-Saharan Africa, about 40 billion productive hours are lost each year due to fetching water (Human Development Report, 2006). The report further found that on average, women and girls in developing countries walk six kilometers each day to collect water. The time spent would otherwise be spent in school or at work. It's estimated that the world loses $24 billion in economic benefits each year due to time spent fetching water (The Millennium Development Goals Report, 2012). The report also shows that 72% of water collected in SSA is fetched by women. Households with private toilets experience lower morbidity rates than those without (Christopher *et al*, 2001).

2.2.4 Access to Infrastructure and Poverty

Ogun (2010) investigated the impact of infrastructural development on poverty reduction in Nigeria. He examined the relative effects of physical and social infrastructure on living standards (poverty indicators). The study used secondary data for the period 1970:1 to 2005:4 and the Structural Vector Autoregressive as data analysis technique. His study found that infrastructural development leads to poverty reduction. The study also found that social infrastructure explains a

higher proportion of the forecast error in poverty indicators relative to physical infrastructure. He concluded that poverty in the urban areas would drastically reduce through massive investment in social infrastructure in cities.

Good transport infrastructure is essential for economic growth and overall reduction in poverty (Duncan, 2007). Roads have a significant impact on poverty reduction through economic growth. Roads facilitate access to markets, travel to work-places etc. The world's poor population has been isolated from employment and economic opportunities, markets, healthcare and education due to poor infrastructure (Starkey & Hine, 2014). They argue that the poor face challenges to access markets and services since they lack basic infrastructure (paths, trails, bridges and roads) and access to transport services. They postulate the "rural isolation" phenomena where the rural people cannot effectively travel. Rural isolation is characterized by low agricultural productivity, poor health and low school enrolment. The low agricultural productivity is caused by poor market access and low use of fertilizers and modern agricultural technologies. High pre-natal mortality rates may be caused by poor infrastructure.

3.0 RESEARCH METHODOLOGY

Causal research design was used in this study. The study adopted a non-probabilistic sampling technique and in particular purposive sampling technique. The study used secondary data sources for analysis. The study used time series data for the year 2005 to 2015 for WDR and HDI from World Bank and UNDP respectively for Kenya. The data collected was in soft copy because the study used the secondary data collection method. The data was extracted from data repositories of the World Bank and UNDP. Data analysis involved both descriptive and causal analysis to answer the research questions. Inferential analysis used Ordinary Least Squares (OLS) Regression model in establishing the relationship between the dependent and independent variables

4.0 RESULTS

4.1 Correlation Analysis

Correlation analysis helps in establishing the degree of the linear relationship between two variables in correlation ranges between +1 and -1. The correlation between independent variables in the study was analyzed. The correlation analysis was to ascertain that the different indicators of the independent variables are correlated. In addition, it also looked at the correlation between the dependent and independent variables in the OLS model.

4.1.1: Pearson Correlation Matrix

Table 1 shows the correlation co-efficient between the dependent variable; poverty incidence and the dependent variables; prevalence of HIV, expected years of schooling, improved water source and roads paved of total roads. There was a strong positive relationship between poverty incidence and prevalence of HIV implying an increase in one variable corresponded to an increase in the other variable. Both expected years of schooling and improved water source had strong negative

relationship with poverty incidence suggesting an increase in one variable corresponded with a decrease in the other variable. Roads paved of total roads was weakly negatively correlated with poverty incidence.

Table 1: Pearson Correlation Matrix

	Poverty incidence	Prevalence of HIV, total	Expected years of schooling	Improved water source	Roads paved of total roads
Poverty incidence	1				
Prevalence of HIV, total	0.9168	1			
Expected years of schooling	-0.7478	-0.9441	1		
Improved water source	-0.9689	-0.973	0.8632	1	
Roads paved of total roads	-0.5824	-0.7569	0.7173	0.6756	1

Note: Significance level: 5% (*)

4.1.2 Health Indicators

Figure 1 below shows the correlation plot of the health indicators. There was strong correlation coefficient between the health indicators. Life expectancy at birth was negatively correlated with mortality rate, under-5 and prevalence of HIV with values -0.9972 and -0.9838 respectively. There was a strong positive correlation of 0.9925 between Mortality rate, under-5 and Prevalence of HIV, total.

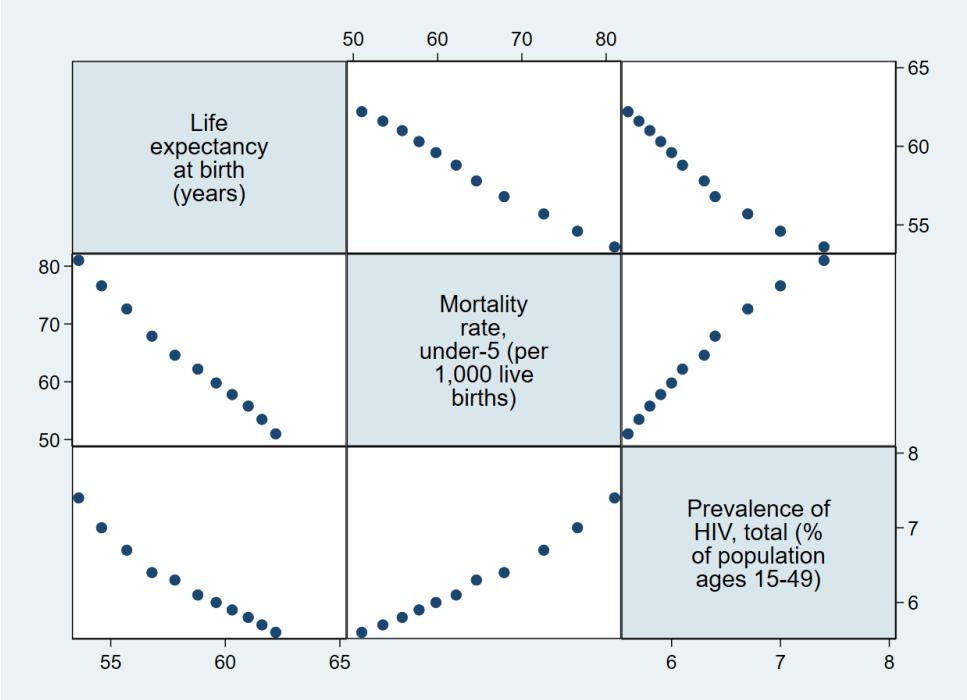

Figure 1: Correlation of health indicators

4.1.3 Education Indicators

Figure 2 below shows the correlation plot of the education indicators. Expected years of schooling and Mean years of schooling had a correlation coefficient of 0.8968. This shows a strong positive relationship between the two education outcomes. The strong correlation implies that the two indicators moved in the same direction over the period 2005 to 2015.

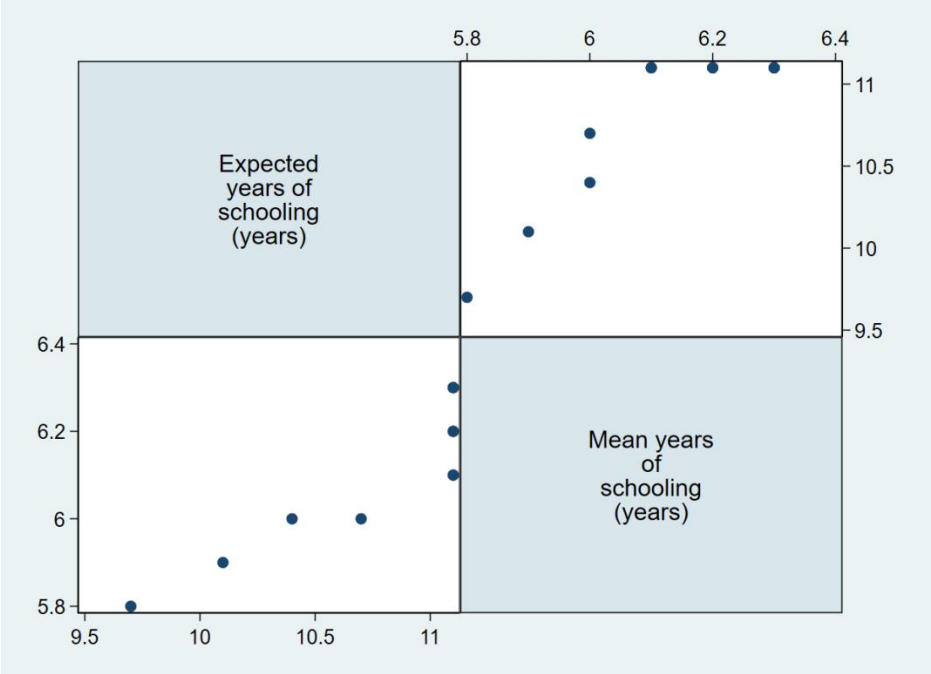

Figure 2: Correlation of education indicators

4.1.4 Access to water and sanitation

Figure 3 shows the correlation plot of the access to water and sanitation outcomes. The correlation coefficient between access to water and sanitation outcomes was 0.999. This shows a strong positive relationship between the two indicators. In other words, the two indicators changed in a similar direction over the period 2005 to 2015.

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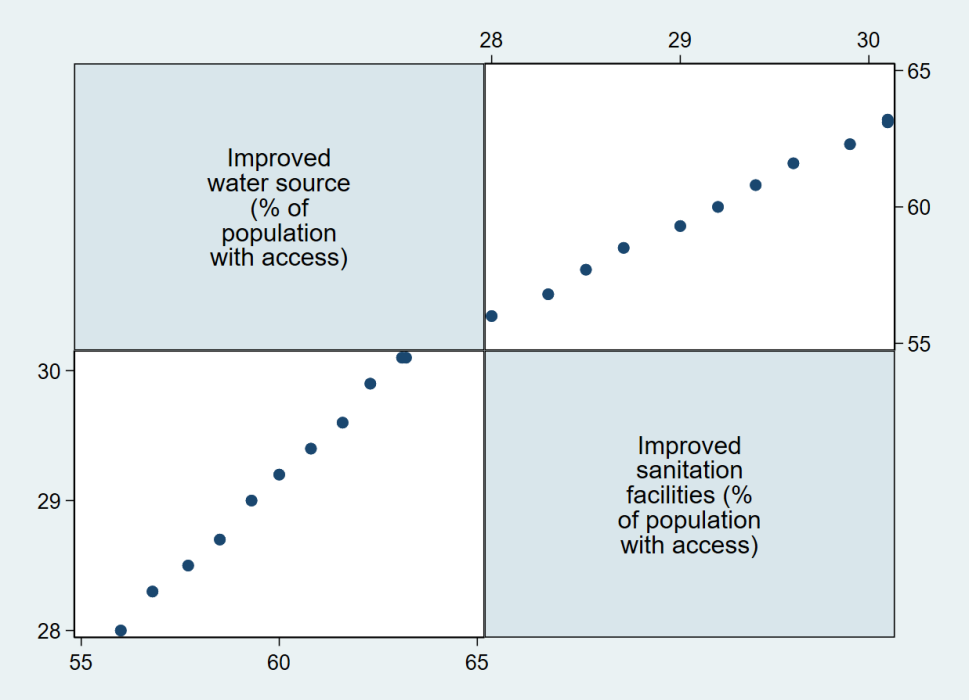

Figure 3: Correlation between access to water and sanitation

4.2 Multiple Linear Regression Analysis

Linear multiple regression was used in analyzing the relationship between human capital development and poverty in Kenya. Table 2 below gives a summary of the results of the linear multiple regression model. The R-squared and Adjusted R-squared were 99.6% and 99.3% respectively. This implies that 99.6% of the variation in the dependent variable can be explained by the independent variables included in the model.

The results from the multiple regression model shows that improved water source was the only independent variable that was statistically insignificant in affecting poverty incidence. Both prevalence of HIV and expected years of schooling were statistically significant at 1% level whereas roads paved of total roads was statistically significant at 5% level. Prevalence of HIV increases the likelihood of poverty incidence by 9.59%. Expected years of schooling and roads paved of total roads reduces poverty incidence by 5.68 and 4.75 percent respectively. While the results suggest that improved water source reduces poverty incidence, they were not statistically significant at either 1% or 5% or 10% significance level.

Table 2: Multiple Linear Regression Model

Source	SS	df	MS
Model	75.4968	4	18.8742
Residual	0.30367	6	0.05061
Total	75.8005	10	7.58005

Poverty incidence	Coefficient	Standard Error	t	P>|t|	95% Confidence Interval	
Prevalence of HIV	9.5882	1.5644	6.1300	0.0010	5.7602	13.4162
Expected years of schooling	-5.6814	0.7082	-8.0200	0.0000	-7.4143	-3.9485
Improved water source	-0.1008	0.2210	-0.4600	0.6640	-0.6416	0.4400
Roads paved of total roads	-4.7491	0.9524	-4.9900	0.0020	-7.0796	-2.4187
Constant	-153.8142	39.1882	-3.9300	0.0080	-249.7044	-57.9241

Number of obs = 11

F(4, 6) = 372.92

Prob > F = 0.0000

R-squared = 0.9960

Adj R-squared = 0.9933

Root MSE = 0.22497

The null hypothesis that beta coefficient of prevalence of HIV was equal to 0 (zero) was rejected at 5% level and the research hypothesis that prevalence of HIV had an effect on poverty in Kenya was supported. The positive sign of the coefficient implies a positive relationship between prevalence of HIV and poverty incidence i.e. prevalence of HIV increases the likelihood of poverty incidence by 9.59%. This result arrives at the same conclusion with previous studies such as Miguel and Kremer (2004), Sarah *et al.* (2016), Gallup and Sachs (2001), Bleakly (2006), Syed *et al.* (2006), Ochako *et a.l* (2011) among other studies that health outcomes impact poverty. The

studies find that reduction in poverty is achieved through improvement of health outcomes by reducing morbidity and mortality rates. In addition, the benefits are spilled over to education outcomes.

The null hypothesis that beta coefficient of expected years of schooling was equal to 0 (zero) was rejected at 1% level since the results were statistically significant at this level. The coefficient had a negative sign hence implying a negative relationship between expected years of schooling and poverty incidence. The model implies expected years of schooling increases the likelihood of poverty incidence by 5.68%. Past studies such as Angrist and Acemoglu (2000), Wedgwood (2007), Munir *et al.* (2009), Duflo (2001), Ozturk (2011), Darby (1996) among others conclude that education outcomes have both direct and indirect effect on poverty. This can be through increase in wages or improvement in health outcomes.

The beta coefficient of roads paved of total roads was statistically significant at 5% level i.e. the study rejected the null hypothesis that beta coefficient of roads paved of total roads was equal to 0 (zero). The negative sign of the beta coefficient of roads paved of total roads was positive. This suggests that roads paved of total roads reduces poverty incidence by 4.75 percent. This result that access to infrastructure impact positively on poverty is similar to that of past studies such as Ogun (2010), Duncan (2007), Seetanah *et al. (*2009), Kwon (2000), Varun and Rao (2015), World Bank (2002).

The results from the multiple regression model shows that improved water source was the only independent variable that was statistically insignificant in affecting poverty incidence. Therefore the study failed to reject the null that beta coefficient for improved water source was equal to 0 (zero). While the results suggest that improved water source reduces poverty incidence, they were not statistically significant at either 1% or 5% or 10% significance level. Some studies such as Patunru (2015), Pathak (2015), Mknodwe *et al*. (2013), Youngmee et al. (2017), Christopher et al, (2001) etc. found results that were statistically significant.

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

The study aimed at investigating the effect of human capital development on poverty in Kenya. The independent variables for the study include health, education, access to water and sanitation and access to infrastructure. The study used some indicators as proxies for health, education, access to water and sanitation and access to infrastructure. These include prevalence of HIV, expected years of schooling, improved water source and roads paved of total roads. The study revealed that there is significant relationship between human capital development and poverty in Kenya.

Prevalence of HIV had a statistically significant positive relationship with poverty incidence in Kenya. Health outcomes such as prevalence of HIV that result to morbidity and mortality tend to increase poverty incidence. This is because the human productivity of an individual is affected due to the effect of diseases on the psychological and physical mechanisms of the body. The population

becomes less productive therefore negatively impacting on the welfare. Health outcomes positively impact on education impacts too hence have indirect impact on poverty.

Expected years of schooling had a statistically significant negative relationship with poverty incidence in Kenya. High levels in expected years of schooling corresponded to low levels of poverty incidence. Poverty incidence is decreased with improvement in education outcomes such as expected years of schooling, mean years of schooling, literacy and numeracy rates etc. Higher years of schooling increases the likelihood in participation in the labor market, and with participation in the labor market may result to high wages hence decreasing poverty incidence. Improvement in education outcomes may also lead to improvement in health hence affecting poverty indirectly.

Improved water source was found not to have a significant relationship with poverty incidence in Kenya. Even though past studies suggest that improved water source and sanitation are negatively related to poverty incidence, this study didn't found statistically significant results. However, the coefficient did indicate a negative relationship between improved water source and poverty.

Roads paved of total roads was found to have had a significant relationship with poverty incidence in Kenya. The relationship was negative suggesting that increase in the roads paved corresponds to lower poverty incidence. Access to infrastructure increases mobility of human beings, therefore, impacting on health and education outcomes. It also leads to increased access to markets. Such effects have a positive impact on welfare and as a result, reduce incidence of poverty.

5.3 Conclusion

The study aimed at establishing the effect of human capital development on poverty in Kenya. This study focused on health, education, access to improved water and sanitation and access to infrastructure as ways to improve human welfare through reduced poverty incidence. Most of the variables were statistically significantly related to poverty incidence in Kenya with an exception of improved water and sanitation source. This suggests that development of human capital can lead to decrease in poverty incidence in Kenya. Therefore government and its development partners need to design policies that help in improvement of human capital outcomes as a means of reducing poverty in Kenya.

5.4 Recommendations

Mortality and morbidity still remain high in Kenya and as a result impact on human productivity. The study results found that poverty is related to health outcomes therefore recommending the need to improve health outcomes in order to reduce the incidence of mortality and morbidity. Since Universal Health Coverage and food security are among the pillars of the Big Four agenda, the policy framework can benefit from the findings of the study by having evidence based on the study. Food and nutrition security have positive effect on health and education outcomes hence an indirect effect on poverty incidence in Kenya. These agenda can find a solid basis on the results of this study. Reduction in morbidity and mortality will lead to increase in labor force participation.

The study recommends improvement in education outcomes with the aim of alleviating poverty in Kenya. Since poverty was poverty negatively correlated with poverty, the government and its development partners should design interventions that aim at improving education outcomes. This will in turn improve welfare of poor individuals through increased wages and positive externalities on health outcomes. Both attendance and literacy are critical aspects of education outcomes hence the need to have a quantity-quality trade-off.

The study also recommends increasing access to improved safe water and sanitation. While the study didn't find statistically significant results on the access to improved safe water the coefficient suggested a negative relationship between poverty and access to improved safe water. This is a motivation for exploiting the potential role played by access to improved safe water in alleviating poverty.

There are several benefits accrued to increased access to infrastructure. Human mobility is critical for economic growth and development. Mobility affects other outcomes such as health and education hence the need to improve access to infrastructure. The study recommends improvement of roads and other infrastructure as one of the channels of reducing poverty. Ease in connectivity facilitates easy communication and economic activities such as trade.

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